Gender equality as a resource and a dilemma: interpretative repertoires in engineering education in Sweden

Eva Silfver, Allison J. Gonsalves, Anna T. Danielsson* and Maria Berge

Pedagogiska institutionen, Umeå University, Umeå, Sverige; Department of Integrated Studies in Education, McGill University, Montreal, Canada; Institutionen för pedagogik, didaktik och utbildningsstudier, Uppsala University, Uppsala, Sverige; Institutionen för naturvetenskapernas och matematikens didaktik, Umeå University, Umeå, Sverige

ABSTRACT
This article explores how female university students’ abilities to present themselves as ‘authentic’ engineers are imbricated with discursive constructions of gender and gender equality. The empirical data comes from interviews and video diaries collected with three female engineering students. The analysis demonstrates the power of the Swedish gender equality discourse to inform the students’ talk as they negotiate their gendered identities to become intelligible as engineering students and engineers. We suggest that gender equality is used as a resource in the repertoires, but we also demonstrate that this discourse becomes a dilemma in that it limits possibilities for gender performances to go beyond old patterns. Despite this, the article still shows three unique ways of negotiating gender and other social categories in different situations connected to university learning and participation in internships.

ARTICLE HISTORY
Received 1 July 2020
Accepted 14 June 2021

KEYWORDS
Women engineering students; negotiations; ‘authentic’ engineers; gender equality discourse

Introduction
This article draws on data from in-depth interviews and video diaries with three Swedish students concerning their experiences as women in a constructing engineering university programme and internship. Of concern is how these students present themselves as ‘authentic’, or ‘appropriate’, engineers in current Sweden. Historically, engineering has been constructed as a profession predominantly for men with a close relationship to technology (e.g. Faulkner 2000). However, over the last decades, this view has been under renegotiation and more heterogeneous images of the engineering profession have developed, with an emphasis on leadership and ‘soft skills’ (Mellström 1999). To respond to these changes, a corresponding shift in engineering education has occurred (Arlett et al. 2010; Mäkimurto-Koivumaa and Belt 2016), with a focus on recruitment and
retention practices for a diverse student body and workforce (Hemmo, Love, and OECD 2008). Yet, according to Holth’s (2015) study, many Swedish men in engineering education begin their engineering studies soon after graduating from school, whereas the choice of engineering is less self-evident for women; their paths into engineering typically are more winding, and they often begin engineering education later in life. A recent study of how engineering education departments at Swedish universities represent their engineering programmes through websites also shows that, despite efforts to diversify students’ participation in engineering education, they hold stereotypical norms concerning gender and age (Berge, Silfver, and Danielsson 2019). This is surprising, given that gender equality is a strong discourse in Sweden. Gender equality is regarded as a societal value that is obviously good. It comes with norms saying that women and men are equally valued, and that we will soon have a society with equal gender representation in all fields – at least – this development is going in the ‘right direction’.

Gender equality is also an outspoken political idea (Pincus 2002). The gender equality policy clarifies that women and men must have the same power to shape society and their lives, and gender mainstreaming is the overarching strategy for implementing this policy (Government Offices of Sweden 2020). Everyday life does not always follow the policy, however, something highlighted by Holli, Magnusson, and Rönnblom (2005), who point to a gap between the Swedish rhetoric of gender equality and societal reality. Thus, there are good reasons to investigate how Swedish students understand, or rhetorically use, gender equality today. This is of particular interest in engineering education because few women are still applying for engineering programmes in Sweden despite the large number of efforts to increase their proportion in the field (National Agency for Higher Education 2014).

The aim of this article is therefore to explore how female university students’ possibilities to present themselves as ‘authentic’ engineers are imbued with discursive constructions of gender equality, gender, and other social categories. In this ‘micro reading’ of the three women’s talk, we pay attention to, not only, what they say but also how they say it (Wetherell, Taylor, and Yates 2001). In doing so, we seek to avoid establishing broader patterns of a predominantly masculine engineering culture shown in earlier research (Powell, Bagihole, and Dainty 2009), and instead go beyond these and explore the ‘granularity’ and complexity of gender performances in engineering contexts. The questions guiding our analysis are:

1. How do the female students position themselves in their engineering education?
2. How do the female students use the gender equality discourse, i.e. how are they doing gender equality?
3. How do gender, and other social categories operate in the narratives?

Gender, identity and engineering

Gender research in technology and engineering industries has tended to focus on either ‘recruiting or promoting the industry to women of school age or retaining women once they are employed’ (Powell, Bagihole, and Dainty 2011, 585). These research perspectives have focussed on explanations for women’s underrepresentation, rather than understanding their experiences in engineering and their impact. A helpful research focus to move beyond what Powell, Bagihole, and Dainty (2011) call ‘deficit-orientations’ to researching women’s participation in engineering, is a recent emphasis on identity
work in engineering. Research has examined available identity positions for women in engineering (e.g. Du 2006; Faulkner 2007; Tonso 2006), and how limited identity positions can diminish possibilities for women to see themselves as insiders in engineering. We regard identity positions as constituted through discourses about what counts as appropriate or recognizable (e.g. Carlone and Johnson 2007) performances of 'engineer' in local contexts. The potential of this theoretical focus is reflected in the uptake of this work in science education research (e.g. Carlone 2004; Carlone and Johnson 2007; Gonsalves 2014; Ong, Smith, and Ko 2017). This research demonstrates that women often find themselves situated in masculine environments and must therefore negotiate their positions and scientific identities in relation to the dominant discourse of the discipline (e.g. Smyth and Nosek 2015; Stepulevage and Plumeridge 1998).

