Gender in Science and Engineering: Validating an Institutional Development Model[1]

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Abstract

The present paper explores the mechanism of production and reproduction of gender and gendered processes in natural science and engineering domains at the university level. It starts with an overview of some policies on gender in science and technology in Europe followed by a theoretical approach to the impact of the 'default' or 'hegemonic masculinity' on study paths of young women in science, engineering and technology (SET). Some comparative statistical data are introduced presenting the proportion of female students and graduates in these fields, and illustrating the situation both in Western and Eastern European countries. Having as references a pool of strategies and policies proposed by two European projects, the aim of the empirical study was to investigate the validity of an institutional development model for encouraging women in science and engineering in a higher education institution in Romania. Six dimensions of the previously elaborated model have been closely examined, namely: institutional statistics, recruitment opportunities, institutional image, career development, teacher training strategy and curriculum development, using qualitative research methods, i.e. sixteen semi-structured interviews and two focus groups. The results indicate that despite mapping an apparent gender neutral environment, there are gender biases operating at various levels; and furthermore an efficient strategy in the investigated context again should be gender neutral to be really accepted and effective.

Introduction: European policies on gender in SET

A continuing issue in Europe and in the United States is women's underrepresentation in science and engineering (Adelman 1998; Kohlstedt & Longino 1997; Lane 1997; Wächter 2005). Moreover, at a time when technology seems to be playing an ever increasing role in society, a low interest in science and engineering has been noticed. In Europe, beginning in the 1990s and more acutely in the past few years, there has been an urgent

need to substantially increase the number of students in science and technology and more specifically young women entering science and engineering studies, and to support their future careers. As the Lisbon Agenda 2000 seems to indicate, Europe needs more researchers to achieve scientific and technological excellence and to reach the goal of becoming the most competitive and dynamic knowledge economy by 2010. As women are currently under-represented in the field of scientific research or in technology, the European Commission is promoting measures specifically aimed at encouraging women to take part in European research. The efficiency of these measures located only at the university level, however, may be disputed, professional images that are not highly regarded and research or industry's hostile environments being mentioned as key factors affecting the low retention rate of women in these fields.

With the growing awareness of the under-representation of women in the scientific community, technology and engineering, there is a real need for new policies and strategies, yet there is a debate about what and how they should be proposed or even imposed. The discussion topics vary from quantitative objectives like quotas or positive action, such as changing the culture of universities, industry, research, and development sectors to positive discrimination measures. Moreover, it is argued that higher education, government and industry should have an imperative for equal opportunities and female-friendly climate.

European Technology Assessment Network on Women and Science has been created in 1999 having the main aim promoting excellence through mainstreaming gender equality. Its priorities have been formulated in the following terms: women's participation must be encouraged—supporting research by women; research must address women's needs—more research for women should be designed; and research must be carried out on the gender question itself—research about women should be promoted (ETAN 2000).

The European Platform for Women Scientists (EPWS 2006) has been launched recently, in order to build a structural link between women scientists and research policy makers. The aim is to introduce a new key strategic actor into the research policy debate by making the voice of women scientists heard, but also linked to education, industry, and research and development. At the same time, the platform aims to make women

scientists better understand the role they can play in the research policy debate, and the way they can fully benefit from these opportunities by bundling their powers and forces. The aim is also to promote the understanding of the gender issue in science, as well as to promote women scientists from all disciplines. The main characteristics are: focus on understanding of the gender issue in science; open to any women doing research in any discipline taught at university level; and especially dedicated to women scientists working in engineering and technology.

Gender construction in science, engineering and education

Gender might be defined as a constructed concept referring to the social differences between women and men that are learned and changeable over time, and have wide variations both within and between cultures. How does the issue of perceived gender relate to science and engineering in various cultures in Europe? Is it possible to generalise and to identify patterns which might be applicable to very different contexts? This is obviously a difficult issue, and to differentiate between East and West seems to be as inadequate as making reductions and ignoring the specific traditions within Europe. Nevertheless, one of the next sections will present the Romanian experience in constructing gender during the communist period and also today.

Engineering, technology and science can be considered gendered in at least three ways. First, gendered structures are visible in gender difference in the division of labour and in the work styles of women and men in all these domains. Second, the symbols and images of engineering and science knowledge and practice are gendered through cultural associations between masculinity and technology. And third, individual scientists and engineers have gendered personal and professional identities and experiences (Faulkner 2000; Harding 1986).

