The challenges and potentials of gendered innovation projects: an interdisciplinary perspective – a field report

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Introduction / Abstract

Currently we are conducting three gender in research projects at JOANNEUM RESEARCH in the fields of sensortextiles, renal replacement therapy and optotechnologies. In these three projects we face substantial interdisciplinary challenges. However, since only the sensortextile-project is more advanced and the other two projects are still at the beginning, we decided to focus in this report on field experiences from Pyzotex. Therefore the first part of this field report will describe the project Pyzotex and the role of gender in it.

A gender sensitive perspective on science and technology is necessary for gender in research projects and is introduced in the respective project by gender experts with a social science background. So this project brings together researchers from different disciplines with specific interests, expertise and understandings. Different stocks of knowledge meet.

Under these circumstances, questions arise like: How do research teams work together without fully understanding knowledge of other disciplines, without being able to assess the relevance of other knowledge and with differences in methodologies and focus on research questions etc.? How can they manage to work together instead of working next to each other? How can the gender perspective become an integral part of the project and not just an "add on"? To answer these questions we systematically reflect challenges of interdisciplinary projects on the interface of gender studies and science and technology to improve gender in research-practice and formulate first lessons learned. This paper must be understood as a documentation of first experiences.

Our analysis will be based on research diaries we keep since the start of the project and on group discussions of the research team. From these sources we expect to identify success factors for taking gender fully into account in a technological research project. Moreover we want to identify potential pitfalls, e.g. how gender can be marginalized or misunderstood within the project, and how to avoid them.

What is the project about?

The Research Project PyzoTex - Gender sensitive textile interface for the detection of different parameters such as pressure, temperature or humidity is funded by the Austrian Research Promotion Agency in the Funding programme FEMtech Research Projects. In this project existing sensor technologies will be transferred to textile substrates. These sensors can measure pressure, heart rate, humidity, temperature and pH-value. So for example these sensors could be put on a T-Shirt to measure physical data during sports or to be used as a fall-detection in nursing homes. The different requirements on sensor textiles men and women, elderly and young people may have will be studied and design parameters for textiles will be developed, based on gender and age-specific differences.

So the project aims at identifying possible differences between the sexes/genders and within the groups of men / women (age, physical build as explaining variables) to avoid gender stereotyping. Discovered differences shall be considered in the process of developing sensor textiles.

In PyzoTex scientists from the fields of sensor technology, statistics, medical technology and gender studies work together.

How is Gender implemented in the project?
Two experts on gender studies accompany the project from beginning to end and ensure that gender is regularly reflected in the team meetings. At the beginning they conducted a gender Workshop. The workshop's objectives were disambiguation, awareness rising and addressing gender stereotypes. The integration of gender into the research process was illustrated by the Gender in Research Toolkits yellow window. In the last part of the workshop, the research team discussed how to take gender and age into account in PyzoTex.

In order to identify possible application scenarios of sensor textiles in the nursing field technicians were encouraged and supported to conduct qualitative interviews with nursing experts. Potential gender differences were part of these interviews.

Statisticians conduct a survey of comfort feeling among test subjects wearing Sensor-T-Shirts. The gender experts support them in designing the questionnaire and analyzing the data.
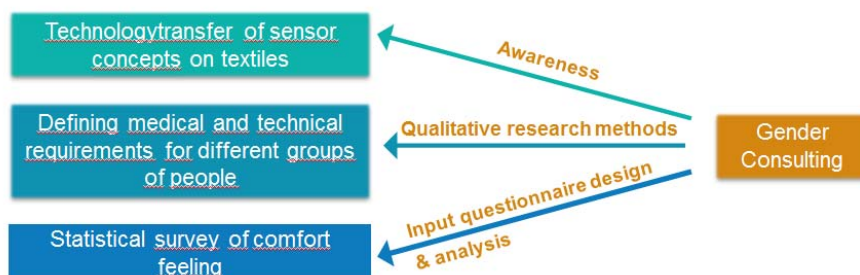

Figure 1: Work Packages in PyzoTex and role of gender consulting

But why do we think, gender matters? Up to now the functionalization of textiles has not taken sex or gender into account. But skin conditions of men and women differ and change with increasing age (see, Bolognia 1995, Seidenari et al. 1994, Leveque et al. 1984, Wollina et al. 2006), tactile perception of men and women is different (Giacomoni et al. 2009) and clothing habits and resulting feeling of comfort differ by sex/gender and age.

Experiences
Working in an interdisciplinary research team means to deal with limited understanding of knowledge of other disciplines, limitations in being able to assess the relevance of other knowledge and to deal with differences in methodologies and focus on research questions. Particularly challenging is interdisciplinary work across the boundaries of natural science & engineering and social science because they represent two different scientific cultures (see Halfmann & Rohbeck 2007). This also seems to be rather rare, as the following statements made by a biochemical telematic and an experimental physicist show:

> MF: Yes that's true, interdisciplinarity is a common practice, but among natural
> scientists and engineers.
> BS: To work together with social scientists is new to us. 24:30

It takes time to find a common language. And it takes time to identify, what are the minimum requirements of understanding to be able to work together. Some researchers are used to this translation process – as a statistician describes, others are not:

> „So we have to learn the language of the cooperation partner, so to speak, and we try
> to tell the cooperation partners what we are able to do. Because statistic is a cross-

cutting issue, we have this situation in almost every project and this is no particular difference to a regular statistics project. We participate in quite a number of technology projects (...) where we have to find a common language. For us this is nothing new." (HK 23:29)

This is what statisticians and gender-experts have in common – their work is a cross-cutting issue.