Research investigating gendered discourses in engineering identifies two contradictory discourses that women must navigate in engineering fields: difference to men, and difference to other women (e.g. Henwood 1998; Walker 2001). Henwood (1998), for example, found that female software engineering students were on one hand positioned as different from men: men were seen as immature, while women were seen as having a civilizing effect in men dominated environments. On the other hand, the women were positioned, and made attempts to position themselves, as different to other women, thus counter-identifying with traditional forms of femininity (which were interpreted as inferior). Henwood (1998) suggests that a counter-identification with traditional femininity may be the most convenient or ‘agential’ way for a woman to do gender. This counter-identification with traditional forms of femininity is also a strategy we have seen in our own work examining the gendering of physics learning environments (Danielsson 2012; Gonsalves 2014). Likewise, Kvande (1999) saw that some female engineers in her study would actively position themselves as ‘one of the boys’ or even ‘anti-women’ to signal membership and belonging to their field. This was a strategy that facilitated individuals’ sense of belonging to engineering but did nothing to trouble the prevailing culture of masculinity in engineering. So, even though counter identification with traditional femininity does not challenge the masculine norms and culture, as Danielsson (2012) expresses it, counter-identification: ‘does challenge heteronormative understandings of all men as desiring to be masculine and all women desiring to be feminine.’ (Danielsson 2012, 37). Furthermore, dominant subject positions and culture do not only trouble female engineers/engineering students, but also ‘unconventional’ students more broadly, as shown by Gonsalves et al. (2019). A similar result is found in Gill et al.’s (2008) interview study on Australian men and women working as professional engineers about reasons for choosing engineering and facilitating/hindering factors for professional advancement. The ‘women-as-different’ (to men) position was down-played by some women, whereas others saw this position as a case of recounting experiences of being made to feel different and thus working out ways of using this position to achieve a degree of comfort in their workplace. A recent study by Male et al. (2018) also shows how female engineering students were perceived and positioned as different in that they were not seen as strong enough. They were also given supporting roles like ‘the one who takes notes’ instead of doing the calculations or the tinkering jobs. Other women were positioned as ‘threats’ to men’s previously assumed ‘rights in the workplace’, for example, swearing and making sexist jokes (see also Faulkner 2009). This contradiction between rejecting and
reinforcing gender difference found in earlier research is something we explore further in this article, with a focus on how notions of difference and equality interplay in female engineering students’ talk.

Theoretical framing

Given that we explore female engineering students’ talk about becoming engineers, we draw on Foucault’s (1971) interpretation of discourse, that is, that discourse is about knowledge production through language and practices in specific institutional settings. Since discourses are ‘practices that systematically form the objects of which they speak’ (Foucault 1972, 49), they have power to produce (rather than describe) reality. Therefore, when students talk about themselves and how it is to be a woman in a masculine culture such as engineering, they build on discourses available to them in their specific contexts (study context and workplace context), for example, a gender equality discourse. That is, they talk in ways that create meaning for them (Wetherell, Taylor, and Yates 2001), and thus, they become bearers of knowledge produced by discourse. Theoretically, we draw here also on Butler’s ([1990] 1999) performativity concept, where gender (and other social categories) is understood as a ‘doing’, as an effect of repeated and reified performances, rather than a cause. This is also in line with how Crenshaw (1991) explains how different systems of power work together and produce categories such as gender, social class, sexuality, and ethnicity, which intersect with and transform each other in a fluid manner (de los Reyes and Muliniari 2005) – or as Phoenix (2006, 21) puts it: ‘social categories [that] are mutually constitutive’. So, in our analysis we look for how the social positions come with different meanings in the narratives. For example, how age transforms gender from being a weakness to becoming a strength.

However, individuals are also capable of exercising choice, or agency, in relation to discursive practices (Davies and Harré 2001). Following Foucault (1983), we, therefore, set out not only to interpret how female engineering students become subjected within different discourses, but also how they position themselves as subjects (Laws and Davies 2000). We understand students’ talk and positioning as a form of discursive work where they negotiate their gendered identities to become intelligible subjects in their local engineering contexts. In Butler’s work, intelligibility ‘generally refers to the ability to be seen, heard, or otherwise interpreted as a valid social subject’ (Butler 2005, referred to in Leigh 2016, 72). In this article, we use the notion of intelligibility when we analyse how students’ possibilities to present themselves as ‘authentic’ engineers are imbued with discursive constructions of gender and gender equality.

Methodology

Data selection and collection

The present study was conducted as part of a three-year Engineering Education research project, funded by the Swedish Research Council. Data were gathered from two different BSc level programmes 2016–2017 at a Swedish university, but for this specific article, the data comes from the Construction Engineering programme. This is a programme that in the Swedish context predominantly attracts young, middle-class men (UKÄ 2020) and as
such it opens up the possibility to explore how power works from the perspective of female students who are in a minority, and therefore might have the possibility to more easily to identify gendered norms. The programme is also particularly interesting due to the history of construction engineering as male-dominated and associated with hegemonic forms of masculinity (Ness 2012) and in comparison, to for example, the architectural engineering programme, where women are in the majority (UKÄ 2020).

At the time of data collection, the whole student group consisted of 36 students (8 women, 28 men) on their final year who were studying a course designed around group work and field visits. Students were asked to participate in our study and six (three women and three men) accepted. This paper focuses only on the women’s experiences. We chose to do an in-depth analysis with the women because of the tensions we noticed between how they discursively activate gender equality in Sweden, yet at the same time need to negotiate their own experiences in engineering.

