

The (re)production of heteronormativity in the discourse of gender equality and justice in engineering¹

Nowadays in Germany, engineering is still a men's domain. This is in contrast to the public discourse, which seems to assume that gender/sex equality and justice have been achieved and also in contrast to the long lasting efforts to introduce a quota for women in this field. The sociologist Angelika Wetterer (2003, 2005) coined the expression of "rhetorical modernisation" for these contrasting phenomena.

In my research on gender and engineering I'm interested in what engineers think about these contradictions. Are these even recognized as such?

My interests are epistemological as well as political: One goal is to understand the co-constitutive relations between gender and the practices of knowledge production and transfer in engineering. Another goal is to find 'adjusting screws' through which possible changes may be promoted within these fields. Changes, which lead to more just sex/gender ratios and relations and to a dissolution of bipolar sex/gender comprehension. Referring to Roy (2011, 191) my approach to these questions is one of *immanent critique* that seeks to find points of *joint perplexity* with other agents in the field.

The qualitative interviews that I conducted in the field of engineering are characterized by a contradictory simultaneity of different sex/gender norms. For this reason, I developed the knowledge about gender (Geschlechterwissen) (Andresen/Dölling/Kimmerle 2003) as important analysis concept.

When analysing those interviews, I am finding over and over situations, in which – despite of the obvious intention of equality – the language itself nevertheless implicitly (re)produces knowledge of the sex/gender difference. Perhaps these paradoxes, which irritate 'us', these joint perplexities are the reason for the high level of engagement of my informants in projects for girls.

Drawing on Pierre Bourdieu's (1976, 1993, 2005) concept of the habitus and Judith Butler's (1991, 1997) concept of the heterosexual matrix, I want to understand how subjects are formed in society and vice versa. Both society and subjects are not given and stable entities, but rather emerge from relations.

¹ This talk is based on results of my dissertation which I submitted 2016 under the title: „Rhetorische Modernisierung in den Ingenieurwissenschaften? Eine Interviewstudie zur Verknüpfung von Fachhabitus, heterosexueller Matrix und Geschlechterwissen im akademischen Feld der Ingenieurwissenschaften“.

Habitus and the world are constitutive of each other in a mutual (re)constitution process. They are structured structures which seem to be created only to function as structuring structures. Bourdieu says: as the world realises me, I realise the world; I am contained in the world, but the world is also contained in me. (Bourdieu, Wacquant 2006, 161).

One important category of our local society is the norm of two sexes/genders which is, referring to Butler embedded in a heterosexual matrix. Judith Butlers concept of the heterosexual matrix characterises a circular (re)constitutive network of cross-references between sex, gender and heterosexual desire. It implicates a hierarchical structure where masculinity always has advantage over femininity. Both are (re)constituted as diametrically opposed and bonded through the heterosexual desire.

The subject of my research are transliterated interviews, which I conducted with engineers. Referring to Bourdieu I understand them as part of a social practice and referring to Butler (2006) as performative acts between different agents (e.g. interviewer, informants, recorder, language, knowledge) in the engineering field.

Let me briefly introduce the agents who were participating in the interviews:

- The interviewed persons, hence my informants, are not only engineers, working at universities in Germany. They are also highly engaged in at least one project for girls that aims at motivating these girls to be interested/become part of their own field of engineering. My informants have a position in their social field of engineering. Through the formation of their field-habitus, they have also gained the capacity to appropriate the 'right', that means the relevant knowledge, and to act intelligibly in the field, for example in an interview. Through narrations and mutual intra-actions in the interviews, interpretative patterns which are effective agents in this field became transparent and can be studied.
- The interviewing person, me, is situated as investigator and lecturer in the field of feminist science studies. I lead a project for female identified high school students and I have an engineering diploma. Hence I'm also positioned in the same field as my informants.
- The recorder acts through its congealing social practice. For instance it records only spoken language and not nonverbal utterances.
- Whenever humans are part of intra-actions so my argument, also language and knowledge are important and effective agents, e.g. for asking, responding, thinking, technical gathering, transliterations, printing, writing and publicising etc. They are

neither immutable nor are they only tools of mediation. Rather they are efficacious intra-acting agents which are (re)constituted in an ongoing manner and in a mutual process that involves all the agents. Language and knowledge are parts of a social practice through which differences take shape.

- The result of the intra-action process within the interviews and within the transcription is a sheet of paper filled with words. However, it is not only the sum of all single components which could be separated again. Once thought, spoken, heard and gathered words are now pressed and materialised into printed, readable and analyzable letters. The transcript has emerged only out of this specific intra-action. And it is not the only 'new' phenomenon. Every involved agent has (re)constituted itself/or him/herself in mutual intra-actions. This perspective of analysis renders visible the inimitability and the interventional character of interviews.

As a result of my analytical work I could generate three key-concepts (Greusing 2015) which explain how sex, gender and heterosexuality is intertwined in the social practice in the field of engineering as structuring structures. These are the math hurdle (Mathematikhürde), exception woman (Ausnahmefrau) and marriage market (Heiratsmarkt). I will quickly summarize them.

