How Women in leadership positions in science and technology can contribute to change gendered organizational cultures in universities

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INTERNATIONAL SYMPOSIUM on GENDER EQUALITY IN THE ACADEMIA:
BEST PRACTICES
Commemorating the 100th Year of Women in Higher Education in Turkey
6-8 November 2014
Karaköy Minerva Palace, Istanbul

Introduction

- **Networks and network awareness influence the success of leading women as well as men** and their potential for organizational change. **Gender awareness** as a necessary factor for organizational change to gender equality is normally only relevant for women. The paper will analyze how gender is intertwined in leadership positions and options in different organizations for science and engineering.

- The paper is based mostly on the German cooperation project “The impact of women scientists in leadership positions. Power and organisational cultures in engineering, science and environmental organisations” (1). It has been based on former European Commission projects in which I have been engaged.

- **Aim of this part of paper is to demonstrate how leading women in SET academia (can) use their gender and networking awareness for organizational change and which hindrances they meet**

- **Second part of paper is focused on SET education and measures to change gender segregation in choice of degree courses and SET careers**

- This part of paper is based on results from European project Womeng (2002 to 2005) and on a study by CEWS for the Gemeinsame Wissenschaftskonferenz (GWK 2011)

- (1) This project has been done between the University of Wuppertal and the Wuppertal Institute for Climate, Environment and Energy from 2009 to 2012 and was funded by The German Ministry for Education and Research together with European Social Funds. Researcher for the university were Ulla Hendrix and Christine Schreiterbrunner.
Overview Part one: female professors

- Understanding of organizational change
- Project success and output orientation as priorities in science organizations
- Work-family-balance as part of work organisation
- Cooperation and competition as necessary for successful projects
- Genderedness of mentoring as network introduction
- Awareness about the importance of informal networking/networks
- Awareness about women not fitting in networking/networks
- Women’s networks in academia
- Importance of women’s own networks

Understanding of organizational change

- Organizational structural and cultural changes to gender equity
  - Changes in management priorities
  - Reduction of barriers against organizational change
  - Change of traditional masculine organizational cultures (performance criteria, working time arrangements)?
  - Transformation of gender stereotypes
  - Developing measures for furthering gender equity
Project success and output orientation as priorities in science organizations

- Entrepreneurial change to stronger economic output orientation which demands a working culture of total dedication to work and availability
- This work culture is also the situation for the researcher staff, because division of labor between leading researchers and researchers changes too
- As one younger professor in governmental research organisation put it:
  - “Output is what counts. But until now the output was not measured and now I focus it. This is the difference, which is difficult for some employees… Until now the output was not controlled. I change it. Now all acquisitions go over my table and therefore I know who is working in which amount.” (female professor in a university and leader in a research institute)
- So, expectations to researchers are:
  - being motivated to growth of the institute as if they would work self-employed and
  - acquire funds themselves

Work-family-balance as part of work organisation

- Leave earlier and continue working at home as modern success strategy in science organizations
- “And the duty to be at the workplace... Many leave after noon because they have to catch their children, and they continue working in the evening. That is very flexible.” (I3 F)
- “partly it is so organized that they leave for example at 6 …and work again at the evening at home for one to two hours. Where the work is done ultimately does not matter. …someone who is reflecting about an issue is not forced to stay at a special place.” (Uni2 M)
- This concession requires a certain effort though, but it is worthwhile in the view of male leading persons for the result in the end:
- “We make this...not only, because we have to. We like to be kind, if we value the employees….the work day has to be organised a bit, but, it is worth while.” (I4 M)
Cooperation and competition as necessary for successful projects

- One male professor in a governmental research institute refers to the interdependent relationship between cooperation and competition for acquisition of projects
- “Competition is a condition for cooperation: one can only cooperate with people with whom one has overlapping topics”
- Management of cooperation and competition is a genuine male game (Evetts 1997) which leading women as professors adapt more or less successfully, but often without fun.
- Cooperation between men starts often informal, similar to networking, and competition is determined by men’s networks and bonding often with informal exclusion of women.