We collected data through video-diaries (Danielsson et al. 2019) used to generate narratives of experiences, and follow-up semi-structured individual interviews. We gave participants cameras and asked them to record video diaries at three different time points focussed on the following: (1) Their academic backgrounds, motivations to study construction engineering, and their experiences in the programme; (2) Descriptions of their ongoing projects; (3) Perceptions of engineering workforce and future aspirations. The semi-structured interviews were conducted after analysis of video diaries, and framed around themes related to group work, identity work, and engineering education broadly. Interviews were individualized as interesting points for discussion were picked up from video diaries and expanded upon. The interviews with the three women were carried through by the first and fourth author and lasted between 50 and 70 min. They were recorded, transcribed, and translated from Swedish to English. The next section describes the analytic process in which all four authors with backgrounds in engineering and STEM education participated.

**Method of analysis**

The analysis of video-diaries and interviews is based on rhetorical and discursive psychology analysis (Billig 1987; Edley 2001; Edley and Wetherell 1999; Wetherell and Potter 1988). Important concepts in this kind of analysis are the idea of *interpretative repertoires* and *subject positions*. Interpretative repertoires are culturally available resources or ‘storylines’ which members from a specific society ‘can both draw on and resist in order to produce their own accounts’ (Jones 2002, 2). Here we refer to the repertoire concept as consisting of different, sometimes competing, ‘meanings’ that constitute discourse. The concept of subject positions is defined as ‘locations within a conversation’, or ‘identities made relevant by specific ways of talking’ (Edley 2001, 210). Importantly, the analysis is confined to the discourse rather than to the specific students who produced the talk. Thus, we take the position that it is within discourse that the agency of the female engineering students become intelligible (Foucault 1983; Taylor 2001). We wish to highlight here that although we regard gender and identity as a ‘doing’ and formed in practice, we also acknowledge that these formulations can endure over time. As gender and identity are done in context, over time performances and forms of participation become patterned, as they respond to recognition (e.g. Carlone and Johnson 2007). As we are not
able to access women’s gender and identity performances in context, we look for narratives of these in women’s talk, and highlight episodes that signal gender performances are taking place.

In the first iteration of our analysis, we identified episodes where informants described their experiences being women in male-dominated fields as ‘no problem’ and highlighted these as they emerged across the data sets. We looked for how this ‘no problem’ position could be understood and found that it was connected to talk about gender equality through three different repertoires. Having identified these, we focused our analysis on gender performances, that is, patterns of talk where the repertoires created different gendered subject positions for students in the ways in which these intersected with other social categories (e.g. age). In a third step, we went back to the datasets and explored how they negotiated or balanced between different positions in order to be able to claim an engineering student subjectivity. Here Edley’s (2001) concepts of ‘troubled’ and ‘untroubled’ positions were helpful. Of interest to us was whether, and if so how, students do this considering their different experiences at university and workplace. Here the possibility of agency (Davies and Harré 2001) opens up for them to draw on different repertoires to construct themselves as ‘authentic’ engineers, although this is neither an entirely free, nor an entirely determined process since there is a tension between agency and social structures such as gender, class and race (Connell 1987; Reay and Wiliam 1999). In the last step we looked across the data sets again to see how the different repertoires function as resources to render informants intelligible (Butler 2005) in engineering contexts.

The three women

The three women, Caren (in her late 20s), Monica (40 years old) and Layla (in her mid-20s), have different backgrounds. Caren was brought up in a small Swedish community. Her mother works in administration and her father as a consultant within the construction business. She also has a brother who works as a plumber. Caren studied on the technology programme at upper secondary school, and she says engineering is a good education programme because it is ‘wide’. Monica comes from the northern part of Sweden and has worked in the hotel and restaurant business and worked in different countries for several years. Her mother works as a preschool teacher, and both her father and brother are carpenters. She decided quite late in life to study engineering. Monica argues that she ended up in construction engineering because it seemed familiar to her. Our third informant, Layla, arrived in Sweden with her family from a non-European Muslim country when she was a teenager. Her highly educated parents have always stressed the importance of getting a good education. She says that it is her parents’ dream that she and her siblings become highly educated, and that this would make them happy. Layla’s first choice of education was to study architecture, but she did not have high enough grades. But the construction engineering programme, she says, will give her an opportunity to build houses anyway.

Findings

When the three women are asked about their experiences studying and working in a male-dominated field such as engineering, they all suggest that being a woman in
that context is ‘no problem’. We suggest that this ‘no problem’ position is possible to take up within a gender equality discourse, which is activated through different repertoires or meanings. However, the ‘no problem’ position is constantly challenged in the narratives, and re-position the students as ‘troubled’, or not ‘authentic’, engineers. In the coming sections we explore how the students use different gender equality repertoires as resources when they negotiate their gendered identities and explain themselves as *intelligible* subjects in their local engineering contexts. We have called the repertoires ‘women and men have the same value’, ‘gender equal representation’, and ‘a new generation’.

**Women and men have the same value**

This repertoire highlights the commonly-held notion that women and men are equally valued in all workplaces and academic contexts. It is mobilized in participants narratives to argue that gender does not matter, instead school and workplace experiences are all about the individual, thus making it ‘no problem’ for women to enter a male-dominated area such as engineering. Both Caren and Monica activate this repertoire:

INT: But, your program is a, a male-dominated education.

Caren: Mm.

INT: How has it been to be a woman in such a [field]?

Caren: Well, just fine

INT: Yes.

Caren: I’ve never had a problem with that.

INT: Nah.

Although Caren first takes a ‘no problem’ position she later in the interview stresses that she refuses to be judged according to gender. She says:

In my case, it has always been very strong that I refuse to be judged on the basis of my gender. I’m neither more nor less valued just because I’m like a girl.

The way Caren ‘does’ gender equality here gives her agency to refuse her gendered position as less valued. Yet, as we interpret a ‘refusal’ as an action of resistance, we read it also as an acknowledgement of existing power differences between women and men, and/or a refusal to be exposed to positive discrimination because of gender.