Central to stereotyping engineering or science is the explanation of cause-effect, a perception that has been called 'binary thinking' or the 'hard-soft' dualism (Faulkner 2000) in the literature. Stereotypical images

of science and technology seem to have obvious connotations with the masculine sides of dualisms such as hard – soft, abstract – concrete, people-centred – technology-centred, mind – body, rationality – emotionality. Gender dualism is observed in science, engineering and technology in various aspects: rationality (objective and subjective), problem solving strategies (empirical or abstract) or emotional aspects (detached or connected), thus, it should be attempted to define the culturally constructed images of these practices as both male and female domains. While accepting the differences between the 'feminine expressiveness' and 'masculine instrumentalism', it is important to change the image of 'default masculinity' (Paechter 2006) or 'hegemonic masculinities' (Lohan & Faulkner 2004) considered predetermined for these fields, and to reflect on strategies to gender inclusiveness in these domains.

Engineering study is considered a more gender-segmented field than any of the natural sciences. As Adelman (1998, 61) argues: 'One of the problems in the traditional literature is that the analysis of sex differentials and inequality in scientific careers is grounded in the sociology of academic science, not the practice of engineering'. It is argued that the culture of engineering is more a culture of industry, and then it is reasonable to assume that when the experience of women in industries where they are a distinct minority seeps down to undergraduates, then women's low representation or even migration from engineering programs is no longer surprising. Women engineering students seem to be more successful in classrooms than in the laboratory (Adelman 1998; McIlwee & Robinson 1992); moreover, it is argued (Adelman 1998; Felder et al. 1995) that within small cooperative working groups their work and contributions seem to be undervalued.

Generally speaking, some trends in Europe confirm the hypothesis that applications for natural science and engineering studies are in decline in Europe. Moreover, the drop out rate of science and engineering students also seems to be high. In general, choosing a natural sciences specialisation (like mathematics, physics or chemistry) or an engineering path might be problematic nowadays in Romania, as statistical data and our interviews showed. For example, neither young women nor young men will choose engineering for special reasons (vocation, interests, high status or positive

image)—except possibly those having the right models of what a real engineer is—unless universities can reach out to potential students and society as a whole, with an elaborated and drastically changed portrait of a new culture and practices associated with it. Under these conditions, this might be the only real reason for attracting more prospective students. Technical studies and careers should be presented and perceived as describing an 'object world' or a 'social world' of engineering (Bucciarelli & Kuhn 1997), and then it should be clear that women belong to this reality. The culturally constructed relationship between masculinity and engineering seems to be viewed as an important factor in explaining young women's lack of interest in science studies (Faulkner 2000). Another important point to consider before looking at the barriers women face in science and engineering disciplines is the argument that women know they are not welcome in these disciplines, and therefore do not pursue a career in this field.

The identification between masculinity and technology is seen as the main reason for this lack of interest for engineering professions (Faulkner 2000). Harding (1989) has observed that one reason for few women entering the science and engineering professions is the negative image associated with them. The image of science and engineering is often described negatively and studying engineering is equated with being first a man, and then a nerd (not a very attractive person dedicated to a predominantly non-social occupation), super engineer-nerd, nerd-boy (Brush 1991; Phipps 2002; Tonso 2006; Walker 2001). Identity production is a complex process that involves thinking about oneself as an engineer, performing an engineering self and ultimately being thought of as an engineer. Talking about constructing or enculturating male and female identities of engineering students, Walker (2001) refers to Castells' model of identity building using the categories: 'legitimising, resistance and project identities' (Castells 1997). Strategies for empowering women in SET refer to the construction of subjects or redefining subjectivity by (women) 'project' identities. Having specific and effective models available, young women's choices for a career in these fields might increase significantly.

Jonsson (1999) explores sex segregation with regard to the choice of type of education, or educational programme. In order to explain this phenomenon, the author proposes a rational choice model focusing on sex-specific

comparative advantages in different fields of study like science / technics and care / nursing. Such relative advantages in sex-typical areas of study are hypothesized to influence educational choices through their effects on the expected probabilities of success in different study programmes.