Genderedness of mentoring as network introduction

- Women need longer mentoring because even when on top they cannot rely on established powerful networks.
- Female network juniors are traditionally not introduced by seniors (mentors):
  - „Conference visits or something similar. That was not yet as established as today. And I did not come inside so very much, was not introduced, and when I later … had the travel resources, … I practised it myself more intensively and noticed for myself, how important it is. I was … so very much left alone with it in that respect and I also had to discover the necessity of such things for myself“ (female university professor)
- Male network juniors are traditionally introduced by seniors (mentors)
  - „I was just a fresh graduate … then he took me to France for a week with him. … Well, you have to get to know the people. … He wouldn’t have had to go there and he couldn’t have sent me alone there, I would have been a little helpless, but like that, it matched quite well. … Because with networks one has to start at some time, they typically don’t fall as a net over oneself“ (male university professor)
Awareness about the importance of informal networking/networks

- Female professors are **aware of the necessity of networks**:
- “My theory is that men are often in top positions because they are active in different networks and have more connections... Most of the decisions are informally made over a beer, and become formal afterwards... and one cannot underestimate the importance of this beer culture where men function in a more skillful and more integrated manner than women.” (Female professor in a university and leader in a governmental research organisation)
- “…much is functioning via selection processes. Who will be selected as the evaluator? How the list will be constructed?... We always think that these processes are fair, but that is not true...I would be naive to think that this story...did not function via collusive behaviour... Yes and when you look who got the first place and if one investigates the story afterwards then you will find the connections which caused the result...(female professor in a technical university)

Awareness about women not fitting in networking/networks

- **Women realise the barrier and also partly don’t want to join a network from which they feel being excluded:**
  - “I believe that many great deals are still [made] on a men's level ... while drinking beer at the bar – I don't do that, I don't drink. ... even with my partners in Japan, ... what my male colleagues do. And I am very convinced – that may be strange – that I simply meet a barrier ... I believe that this being together from man to man would open some door additionally.” (female professor in a university and leader in a governmental research organisation)
- **The culture of networking is gendered and women’s participation in men’s networks is limited**
- Women engineers feel that they are somehow not fitting in men's networks.
- Space, time, media and activities separate them from networking men (restrooms, meeting at unpredictable times, phoning, drinking at night, doing extreme sports)
Women’s networks in academia

- Contacting women with each other is experienced as **less complicated**:
- "I think that sometimes women engineers handle problems more impartial, also in case of technical one I can handle it more personally and collegial." (female professor in a university and leader in a governmental research organisation)
- One woman engineer used an **elite women’s network for consulting**: 
  - "I personally appreciate most the network ‘Generation CEO’, which is a women’s to the top network." (female professor in a university and leader in a governmental research organisation)

Importance of women’s own networks

- **Women’s networks are mostly formal ones, but, give at the same time opportunities for informal cooperation**: 
  - "We deal together from time to time, but chances or possibilities were not as big. If we can support each other we do so, we make an arrangement in the run-up, but we are limited because we do not work in the same enterprise.” (woman engineer and leader in an industrial company)
- **Building a women’s network can serve for**
  - information exchange
  - qualification (mentoring programs)
  - reflexion (of experiences in a male domain, especially from handling visibility and discrimination) and
  - solidarity
- **The power of the described women’s network is limited, because of their low number most of the women do not cooperate directly**
Overview part two: female students

- Results about educational sphere of engineering: Masculine image of engineering
- Gendered engineering stereotypes and masculine organizational cultures
- Self-assurance: necessary prerequisite or learning-process?
- From traditional to subtle discrimination
- Women engineers advises for education
- Results about special measures to increase women’s participation in SET
- Positive effects of mentoring for women in SET for career development

Results about educational sphere of engineering:

**Masculine image of engineering**

- The image of engineering in society is still a traditional masculine one in the view of female students (Germany, France, Austria and Slovakia):
  - machine oriented,
  - with less communication,
  - rational but not creative, not positive, but
  - combined with earning a lot of money.
- Departments of engineering degree courses reflect this masculine image, especially in the view of the female faculty.
- Masculine image of engineering leads to conflicts with femininity image in the view of other women, tell female students
- Female students explain their low number with different socialisation:
- “It is still a question of education which is different for girls and boys”
- “Women are pressed into typical female subjects or may be they choose those typical female subjects themselves. And peer groups are very important, too”.

Faliztax Sagebiel, How Women in leadership positions in science and technology can contribute to change gendered organizational cultures in universities, Istanbul, 6th November 2014
Gendered engineering stereotypes and masculine organizational cultures

- **Sets of dualism about masculine-feminine still exist** in society and engineering education and result in gender segregation.
- Engineering in a **male domain**: “It is a men’s world and women have to accept that it is a men’s world, and to work hard to be taken seriously.”
- Predominately **competitive and masculine climate in engineering degree courses** is one deterring factor (but not in all partner countries existent) and minority status effects in “loneliness” or “feeling okay”
- **Masculinities, culture of stupid jokes, open and subtle discrimination** lead to coping strategies between adaptation and playing with prejudices (Sagebiel/ Dahmen 2006)
- **Self-confidence** is the most prominent factor for success, which can be furthered or decline during study
- **Interdisciplinary and single sex education** help for fighting against gender engineering stereotypes (but negative attitudes of staff are barriers).