Monica also expresses having no problem in engineering class in relation to her gender, but her narrative simultaneously involves some uncertainty:

INT: How is it to be a woman then, in such a male-dominated environment, being an engineering student?

Monica: Mm, our study class … I don’t want to say, we have, I have, I have no problem with that. Yes, eh, with … /—/ Just because we are fewer, we are not worth less, or feel [less valued] in a way. That does not occur in my world. Or does not occur in my world … but I don’t put any energy on it.

INT: Mm.
Monica: Or [I don’t] care about knowing this

INT: Mm.

Monica: I am me, and you are you. We do this, we do the same.

INT: Mm.

Although Monica first argues that she has no problem with her study class, she points out that to her, it is an unthinkable idea that the underrepresentation of women in engineering could be interpreted as signalling that women are less valued than men in engineering contexts (cf. Henwood 1998). This is also in line with how the gender equality discourse is formulated in the Swedish context, i.e. women and men have equal value. However, Monica’s talk changes slightly when it progresses, and rather than saying that it never happens that women are less valued, she argues that: ‘… I don’t put any energy on it. Or care about knowing this’. This suggests, in line with Caren’s talk, that she acknowledges that inequality exists, but she does not let it affect her. Therefore, we perceive both Monica’s and Caren’s way of talking as moving from a first clear ‘no problem’ orientation to gradually making the statement less secure. We read this as a way for the two women to acknowledge that power imbalances between women and men can exist, although the ‘same value’ repertoire gives them agency to resist the gender order (Connell 1987). When Monica continues, we can also see that she positions herself within a liberal tradition of thinking, where individuals rather than women and men, are in focus: ‘I am me, and you are you. We do this, we do the same’. This idea, of equal value is thus shifting focus away from gendered structures towards individual performances. This is also repeated by Caren:

We need to, actually, see people and individuals instead of gender. I think. Then, of course, it’s obvious that /—/ it’s not the case that we [women] should come out and be men. Like, behave like men like [?] as a stereotypical [man]. So, it is necessary to come out… and be humble… but still determined.

Even though Caren first downplays gender, she also strongly (‘… of course, it’s obvious’) argues that women should not be or behave like men. This talk, we argue, draws on a binary notion of gender. However, the addition about the ‘stereotypical man’ points to an understanding that there are shifting ways of doing masculinity. Her talk highlights the importance of how to ‘come out’ and perform gender (‘humble but still determined’), which we read as an effect of the norm that engineers are men and therefore, she as a woman becomes more visible, and needs to think through how to behave. While positioning herself as an ‘authentic’ engineer drawing on the arguments of ‘same value’ and ‘people and individuals instead of gender’, Caren is still regulated by gendered notions and needs to negotiate how she, as a woman, can become intelligible in the masculine engineering culture. In the next section we give two examples of how gender and age intersect in negotiations about an ‘authentic’ engineering identity. We argue that these examples illustrate contradictions in the ‘women and men have the same value’ repertoire. Although our participants activate this repertoire, drawing on the gender equality discourse, they nevertheless engage in identity negotiations which suggests a troubled position in relation to this repertoire.
The ‘mom’ position

Monica downplays gender as a problem when asked what it is like to study construction engineering. In her narrative, gender and age intersect and are negotiated together in her talk creating a ‘mom’ position:

Monica: They [the male students] are hanging out together. Yes, yes, well … they go exercising and they … eh, studying together, they are always together. Though they are not, they are not a closed group.

So, it’s not like that you’re ‘ah, shit, there they are, I cannot go there’ … Or, maybe someone thinks so, but I don’t. Because … I’m very … too … feel … ehm … I’m not going to say … [I’m] like a mom … But, I don’t feel shy to go forward, or something …

INT: No.

Monica: Because you also notice if they want you to come or if they want you to leave. Or, like, you know …

INT: Mm.

Monica: I’m usually pretty good at feelings. You know … when it’s time to leave, or when you’re welcome or not. Besides, I’ve been out [in the world], I’m a bit older [than the other students] and have a lot of thick skin, I would say.

Monica’s narrative tells us that because she is a woman, she cannot naturally fit in with her male student colleagues and must therefore approach them in some other way. Her age becomes an opening for this – she almost becomes ‘like a mom’ – and thus harmless as a woman to them. But the way Monica talks about it is hesitant (‘I’m very … too … feel … ehm … I’m not going to say … [I’m] like a mom … ’), which tells us the ‘mom’ position is not that untroubled, perhaps because it is not entirely compatible with an engineering identity. Her quick shift towards highlighting her femininity instead thus becomes understandable. So, what we see is how Monica needs to negotiate around her gender and age to become untroubled. Her femininity, she argues, gives her tools to better understand when she is welcomed to be with her male colleagues, and her use of the metaphor of ‘thick skin’ suggests that age has given her strength and resilience, which help to avoid getting caught up in a troubled, too feminine and a too mothering, position.

The ‘boy’ position

Similarly, gender and age work together in Caren’s talk but unlike Monica’s, Caren’s youth make it possible for her to become ‘one of the guys’:

Caren: But, it has to do with how I always, you know, I’ve always had a lot of friends that are boys, I’ve always been one of the gang.

INT: Yes.