Investigating students' choice of engineering, Anguelova (2001) found that the factors of motivation for an engineering study path are mostly external for female students and internal for male students, and although the projection of their future goals, aims and ambition seems to be similar and not very well defined, male students' ideas about their future are more clear and concrete, corresponding with their aims and stronger interest. Accordingly, it is suggested that universities and school programmes should address the developmental issues and encourage students in understanding the reality of the science and engineering world. Of course, encouraging as many students—male and female—as possible to engineering or science fields is a desire for many institutions or national education policies, but it should be accepted that ultimately individuals have to choose their field of interest. It is true that one can encourage, but ultimately individuals have to choose one domain or another and it also depends on other variables, such as the image and prestige of these professions, the future employment opportunities and the overall social, economic and technical trends.

Related with organisational theory, the production and reproduction of gender and gendered processes could be investigated in different ways (Mählck 2001); on the one hand, it is interesting to investigate how the mental structures determining how people think about gender and implicitly gender dichotomies are constructed, and on the other hand, how agencies, structures and processes through which gender is put into practice are implemented. As already stated, various measures have been promoted in different countries, both at the level of policies and practices. Also, a significant number of scientific projects across Europe are focussing on strategies to overcome the low representation of women in some areas like science, technology and engineering.

Analysing two of these projects: (1) *Creating Culture of Success for Women Engineers* (WomEng 2006), and (2) *Gender Equality in a Wider Europe—Women Scientists in the Central and Eastern European Countries and the Baltic States* (ENWISE 2006), the empirical section of the present paper investigates

how the envisaged recommendations or policies designed for the academic sphere or universities are received in a specific institution in Eastern Europe, more precisely in Romania.

The *WomEng* project has been designed to compare training degrees in engineering in Europe; analyze professional positions of women engineers; evaluate the process of recruitment of women engineers; and investigate existing innovations which make engineering programmes desirable for female students. The main research question was 'What should be done for enhancing the number of women in engineering studies and professions?'. The *Enwise* project, addressing mainly the issue of women scientists in the Central and Eastern European countries and the Baltic States, was oriented towards identifying existing and relevant statistical data for Eastern Europe and designing recommendations for increasing women's participation in European Community programmes.

The reports of these projects reveal major differences in perception of gender related issues between the Western and Eastern countries. Even though it has not yet been acknowledged, there are significant discrepancies not only in numbers—at the quantitative level—but also at the qualitative level: in mentalities, opportunities or, generally speaking, in socio-economic contexts. Western countries are constantly proposing measures to increase and support women's participation, whereas people in Central and Eastern Europe take different positions between the two extremes: from no concern for the issue of women in science, technology and engineering (due to a relatively high representation and previous explicit policies for getting women into SET during the communist period) to an exaggerated attitude, sometimes blaming the values of democracy that brought major problems in relation to unemployment, wages or socio-economic conditions for women in these domains.

The recently launched European Platform of Women Scientists already mentioned (EPWS 2006) appears to have only one female representative from Eastern Europe. It might be only a fact, but meanwhile it seems to be a trend in associating the unproblematic and so-called high representation of women in Eastern countries as a fact which automatically gives perspective for future and better employment. The next section presents some statistical data illustrating several quantitative differences between selected European countries.

Some quantitative data on female students and graduates in Europe

Three different sets of data are presented in the current analysis: (1) total percentages of female students and graduates in tertiary education; (2) proportion of female students and (3) female graduates in two specific fields, (a) Science, Math & Computing and (b) Engineering, Manufacturing & Construction. The analysis is based on the 'Education for All Global Monitoring Report 2005—The Quality Imperative' published by the United Nations Educational, Scientific and Cultural Organisation (UNESCO 2005).