Math hurdle (Mathematikhürde) and exception woman (Ausnahmefrau): Through analytically linking knowledge about gender and Bourdieu's concept of professional habitus I can show that and how an alleged gender-neutral mathematic is working as gendered usher in the social field of engineering. On the one hand the engineering field is defined about mathematics. For example knowledge and interest in mathematics is seen as the most important and essential qualification one must have for starting an engineering training. In this context gender seemed to be unimportant. The field of engineering is seen as gender neutral. On the other hand maths ability is explicitly and implicitly closely related to 'masculinity'. Hence the engineering field becomes masculinized. A seemingly gender-neutral subject like maths shows up as naturelly element of masculinity. The maths hurdle positions men about an attributed genuine masculine interest and ability in maths as engineer inside the field of engineering. Diametrically opposed, women are attributed a genuine feminine lack of ability and interest in mathematics outside the engineering field.

Female workmates within the field, hence women engineers which my informants typically perceive as excellent skilled in maths, are contrary to the hegemonic field order generated by the maths hurdle. These women are constructed as exceptions. They are named with "echte Ausnahme" (real exception), "starke Frau" (strong woman), "technische Frau" (technical

woman) or “Mannweib” (mannish woman) which shows that they are constructed as gendered hybrid creatures. They are constructed as people with female body (sex) which are gendered masculine by the attribution of genuine masculine characters (gender).

But even when a woman is seen as extraordinary good in the maths, in other interview contexts she is only seen as socially skilled and is reduced to this ability. As social skills are not seen as engineering skills, through this reduction women are narratively positioned outside the field. They have to prove again their maths skills to be accepted as engineer.

Therefore the math hurdle not only re(constitutes) two classes of gendered habitus and social fields. It also generates two categories of women: This is the typical woman who is a carrier of a ‘female’ habitus and the exceptional woman who is a deviation of the typical woman.

Marriage market (Heiratsmarkt): Through my analytical work I can show that and how an invisible strong heterosexual desire structures the field. This is the key for understanding that an alleged gender-neutral ability in maths always again shows up as a naturally element of masculinity, despite all its contradictions and counterfactual knowledge which is also present in the field.

One of the rare examples where the heterosexual desire structure is seen explicitly is in the remarkable consistent answers of men to the question how my informants have noticed the men domination in their field during studying. A typical answer is, that they hadn’t even noticed this fact, because they already had a girlfriend. However, they wouldn’t look inside the engineering field for finding a girlfriend anyway but rather more in fields which are allegedly dominated by women.

Through this phenomenon among others I could generate a third key concept I called marriage marked (Heiratsmarkt). It organizes the heterosexual economic of relationship within the social field of engineering.

Also the marriage market produces two kinds of gendered habitus and fields. Men are defined as social incompetent engineers and subjects of desire. Women are defined as housewives and objects of desire. First are positioned inside the engineering field and second inside the field of welfare. But whereas the maths-hurdle is organized by gender (maths ability), the marriage market is organized by heterosexual desire.

Also the marriage market produces two kinds of women: the typical woman outside the engineering field and the desexualized sister inside. But although the latter is allowed to be inside the field, she is not seen as engineer. Rather, she is seen as a person who enables the men in the field to be heterosexual subjects of marriage. Hence she is welcome for her social

qualities. For being recognized as engineer, she has to prove first her maths ability. So her intelligibility as engineer is only possible of the cost of masculinisation and desexualisation.

The key concepts maths hurdle, exceptional woman and marriage market are deeply relationally intertwined in a way that field and field habitus are heteronormatively masculinized and all at once one sided. For a man in the field this means, that his intelligibility as engineer depends on his intelligibility as heterosexual man and vice versa. For a woman in the field this means that she can only be intelligible as engineer *or* as a heterosexually desirable woman not both at once. In this intertwining shows a hegemonic gendered professional knowledge of the engineering field and habitus. This knowledge operates as background knowledge, hence mostly unconsciously. As a result, it contributes to the reproduction of the hegemony of masculine domination in the field of engineering.

What does all this mean for interpretative patterns about gender/sex equality and justice in the engineering field?

As a result of the key concepts, the field appears as gender neutral, despite of the fact of male domination which is just seen as an effect of social circumstances: The reason is quite simply seen in the fact that girls are not interested in maths and by this also not in engineering, be it because they are genuinely different to boys or because of gendered socialisation.

Furthermore, gender equality in the field is only possible if men and women are sharing equally the responsibility for the household and the upbringing of child. Hence the responsibility for gender equality is moved outside the field into heterosexual nuclear families and other institutions of socialisation.

However, I found a common sense to reach gender equality in opportunities in the field. This is closely linked with progress and a generation change. Whereas for the old generation a female engineer is not even thinkable, the new one is interested in gender equality and justice. At the same time the engineering field is perceived as very over-aged. For that reason, the field is characterised by a highly increasing recruiting problem. Both together explain the high engagement of all my informants in projects which aim at raising the number of engineers in general and thereby also of women in their own fields. But there is no need to change the field itself to make it more attractive for the young generation. The only need for action is seen in a better outside representation of engineering contents and practices and by this solving the recruiting problem of women and men.

The hegemonic interpretive pattern of gender-neutral engineering which I could analyse in the interview transcripts prevents that field members could perceive how much their field is characterised by a sexist and masculinized norm. Consequently, the field is not perceived as

discriminative for women. Women exclusive measures are even seen as discriminating men. The hegemonic interpretative pattern of gender equality requires the same opportunities for men and women, whatever hidden gender inequality may work. This interpretative pattern of gender equality opportunities fits absolute accurate in the concepts of maths hurdle, exception woman and marriage market. Instead of changing, it helps to stabilise field inherent power and gender relations. Thus, I understand it as a narrative strategy to receive the engineering field under maths- and technology focused masculine domination, hence as rhetorical modernisation.

---- **Thank you for your attention**

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