Caren: And, the same, like, at high school. We were kind of 30 people, four of whom were girls. It’s like … I don’t, I’m not afraid, I’m not afraid of it. And, then I think that’s, well, because I’ve never been afraid of conflicts. I’m not like, I’ve got a lot of ‘thick skin’. And, very easy to …, nobody can push me down. Never been [pushed down?] will never be. I’m very, you know …

Caren’s argumentation suggests that doing ‘one of the boys’ (e.g. Kvande 1999; Powell, Bagihole, and Dainty 2009) implies a need to be quite tough, since she goes on to say that
she has never been afraid of conflicts or ‘pushed down’. This ‘counter-identification with traditional femininity’ makes Caren intelligible in the engineering context (cf. Danielsson 2012). Like Monica, Caren draws on ‘thick skin’, here as a metaphor for coping with conflicts, and as a resource to explain why she finds it unproblematic to be one of few women in a male-dominated environment such as her study class in engineering.

**Gender equal representation**

Another repertoire, ‘gender equal representation’, brings arguments for getting more women into the field and is specifically used by Layla. In her video diary, she stresses that construction engineering education is particularly advantageous for women in terms of future job offers, an idea she returns to later in the interview:

They are looking for girls. I have checked today on an ad, job advertisement. They have written at the end, eh, ‘we look forward to getting more women’, so they want women. They want. I have been to many different companies, and everywhere they say: ‘we want girls’. We are like, we, they [look for] girls who want to work [as engineers]. My teacher /---/ he told me ‘if you choose to study road construction engineering, then I will guarantee you get a job, even if like ten other experienced guys’… they [the working place] will pick you because you are girl, there are no girls out there. So that’s good I think, there indeed, we have the future for girls [laughs]. Yes.

When Layla says that women are guaranteed a job position within engineering, she positions herself as ‘needed’. Being a woman in engineering thus becomes a ‘no problem’ because an increase in female representation is desired in the field. We argue that the ‘gender equal representation’ repertoire draws on the notion that women and men are different, and/or that women can add something different to the field – either because they are essentially different, or because they have different experiences. Layla’s talk about quoting women into the engineering field becomes understandable based on both ideas.

However, again we see contradictions in the activation of gender equality repertoires. This time, we see that although Layla invokes a repertoire signalling her belief that being a woman in the field is ‘no problem’ and is in fact desirable, her experiences as a woman in engineering are, in fact, troubled by this positionality. In her narrative Layla recounts being met with sexist jokes and pity when she worked at a construction site during her summer holiday:

They were, they were kidding me a lot, they thought I will not stay [within construction work] and they saw me as a pity. You know … not strong really, and I have nothing masculine, I was like … a little girl.

Layla was placed in a troubled position because, as we interpret her talk, she was seen as ‘a pity’, not strong enough but instead someone to pity. Rather than challenging this notion about herself, Layla expresses that she has ‘nothing masculine’, which in this context made her into ‘a little girl’. So, unlike what we have seen in the other women’s narratives, she does not downplay or negotiate gender. Instead, she even positions herself as bodily different from her male colleagues:

I have been working, eh, this summer, and I became physically tired. If I was a guy, it wouldn’t affect me. Because I worked with guys, and it’s just me who get tired all the time. Because I
feel, well, like, I get my period, and then I’m weak that week. So, I’m a bit weaker than if I would be a boy.

But Layla does not only talk about body differences but also how her male colleagues behave different compared to herself:

Layla: I’ve seen how they are. Really male and, eh, like that

INT: How are you male when you are male?

Layla: They can sit and eat with the same fork for very long, like, they don’t wash it, that’s just a small example.

INT: Yes.

Layla: They eat with the same fork every day without washing it, they are like that. [laughs] They are a bit, you know, sloppy and …

INT: Do you think that’s just because they’re men?

Layla: Yes, but they don’t care.

Further, when Layla talks about duties as a construction engineer, for example, riding the sky-lift, or working outdoors during cold weather in winter, her talk about her ‘weaker’ female body becomes an argument for working indoors instead – avoiding (what she thinks is) cold air and dirty work:

Layla: Well, they [men] dare more.

INT: Mm.

Layla: They are a bit braver. I don’t know if it is just because I’m a beginner, but …

INT: Brave about what?

Layla: Like when there was this ladder [sky lift]. They go up and down many times. But I would like to think, yes, if I have to go up … I had to go, because I had to go, and I thought it was so difficult. But for them … It’s only, ‘what would happen?’ But I would just fall off.

Yes, if you work as a project manager, you’re outdoors. And imagine when it’s cold, when it’s dark, I do not know what, like. I do not know, I feel like a bit weaker, so I will not want to work outside. I want to work at the office now. But if I was a guy, I do not think that would affect me. So that was yes, yes. It is.

Our interpretation of Layla’s talk is that the gender differences she draws on become an argument for escaping outdoor work but still stay in engineering. Thus, biology becomes an advantage for her (cf. Gill et al. 2008) and shows how she can argue for how gender difference matters with help of the gender equal representation repertoire, which thus becomes a resource for her.

A new generation

The third repertoire we found in the narratives is more uncertain than the other two about whether gender equality already exists in Sweden, but is still used as a resource to argue that this is a transient situation. The narratives show how gender equality is discursively
used as a tool to downplay what happens ‘out there’ while individually retaining the ‘no problem’ view. For example, when Monica and Caren give several examples of sexist treatment and joking, they situate this as a problem among the older generation of men and therefore will disappear over time. Monica says:

Monica: But, when I’ve been out now [at a workplace] then, there are quite a lot of older men who work in the construction industry. And they would like to have a comment, and eeh.

INT: What could it be for example?

Monica: Well, yes. The first thing they said just like that: your damn … yes. That was, we were out on a study visit to this place where they were building the foundation for a new IKEA department store. And then, it was me and two more guys, and then he [the boss at the construction site] looked at me and said: ‘Now are you happy?’ ‘Oh, well what do you mean?’ ‘Well, IKEA comes to town so now you can buy napkins and candles.’ ‘Eh, okay? Well. Should I be happier than anyone else here, or how did you think?’