Table 1. Percentage of all female students and graduates in tertiary education

Country	students %	graduates %
Austria	52.7	51.5
Belgium	53.1	56.7
Bulgaria	54.0	57.7
Finland	54.1	61.1
Germany	48.5	52.2
Hungary	55.3	60.5
Latvia	61.5	69.4
Poland	57.9	64.9
Romania	54.4	57.4
Slovenia	57.5	59.4
The Netherlands	50.7	55.4
United Kingdom	55.2	56.5

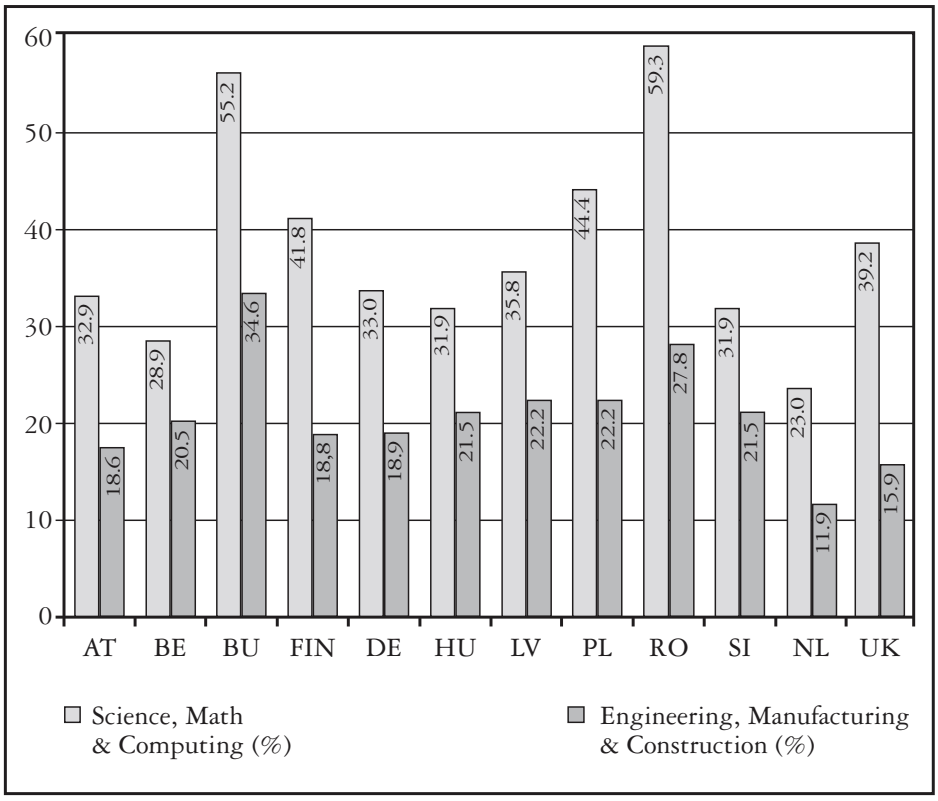
Table 1 presents the total percentages of female students and graduates corresponding to tertiary education, in selected European countries. These types of education, not necessarily referring only to universities but also post-secondary education institutions, are theory-based as well as vocationally

oriented, and are designed to provide sufficient qualifications for entry to advanced research programmes and professions with high skill requirements (OECD 2006).

While Europe shows a positive overall trend in increasing the number of female students and graduates, women remain underrepresented in science, technology and engineering jobs, and especially in leading positions in these fields (European Commission 2006).