Self-assurance: necessary prerequisite or learning-process?

- **Self-assurance** is seen by most of the faculty as a **prominent factor for females being successful in engineering studies**, but
- whereas members of the investigated single sex degree course stated the opinion “single sex teaching increases self-esteem and self-confidence” of female students.
- most of students and faculty of co-educational institutions are **opponents to single sex education**, thinking ‘that it is an artificial world’ and that women who want to study engineering must have a high self-assurance right from the beginning.
From traditional to subtle discrimination

- **In France and Germany females feel acceptance over all** (and even appreciate their exotic status) and
- **they do not feel any isolation**, and
- **don’t long for more female students nor women teachers.**
- These patterns show a different masculinity
- **more subtle discrimination**
- **a masculinity changing to modernity with more equal opportunity in organisational culture.**
- But, at the same time you never know if this changing behaviour proves **sustainable.**

Women engineers advises for education

- Most of the **women engineers all over Europe agreed on needing more visible female role models** - in contrast to most of the asked female students.
- **Women have to be aware of the big influence of networks**
- **Defined gender differences in profession** are barriers for making a career as a woman engineer.
- Many **women engineers are sceptical toward special measures**

- **Close contact between schools, universities and companies** would lead to **more realistic information** (Finish women engineers)
- First of all **university life and later job life are not comparable** and students should not feel disturbed about this (German women engineers)
- Students should **take jobs at big companies to get the experience of working-conditions and to become a member of the internal company network**
Results about special measures to increase women’s participation in SET (GWK 2011)

- 319 measures (activities and initiatives to increase women’s participation in SET) have been evaluated and compared with political recommendations (BLK 2002)
- Overall: activities motivating female students in schools
- Measures differed between accompanying and contextual measures focusing on motivation of women (“fixing the women”) aiming to change their attitudes toward SET (75% of all measures) and structural measures (“fixing the organisation”) (Boxall 2000), the latter being more important for sustainable change in higher education, schools, companies and public research (17% of all measures)
- First of all gender awareness has to be developed
- Optional change to gender awareness in didactics in SET is not enough.
- One example of good practice of study reform is a one year “study naturale” with basics in maths and science at the Technical University in Munich

Results about special measures to increase women’s participation in SET (GWK 2011)

- Measures focusing on women have to have a regular monitoring and evaluation (pre and post evaluation for all measures)
- Measures to reduce drop out of students could make degree courses more attractive for women as well as men with broader study interests
- Broader implementation of successful measures like new didactics (change of paradigm from “teaching to learning”) with integration of gender awareness
- Universities should integrate the results of gender sensible didactics in maths and science in teachers’ education
- Schools need support for implementation of new curricula and to change teaching to more action orientation and more gender sensibility
- Labour market has to become more women friendly as well as family friendly
- Networking between schools, organisations of higher education and companies like have to be further developed as well as
- Examples of good practice of networking are the National Pakt “Komm mach MINT” and the network of maths and science oriented schools in Germany.
Positive effects of mentoring for women in SET for career development

Positive aspects for mentees
- Positive impact for self-confidence
- Support for decisions for or against a Master degree / PHD
- Support and advice for application
- Realistic self-assessment of my competencies
- Increase of motivation for professional development and career
- Orientation about professional possibilities in own subject
- Strengthening of own performance in professional and private life
- Support for study and dissertation
- Female role models for own professional career
- Information and encouragement for work/life balance

Positive aspects for mentors
- Exchange with younger people
- Reflection of own course of life/working principles/leadership style
- New impulses and motivation for own work
- Enhancement of the network in my company/my institution
- Enhancement of professional network
- Reflection of own role as woman in SET
- Positive impulses for own self-confidence
- Insight in other organizational cultures
- Improvement of visibility and positioning in own work environment
- Strengthening of performance in professional and private life

Summary and discussion of results

- Being engaged in relevant networks is a prerequisite of leadership
- Among leading women and men a high networking awareness exists
- Women are no longer formally excluded from most networks, but women’s participation in men’s networks is limited, especially for informal relationships and interactions
- Women’s networks in SET are not as powerful as men’s network
- Needed: more research on networking and power
- Still existing competitive and masculine climate as detering factor
- Women have to be aware of the big influence of networks
- Should self-assurance be supported by study culture or is a prerequisite for choosing a degree course in SET?
Thank you for your attention!

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