And, eh, so … I can take, I can take … I realize that it was like a joke, but it’s a bit like that, aimed at, against women … like that. And now, I have met some older people and they, they are really old, I was about to say, who will soon retire. They just, they almost looked at me with sadness in their eyes and just: ‘why have you chosen this line of business?’ Poor you. [laughs]. They think we don’t belong out there. But I will not tolerate that, so I will not, yes, yes. I’ll deal with it when I come out there

Now, yes, now it’s quite a lot, the younger generation has another understanding. But I think the 50’s and older people are not.

Although Monica’s story shows how she was positioned to the home sphere through associations to napkins and candles, she argues that it is an old-fashioned idea that doesn’t belong in the society of today. The new, or younger, generation in Monica’s talk is suggested to have another understanding of where women and men can work. Gender equality then, will come when the older men retire. Old men are similarly talked about in Caren’s narrative as having stereotypically views that cause problems for women. Yet again, there is trust in a future generation who is different and works towards equality:

Caren: I think there’s a lot to do, there are plenty of old oddballs, and young oddballs too, for that part, who have a very … rusty view of what … for example what a production supervisor [looks like] … you know. It should be a man with a big stomach and snuff. At least they will not listen to a ‘mere slip of a girl’ standing there and saying: you have to do this [giving orders]. I think so. So, it can definitely be a problem. But I think that if you look at how … because my brother is a plumber … so I know very much about how building … the trade union, works.

INT: Yes exactly. Yes.

Caren: Eh, (—) And they are working against these old structures, and try to turn it around, so I mean there is an active work in the entire construction industry. In order to create, like an equal environment.

Despite an acknowledgement that some older generation (and newer generation) engineers have antiquated views about gender, Caren’s statement suggests a belief that engineering in Sweden is shifting to align with the Swedish gender equality
discourse. The commitment to, and belief in, gender equality as central to Swedish society thus, helps the female students to maintain the idea that being a woman in engineering is not a problem, or at least that it will soon not be so (when old men retire).

In summary, the examples presented demonstrate different ways for the three engineering students to draw on the discourse of gender equality in Sweden to construct themselves as valued and needed as engineers. Our analysis suggests that they align themselves with the gender equality discourse, that is, women and men are equally valuable and should have the same opportunities, therefore, it is important to have equal numbers of women and men in the workplace. However, we also see how the different gender equality repertoires, i.e. how they ‘do’ gender equality, are entangled with how they do gender and other social positions.

Discussion

The results show the importance of combining analysis of identity work with analysis of how discourses are structured and activated in specific contexts. In the engineering contexts, we have explored how the Swedish gender equality discourse is used to argue that gender has no significance for who can become an ‘authentic’ engineer, and how this discourse is taken up by women who seek to position themselves as intelligible within engineering contexts. Our findings suggest that this discourse helps women in engineering to resist being questioned because of gender, as they rely strongly on the repertoire that it should be unproblematic for a woman to enter engineering. However, our analysis also suggests that although women do rhetorical work to build up the gender equality discourse, and to occupy untroubled positions as engineers, gender still plays a role in their experiences in the male dominated field. Our analysis also shows how the women explain how gender has (or does not have) significance, but their narratives reveal contradictions in how they talk about gender equality and how they ‘do’ gender. For example, in all three repertoires, participants’ narratives of experience revealed contradictions with their espoused views on gender equality, which required participants to do significant identity work to find a place in engineering. While our data does not permit an analysis of performances, our analysis helped us to determine which repertoires women activate as they negotiate ‘doing gender’ and ‘doing engineer’, and the contradictions and congruencies therein.

We suggest that depending on repertoires the women activate, and how they interpret gender, the contradictions highlighted in the repertoires vs narratives of experience may impose rhetorical dilemmas that require them to negotiate their gendered identities. How they negotiate might depend on the intersection of other social categories (e.g. age) and may result in positionings that yield intelligibility in the engineering context (e.g. the mom or the boy positions) but at the same time can become limiting or entrenching. How gender is interpreted also affects whether the gender equality discourse helps to take a position as an ‘authentic’ engineer. For example, as illustrated in Layla’s case, essentialist interpretations of biological sex can go hand in hand with the gender equality discourse, which paradoxically then contributes to maintaining a gender-segregated labour market in the form of female engineers performing certain tasks while males perform others. Consequently, the gender equality discourse can become a resource for women engineers, in that it makes a ‘gender neutral’ positioning as an ‘authentic’ engineer possible. However, there is also a dilemma in how a perceived gender neutrality implied by the
gender equality discourse can obscure remaining obstacles for women in engineering. Here, a ‘no problem’ position that participants take across the three repertoires signals a desire to uphold the vision of gender equality that Sweden constructs, but obscures gender troubled positions in engineering, as it so strongly assumes that Swedish women’s position in engineering ought to be untroubled. This calls for more research around what gender equality discourses do for individuals in highly gender segregated professions and education, both regarding how such a discourse intersects with a broad range of social categories, but also ways in which it may inhibit and/or support change in organizations and educations.

Disclosure statement
No potential conflict of interest was reported by the author(s).

Funding
This work was supported by Vetenskapsrådet [grant number: 2014-0223].

Notes on contributors

**Eva Silfver** is Professor of Education at the Department of Education, Umeå University, Sweden. Her research – often within the context of teaching and learning science and technology – spans issues of race, ethnicity, gender, social class, ability and disability and has been underpinned by engagements with post-structural thinking about power, the subject, space, and the political.

**Allison J. Gonsalves** is Assistant Professor of Sociocultural Issues in Science Education at the Department of Integrated Studies in Education, McGill University, Montréal, Canada. Her research program involves the tracing of “science identity trajectories” across learning spaces, and the intersections of social identities experiences that shape these movements. She has worked extensively in the area of gender and physics education research, and her current research program investigates the role of science outreach in post-secondary students’ identity work in STEM fields.