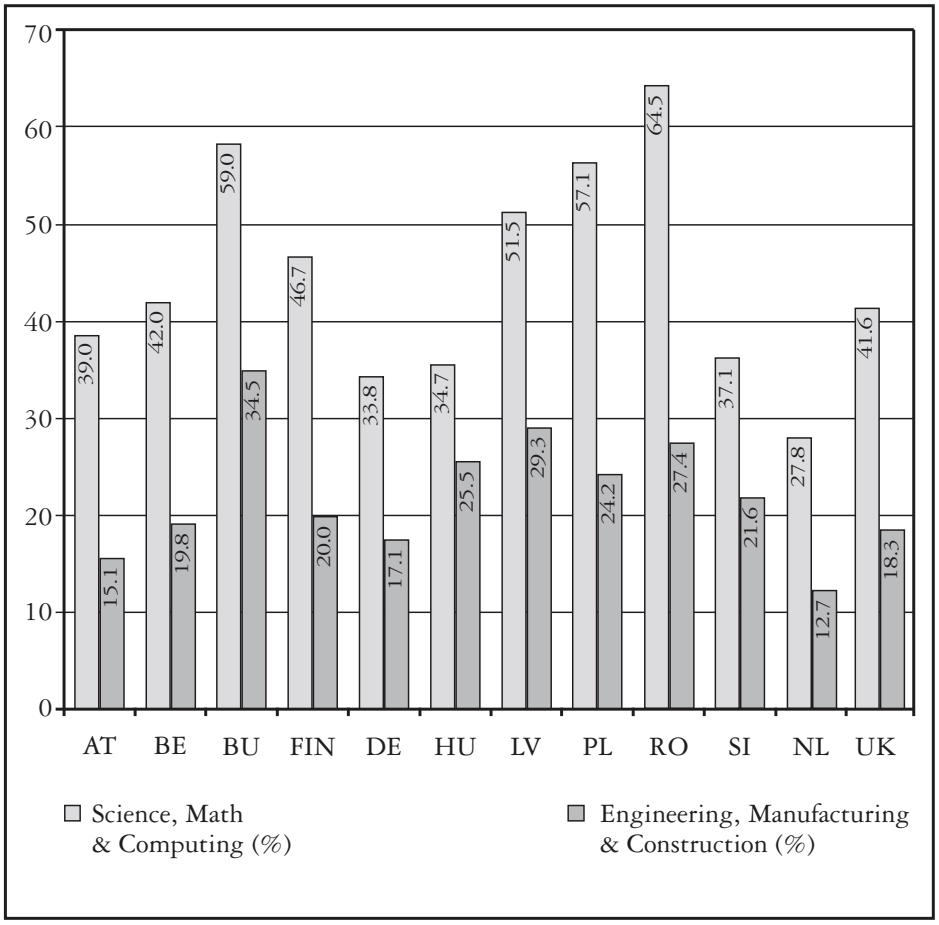
Figures 1 and 2 compare the percentage of students and graduates in tertiary education in (a) Science, Math & Computing and (b) Engineering, Manufacturing & Construction, in the same countries, based on recent data (UNESCO 2005).

Figure 1. Comparative statistics—percentages of female students in tertiary education



The statistics reveal that the proportion of female students in some countries in Central and Eastern Europe is significantly higher than in some Western European states. Romania has the highest rate of female students and graduates in science, mathematics and computing, and a relatively high one in engineering, manufacturing and construction. One could ask how relevant these quantitative data are and what impact a qualitative analysis of the social, cultural and economic realities may have. Some answers, referring to the Romanian case are presented next.

Figure 2. Comparative statistics—percentages of female graduates of tertiary education



Women in science and technology—the Romanian experience

During the communist period, it was a clearly stated priority in all states of the Eastern bloc, including Romania, that women should be brought into technical higher education and later employed in technical professions as engineers or researchers. In terms of quantity (as a quota) this policy was successful, but what about the quality aspects, such as advancement policies, payment and prestige, or with how much effort and what kind of support?

By and large, the so-called 'Eastern communist mentality' regarding women's involvement not only in science or technology but as full employees can be described in a context where everything was an imperative, by inculcated values that women are able to succeed, so they should be given the chance. Women were also offered support (childcare facilities and sometimes flexible study or work schedules), but they were still responsible for the household. Women in Western societies have been, and possibly still are underrepresented in science and technology for the major reason that only few women were given the training or opportunity, and also because there has not been an urge to pursue such a career, or just to be the second breadwinner in a family. This invoked a society that has not empowered women in the West, while in the East to be employed as a woman was perceived as an urge and to be employed in science and technology, a real demand.

When speaking about differences, some dilemmas should be discussed, not necessarily comparing East vs. West. More important is the process of understanding the cultural differences and thus the mentality and socio-economic characteristics in the East and, more accurately, connecting the two different periods, communism and transition, and evoking their impact on society. The following two questions will be illustrated by the specific features of the Romanian reality: (1) Are there any stereotypical images of Eastern European women?, and (2) Are the women in these contexts aware of their position, existing gender differences, or gender sensitive issues in their societies? An eloquent picture of contradictions and paradoxes is expressed using the antithesis between the apparent independence and professional activities of women and the relatively conservative gender patterns

which still dominate the Romanian mentality. These are relevant when considering the everyday struggles of women in science and technology, not only in Romania, but we should be aware of the specific meanings of concepts like representation, involvement, activism, shared responsibilities or even feminism in post-communist contexts; they have not the same connotations and sometimes these differences are not very well known in Western societies.