In a "gender in research" project, the research team is not only challenged to develop a common language, it also has to establish a common understanding of "gender". Therefore we conducted a gender-workshop in the beginning of the project, where we explained sex/gender differences and other important terms. We reflected gender stereotypes, discussed the implementation of gender in research projects in general and in our project specifically. An experimental physicist states:

"So to clarify the concept of gender was for us technicians ever important. Since there have been several barriers and different concepts." (BS 32:44)

The feedback on the workshop was very positive but in later discussions we realized, that gender as a term has not been settled yet – there still exists some confusion about the difference of gender and diversity e.g..

The "Gender-Issue" in an interdisciplinary project can help to ensure that researchers are working with each other and not next to each other. But therefore the gender perspective has to become an integral part of the project and not just an "add on". The research team has to be convinced, that it is worth to take gender and diversity into account. It may be persuasive, when scientists discover, that gender sensitive research results exist, that affect their scientific domain, like an engineer described:

"I've also taken a look at the literature and have found publications, which address gender differences: some skin diseases are for the most part only in women, others occur predominantly in men. That is something, I was totally unaware of before, that there are significant differences between men and women in skin diseases. That's something I would not have investigated if we did not carry out this project." (GM 7:06)

A major issue for the gender experts in PyzoTex was to make the engineers realize that the field of application of the technology has gender relevance. A biomedical telematic describes his experience:

"The gender experts always introduce new aspects nobody has thought of before. So just a different perspective as well. And I already discovered in the project, that there are actually relevant social differences, which are not relevant for the technical development of sensor, because there it is important to map physical processes as accurately as possible. But these social differences are very relevant for the application field of the sensors. That was an aspect that we've hardly noticed. "(MF 8:57)

To realize the added value researchers from other research fields create in an interdisciplinary research project can also support and strengthen cooperation, as the project leader describes:

"In terms of the gender aspect and in terms of interdisciplinarity it is to say that this broadens the horizon of each participant. Because we know as technology developers more or less in theory that you can run statistical analyzes. But we don't know what statements you can make with it. To experience this black on white is a great thing! That is, you might get a slightly fuller picture. "(GS 17:01)

How has research methodology been improved?
Researchers in PyzoTex realized that the field of application of a technology is not gender-neutral. The project raised the awareness that the field of application of technologies should be thought of at an early stage of the development process. This is important to develop technologies for a broader target group. The project also showed that taking gender- or diversity-dimension into account in technology development needs the cooperation of natural scientist, engineers and social scientists. This led also to some learning effects: e.g. an engineer was supported by the gender experts to conduct interviews with nursing experts to identify the application field of sensor textiles in nursing homes. While speaking with these nursing experts he recognized the problem of I-Methodology[1] (Akrich 1995, Rommes 2002) and got new information about needs of residents of nursing homes and their acceptance of technology.
The project also contributed to raise awareness among the researchers for gender and diversity issues. They also start considering these issues in other research projects, as a statistician reports:

"So I do think that PyzoTex has given an impetus to think about in other technology development projects, whether there are diversity aspects that should be taken into account and that have not been considered yet." (HK 14:19)

First lessons learned and further questions
So we could already learn from PyzoTex and some ideas on how to win natural scientists and engineers for the gender and diversity issue could be provided:
- gender sensitive research results, that affect their scientific domain may get them involved
- The experience of field interviews helps to recognize gender differences and needs that shall be met
- Discussions about application fields of the new technology show gender relevance

Interdisciplinary cooperation of natural science/engineering and social science is crucial for integrating gender into technology development. This needs time and it can be very challenging to find a common language and a common work culture. Furthermore considering diversity dimensions multiplies the complexity of a research project. So, don't want to much!
Considering diversity dimension in technology development can be a success factor and potential pitfall. On the one hand, you cannot focus just on gender because maybe it is not the relevant social dimension that makes a difference in your research project. On the other hand we experienced in PyzoTex how challenging it can be to take age into account. How to deal with multi-morbidity of elderly people? How do various diseases and physical limitations change the results of a survey? Or should we only integrate healthy elderly people in the survey? But are they representative? If and how such questions could be addressed carefully in a research project is also a matter of financial limitations.

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[1] I-methology: a practice of technical designers fundamentally criticized by feminists, in which designers implicitly understand themselves as representatives of users and unthinkingly assume that those have the same preferences, interests, technical skills and resources (Bath 2009).

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Short Biography:

Mag.[a] Sybille Reidl studied sociology at the University of Vienna. Since 2003 she works as a researcher at the Centre for Economic and Innovation Research (POLICIES) of JOANNEUM RESEARCH which is focused on applied research and consulting services in the fields of science, technology and innovation (STI). Her main research areas are gender/diversity and human resources in STI (especially promotion of equal opportunities, promotion of young researchers / teenagers in natural sciences and engineering). Currently she is involved in three different gender in research projects in the fields of medicine, sensor technology and optotechnology as a gender consultant.