**Anna T. Danielsson** is Professor of Science Education at the Department of Mathematics and Science Education, Stockholm’s University, Sweden. Her research interests are centred around issues related to gender, identity, and power in the context of teaching and learning science and technology.

**Maria Berge** is Associate Professor in science and technology education at Umeå University, Sweden. She holds a PhD in Engineering Education Research. Her research interests are centred around issues related to interactional patterns and norms in the context of learning science and technology.

ORCID

Allison J. Gonsalves [http://orcid.org/0000-0001-5613-0689](http://orcid.org/0000-0001-5613-0689)

Anna T. Danielsson [http://orcid.org/0000-0002-3407-9007](http://orcid.org/0000-0002-3407-9007)

Maria Berge [http://orcid.org/0000-0003-3614-1692](http://orcid.org/0000-0003-3614-1692)

References

Arlett, C., F. Lamb, R. Dales, L. Willie, and E. Hurdle. 2010. “Meeting the Needs of Industry: Three Drivers for Change in Engineering Education.” Engineering Education 5 (2): 18–25. doi:10.11120/ened.2010.05020018.
Berge, M., E. Silfver, and A. Danielsson. 2019. “In Search of the New Engineer: Gender, Age, and Social Class in Information About Engineering Education.” European Journal of Engineering Education 44 (5): 650–665. doi:10.1080/03043797.2018.1523133.

Billig, M. 1987. Arguing and Thinking: A Rhetorical Approach to Social Psychology. University Press: Cambridge.

Butler, J. (1990) 1999. Gender Trouble: Feminism and the Subversion of Identity. New York: Routledge.

Butler, J. 2005. Giving an Account of Oneself. Fordham University Press.

Carlone, H. B. 2004. “The Cultural Production of Science in Reform-Based Physics: Girls’ Access, Participation, and Resistance.” Journal of Research in Science Teaching 41 (4): 392–414.

Carlone, H. B., and A. Johnson. 2007. “Understanding the Science Experiences of Successful Women of Color: Science Identity as an Analytic Lens.” Journal of Research in Science Teaching 44 (8): 1187–1218. doi:10.1002/tea.20237.

Connell, R. 1987. Gender and Power. Cambridge: Polity.

Crenshaw, K. 1991. “Mapping the Margins: Intersectionality, Identity Politics, and Violence Against Women of Color.” Stanford Law Review 43 (6): 1241–1299.

Danielsson, A. T. 2012. “Exploring Woman University Physics Students ‘Doing Gender’ and ‘Doing Physics’.” Gender and Education 24 (1): 25–39. doi:10.1080/09540253.2011.565040.

Danielsson, A. T., A. J. Gonsalves, E. Silfver, and M. Berge. 2019. “The Pride and Joy of Engineering? The Identity Work of Male Working-Class Engineering Students.” Engineering Studies 11 (3): 172–195. doi:10.1080/19378629.2019.1663859.

Davies, B., and R. Harré. 2001. “Positioning: The Discursive Production of Selves.” In Discourse Theory and Practice: A Reader, edited by M. Wetherell, S. Taylor, and S. J. Yates, 261–271. London: Sage.

de los Reyes, P., and D. Mulinari. 2005. Intersekionalitet – kritiska reflektioner över ojämlikhetens landskap [Intersectionality – Critical Reflections of the Landscape of (in)Equatilities]. Malmö: Liber.

Du, X. Y. 2006. “Gendered Practices of Constructing an Engineering Identity in a Problem-Based Learning Environment.” European Journal of Engineering Education 31 (1): 35–42. doi:10.1080/03043790500430185.

Edley, N. 2001. “Analysing Masculinity: Interpretative Repertoires, Ideological Dilemmas and Subject Positions.” In Discourse as Data: A Guide to Analysis, edited by M. Wetherell, S. Taylor, and S. J. Yates, 198–228. London: Sage.

Edley, N., and M. Wetherell. 1999. “Imagined Futures: Young Men’s Talk About Fatherhood and Domestic Life.” British Journal of Social Psychology 38 (2): 181–194. doi:10.1348/014466999164112.

Faulkner, W. 2007. “Nuts and Bolts and People!: Gender-Troubled Engineering Identities.” Social Studies of Science 37 (3): 331–356.

Faulkner, W. 2009. “Doing Gender in Engineering Workplace Cultures. II. Gender in/Visibility Paradox.” Engineering Studies 1 (3): 169–189. doi:10.1080/19378620903225059.

Faulkner, W. 2000. “Dualisms, Hierarchies and Gender in Engineering.” Social Studies of Science 30 (5): 759–792.

Foucault, M. 1971. Diskursens ordning [The Discourse Order]. Stockholm: Brutus Östlings Bokförlag. Foucault, M. 1972. The Archaeology of Knowledge. London: Tavistock.

Foucault, M. 1983. “Afterword: The Subject and Power.” In Michel Foucault.Beyond Structuralism and Hermeneutics, edited by L. Dreyfus, and P. Rabinow, 208–226. Chicago: University of Chicago Press.

Gill, J., J. Mills, S. Franzway, and R. Sharp. 2008. “Oh You Must Be Very Clever! High-Achieving Women, Professional Power and the Ongoing Negotiation of Workplace Identity.” Gender and Education 20 (3): 223–236. doi:10.1080/09540250801968990.

Gonsalves, A. J. 2014. “Physics and the Girly Girl—There Is a Contradiction Somewhere!: Doctoral Students’ Positioning Around Discourses of Gender and Competence in Physics.” Cultural Studies of Science Education 9 (2): 503–521. doi:10.1007/s11422-012-9447-6.