In understanding the Romanian context, we will locate the analysis in two periods: the communist era between 1945 and 1989, and the transition period of more than 16 years, the era of so-called 'wild capitalism'. There are a few steps and phases which should be pictured as indicating the legacy of the communist past, namely the low industrial development before 1945; the great emphasis on transforming society when all people, regardless of sex and race, were considered equal politically, economically and socially. All those capable of working in the paid labour market should work, and women explicitly should work in order to pursue the aim of social transformation, which was active participation of all in the labour market. The aim of industrialization was providing workers with better living standards, building industrial combines as well as small industrial enterprises which were not always profitable, providing free education and the possibility / obligation to take a designed job associated with future rewards.

The shift of the transition, starting in 1990, brought the emergence of new contradictory statuses and roles for all people, and sometimes women had more difficulties adapting to these transformations. Rebuilding the democratic system, and reshaping the values and norms have also been difficult tasks for the Romanian society. Transition to market oriented economies sometimes created unexpected problems for people who were not prepared for assuming active roles, relying as before, only on state support. These problems were mainly connected to the lack of stable jobs, competition and unemployment, which led to various phenomena such as poverty, aging, decreasing fertility rate, brain drain.

There have been and still are problems in reshaping institutions; the 'institutional vacuum' issue should be addressed, and it requires radical attitudes, responsibilities and skills to be learned. Of course, policies have been proposed like promoting equal opportunities, anti-discrimination measures and so on, but have produced no significant results so far.

One can ask how the reality for women has changed during the transition period. Two levels should be mentioned here: changes regarding the roles of women as paid workers / mothers (reshaping the career-family balance), and new opportunities for women as equal actors in various domains of society. Yet, there are no uniform paths regarding these two aspects, and there still is no coherent public mainstream discourse in terms of gender impact or gender policies for supporting women in science, engineering and technology. Of course, it is expected that the developments at the EU level and the process of harmonisation of policies should make room for public debate in relation to gender and bring effective practical reforms to empower women in science, engineering and technology.

Method, results and discussions on gender issues in science and engineering

The present article reports the results of a qualitative data analysis in relation to the changing organisational culture of two faculties of a Romanian university towards a more sensitive environment for empowering women in science, technology and engineering.. The comparatively new university—transformed in 1990 from a vocational institute (similar to a present University of Applied Sciences) into an academic higher education institution offering more than a hundred specialisations—is located in western Romania and offers undergraduate, graduate and postgraduate programmes for more than 8000 students.

The main focus of the present study was on two types of faculties with several specialisations: (1) *Faculty of Electrical Engineering and Information Technology*—(1a) Electrical Engineering; (1b) Electronic Devices, (1c) Computer Science, and (1d) Electronics, and (2) *Faculty of Natural Sciences*—(2a) Mathematics, (2b) Informatics, (2c) Physics, and (2d) Chemistry. The proportion of female staff is currently 41.6% in the first faculty and 49.3% in the second one. The distribution of female teaching staff at the Faculty of Electrical Engineering and Information Technology is: 18.8 % female full professors, 50% senior lecturers, 57.1% junior lecturers, and 42.8% assistants. The corresponding percentages for the Faculty of Natural

Sciences are: 23.5% female full professors, 45.4% senior lecturers, 48.7% junior lecturers and 39.2% assistants. While the Faculty of Engineering has 16.6% female students, almost 75% of students at the Faculty of Natural Sciences are women.

The first step in the empirical investigation of a more complex project designed to reveal educational measures for empowering women in science and technology has been previously reported (Chioncel 2006) and revealed a tentative model for reshaping organisational culture and climate in these two faculties. In this previous exploratory research the main goal was to investigate how valid the measures and directions of the two international projects *WomEng* and *ENWISE* are for the faculties of engineering and natural sciences. The present data report the next step, namely the results of a trial on validity and reliability of the previously elaborated model for institutional development (Figure 3). The specific research questions are: (1) Is this model a viable and a realistic one for organisational change in your faculty and university?, and (2) What exactly should be done (for a gender sensitive strategy) to promote envisaged organisational change in your faculty / university? The reason for excluding the gender references was to avoid previous experiences when quite a significant number of both female and male interviewees were astonished by the fact that researching gender in SET has a higher priority than other more relevant problems in the current situation. Some basic findings from the previous phase of the research work should be mentioned here in order to understand the model and the present methodology:

- No gender specific discourse has been revealed in analysing the university as an organisation;
- The perception of the environment is closer to a 'gender neutral' one;
- The overall trend indicates there is no need to raise gender related issues, but rather more relevant ones: student recruitment, research facilities and access to resources;
- The findings of the two EU projects were considered interesting, but a detached attitude is nevertheless expected—as a professor said, 'there is no need to create arbitrary issues if they don't exist'.

For testing and analysing this model, at the current stage of the research, the following methodological approach was proposed:

(1) Interviews with 16 respondents employed at the university: 2 full professors, 2 senior lecturers, 2 junior lecturers, and 2 assistants (per category one male, one female / faculty).

(2) Two mixed focus group interviews with teaching staff, one per faculty, each gathering 6 academics (1 professor, 1 assistant, 2 senior lecturers and 2 junior lecturers).

The semi-structured interviews were designed to validate the data obtained in the previous stage and focused on the following dimensions: (a) Women and science, technology and engineering at the national and European level; (b) University policy regarding gender issues; and institutional development. For the two focus groups—organised in line with the requirements in the field (Chioncel et al. 2003)—the aim was to discuss the model presented in Figure 3. Table 2 shows the main results, analysing the differences between the two faculties.

Figure 3. Strategies for university development in relation to the gender issue

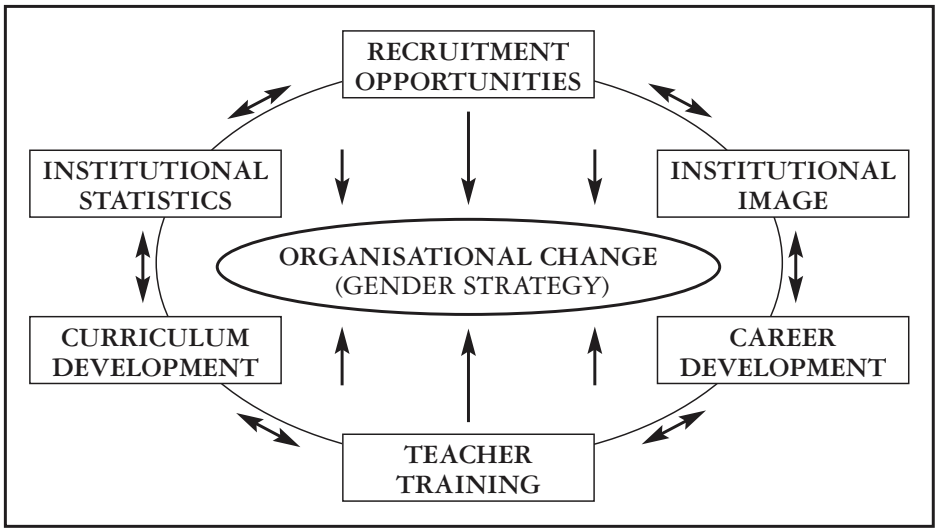


Table 2. The specific dimensions on focus group data in two faculties

Faculty of Electrical Engineering and Information Technology	Faculty of Natural Sciences
- More optimism in tackling the issue of faculty development, acknowledging the gender approach as a starting point; - Micro- and extensive approach to each of the domains, efforts in building and operationalising a coherent strategy; - The category 'career development' was analysed intensively, and obviously considered very relevant for faculty, the second one being 'recruiting students'; - A positive tonus and readiness to implement the measures in order to create better opportunities for staff and students; - Establishing a 'community of practice' and action, involving other staff members to implement the current project.	- More concerned about the organisational aspects of maintaining the faculty due to specific problems (e.g. lack of students); - A macro-perspective was revealed, accompanied by difficulty to go in-depth and to develop strategies for each domain; - Apparently, the main focus was on finding strategies for student recruitment, but gradually they were replaced by finance and research facilities; - A relatively sceptical attitude towards the effectiveness of possible implementation of the specific measures for solving the real problems of the faculty; - Deliberating in a more formal context about the opportunity to follow these measures for faculty development.