Gonsalves, A. J., E. Silfver, A. T. Danielsson, and M. Berge. 2019. “It’s Not My Dream, Actually’: Students’ Identity Work Across Figured Worlds of Construction Engineering in Sweden.” International Journal of STEM Education 6 (13): 1–17.

Government Offices of Sweden. 2020. https://www.government.se/information-material/2019/03/gender-equality-policy-in-sweden/.
Encouraging Student Interest in Science and Technology Studies. Paris: Organisation for Economic Co-operation and Development.

Henwood, F. 1998. "Engineering Difference: Discourses on Gender, Sexuality and Work in a College of Technology." Gender and Education 10 (1): 35–49. doi:10.1080/09540259821087.

Holli, A. M., E. Magnusson, and M. Rönnblom. 2005. "Critical Studies of Nordic Discourses on Gender and Gender Equality." Nordic Journal of Women’s Studies 13 (3): 148–152.

Holth, L. 2015. Den Raka och den Kroika Vägen – Om Genus, Ingenjörer och Teknikkarriärer [The Straight and the Winding Way – Gender, Engineers and Technology Career]. PhD diss., Karlstad University.

Jones, R. 2002. “That’s Very Rude, I Shouldn’t Be Telling You That’: Older Women Talking About Sex.” Narrative Inquiry 12 (1): 121–143. doi:10.1075/ni.mi.12.1.18jon.

Kvande, E. 1999. "In the Belly of the Beast: Constructing Femininities in Engineering Organizations." European Journal of Women’s Studies 6 (3): 305–328.

Laws, C., and B. Davies. 2000. "Poststructuralist Theory in Practice: Working with "Behaviourally Disturbed" Children." Qualitative Studies in Education 13 (3): 205–221.

Leigh, E. F. 2016. "Judith Butler and Leadership: Reimagining Intelligibility, Social Change, and Leadership Discourse." Journal of Leadership Studies 10 (2): 69–81. doi:10.1002/jls.21466.

Male, S. A., A. Gardner, E. Figueroa, and D. Bennett. 2018. “Investigation of Students’ Experiences of Gendered Cultures in Engineering Workplaces.” European Journal of Engineering Education 43 (3): 360–377. doi:10.1080/03043797.2017.1397604.

Mäkimurto-Koivumaa, S., and P. Belt. 2016. "About, For, In or Through Entrepreneurship in Engineering Education." European Journal of Engineering Education 41 (5): 512–529.

Mellström, U. 1999. Män och deras maskiner [Men and Their Machines]. Nora: Nya Doxa.

National agency for Higher Education. 2014. http://www.uka.se/download/18.12f25798156a345894e1f49/1487841916897/040129.pdf.

Ness, K. 2012.

Nordic Journal of Women’s Studies

Ong, M., J. M. Smith, and L.-T. Ko. 2017. “Counterspaces for Women of Color in STEM Higher Education: Marginal and Central Spaces for Persistence and Success.” Journal of Research in Science Teaching 55 (2): 206–245.

Phoenix, A. 2006. “Interrogating Intersectionality: Productive Ways of Theorising Multiple Positioning." Kvinder, køn & Forskning 2-3: 21–30.

Pincus, I. 2002. The Politics of Gender Equality Policy. A Study of Implementation and Non-implementation in Three Swedish Municipalities. PhD diss., Örebro University.

Powell, A., B. Bagihole, and A. Dainty. 2009. “How Women Engineers Do and Undo Gender. Consequences for Gender and Equality.” Gender, Work and Organization 16 (4): 411–428.

Powell, A., B. Bagihole, and A. Dainty. 2011. “A Poisoned Chalice? Why UK Women Engineering and Technology Students May Receive More ‘Help’ Than Their Male Peers.” Gender and Education 23 (5): 585–599. doi:10.1080/09540253.2010.527826.

Reay, D., and D. Willam. 1999. “‘I’ll be Nothing’: Structure, Agency and the Construction of Identity Through Assessment.” British Educational Research Journal 25 (3): 343–354. doi:10.1080/0141129290250305.

Smyth, F. L., and B. A. Nosek. 2015. “On the Gender-Science Stereotypes Held by Scientists: Explicit Accord with Gender-Ratios, Implicit Accord with Scientific Identity.” Frontiers in Psycology 6 (415): 1–19. www.frontiersin.org.

Stepulevage, L., and S. Plumeridge. 1998. “Women Taking Positions Within Computer Science.” Gender and Education 10 (3): 313–326.

Taylor, S. 2001. “Locating and Conducting Discourse Analytical Research.” In Discourse as Data: A Guide for Analysis, edited by M. Wetherell, S. Taylor, and S. J. Yates, 5–48. London: Sage.

Tonso, K. 2006. “Student Engineers and Engineer Identity: Campus Engineer Identities as Figured World.” Cultural Studies of Science Education 1 (2): 273–307.

UKÄ. 2020. Universitetskanslersämbetet Analysavdelningen, löpnummer 2020-03-23 https://www.uka.se/download/18.4dfca4c017137ea94033d3/1587032843135/Statistisk%20analys%20examinerade%202020-04-16.pdf.
Walker, M. 2001. “Engineering Identities.” *British Journal of Sociology of Education* 22 (1): 75–89.

Wetherell, M., and J. Potter. 1988. “Discourse Analysis and the Identification of Interpretative Repertoires.” In *Analysing Everyday Explanation. A Casebook of Methods*, edited by C. Antaki, 168–183. London: Sage.

Wetherell, M., S. Taylor, and S. J. Yates. 2001. *Discourse Theory and Practice. A Reader*. London: Sage Publications.