A general aspect, also observed on previous occasions, is the lack of knowledge about and experiences with the 'national' or 'European policies' on gender, for example the gender mainstreaming policy. Another important point which has been proposed and extensively discussed in both focus groups was the necessity to establish a partnership between schools – university – industry – research. We might consider this aspect as the main achievement, at least for the natural science focus group, that might be seen constructive but still reticent concerning the relevance of gender issues for faculty development. Analysing the data obtained through the focus groups the following strategies were identified and grouped into new domains: (1) institutional statistics; (2) student recruitment, including

two former categories: recruitment opportunities and institutional image; (3) staff development, including career development and teacher training; and (4) curriculum development. The various strategies and recommendations were combined to be suitable for all faculties.

(1) *Institutional statistics* proposes the introduction of both quantitative and qualitative dimensions for monitoring gender equality in teaching and research. These quantitative dimensions are: number of male and female student applications; female and male student admission rate; female and male faculty applications; female and male faculty appointments; male / female student proportion; male / female faculty / department proportion; academic, administrative, managerial positions (rates male and female); promotion scale (duration of years in each position) per gender. The qualitative dimensions refer to participation of staff in gender equality programmes; gender sensitive curriculum proposals; interdisciplinary curriculum proposals; and gender distribution of application for research funds.

(2) *Student recruitment* refers to establishing a partnership with educational institutions, especially with high-schools; proposing programmes on science and engineering for kids and teenagers, in partnership with other institutions; promoting creatively the university, faculty and specialisations and implicitly reshaping the image of engineers or scientists; organising open days at the faculty and laboratories; developing partnerships with industry and research companies for future student placements and employment; redesigning the website and promotional materials presenting faculties not only as being gender neutral but also 'gender sensitive'.

(3) *Staff development* refers to the following aspects: career support for all (women especially); creating child care facilities; maintaining a gender neutral atmosphere; introducing mentoring for young staff members; develop specific training courses for teaching science and engineering; initial and continuous education of students and teachers for gender inclusiveness in science and technology; including gender mainstreaming dimensions in research projects; promoting better facilities for research and development.

(4) *Curriculum development* envisages measures like: re-evaluating the whole study offer; changing the traditional mono-disciplinary curriculum; introducing interdisciplinary subjects into the curriculum; proposing gender-sensitive aspects in suitable disciplines; developing a special module on social and economic disciplines; proposing courses on entrepreneurship, diversity, intercultural education, social psychology, sociology and history of science and engineering; developing a course on project management; encouraging creativity and critical and innovative thinking; proposing project-oriented activities and valuating students' team work; introducing team-teaching in some subjects.

Conclusions and reflections

Considering the theoretical perspectives, policies and projects in SET and the present empirical study, it is possible to make a few concluding remarks about the realities and potential of the gender issue in one specific context of a university in Romania. Extending the conclusions to other realities might be problematic, not only because of the specific characteristics of the higher-education institution and faculties selected but also due to the research design and qualitative methodology, including particularities and openness of participants in interviews and focus groups. More valuable than extrapolation of the findings is the potential of the results for predicting the future developments of such projects in the situated context, for shaping some recommendations for future research and for underlining potential avenues for introducing gender-oriented debates and concrete actions at the university level.

Generally speaking, the empirical evidence collected through interviews and focus groups has been relevant in terms of developing potential strategies for two faculties preparing future engineers and possible researchers in exact sciences, even the so called 'agenda on gender' was not fully accepted as a relevant starting point. Nevertheless, by proposing a 'not-so-visible' agenda on gender issues; some very important problems in relation to institutional development have been explored, namely (1) introduction of institutional statistics; (2) proposing creative strategies for student recruitment; (3) creating more opportunities for staff development and (4) initiating

concrete strategies for curriculum development in natural sciences and engineering. Some final remarks may be of value for future investigations. Despite mapping an apparent gender neutral environment, there are gender biases operating at various levels in university. In this context, an efficient future strategy related to empowering women in SET should be apparently 'gender neutral' to be really accepted, followed and effective. The issue of gender is not about engineering or science only; not about women only and not to be solved by women only. Depending on the envisaged actions and future initiatives, there are chances to succeed in improving the institutional context of the faculties, bringing significant changes not only for women or academic staff but also for all actors of the academic community.

Note

[1] This paper is based on the preliminary results presented at the 5th Annual IAS-STS Conference *'Critical Issues in Science and Technology Studies'*, 26–27 May 2006, Graz, Austria, published on the Conference CD and selected for the Hungarian website on 'Knowledge-based society' http://www.tuastars.hu.

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