

Exploring the 'possible selves' available to male and female engineering graduates



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Lane (1997: 41) argued nearly a decade ago that “[engineering] is a subject where women are currently catastrophically underrepresented”. Unfortunately, this statement still holds true as the UK appears to have the lowest proportion of female engineering professionals in the EU (Kiwana *et al.*, 2011) with only five and a half per cent working within the sector (ONS, 2015). In this paper we try to understand how the journey of seven engineering graduates unfolds in gendered ways: how their graduate, professional identities are being elaborated and developed, how they project themselves into the future and how their career choices are affected by gender.

Background

The transition from education to employment for women engineers seems to be quite thorny as they have to adopt stereotypical ‘masculine values’, such as “a fascination with technology, expertise as a tinkerer, and an aggressive style of self-presentation” and



learn and perform masculine norms of attitude and interaction (McIlwee and Robinson, 1992: 50). Thus women, in order to pass the ‘rite of passage’ and gain authority and legitimacy as engineers, have not only to adjust and conform to the dominant masculine culture, but also internalise the professional identity to demonstrate solidarity with others in the profession (Dryburgh, 1999). For these reasons, women engineers tend to gradually ‘eliminate’ themselves from the industry. Statistics from the UK labour market confirm that the leaky pipeline of graduates is not sealed at this early career stage as only half (51 per cent) of female STEM (Science Technology, Engineering and Maths) graduates actually go on to work in STEM roles, compared with over two thirds (68 per cent) of male STEM graduates (WISE, 2015).

In order to explore male and female engineering graduates’ orientation towards the future, as well as “why the tendency for young women and men to sort themselves (or at least allow themselves to be sorted) into different occupations is so persistent” (Lips, 2007: 52), we adopted the theory of ‘possible selves’ (Markus and Nurius, 1986). Possible selves could be seen as cognitive structures within the self-concept that contains a person’s aspirations, motives, and goals (Markus and Wurf, 1987) and can have a strong impact on an individual’s motivation and actions (Markus and Ruvolo, 1986).



As Hardgrove and her colleagues (2015: 163, italics in original) stress, “a conceptualisation of possible selves identifies the means by which imagined futures become *motivational*, influencing young people’s actions within the immediate and towards the imagined”. However, possible selves can only include those selves that are possible to perceive (Stevenson and Clegg, 2011) and they reflect gender-stereotypic content thus reflecting traditional gender norms (Brown and Diekmann, 2010).

Methodology

This paper draws on data from all the in-depth, semi-structured interviews undertaken in both the phases of the Paired Peers project (PP), a large longitudinal qualitative study funded by the Leverhulme Trust examining the progress of a cohort of seventy-three students through their undergraduate degree course in England and their post-graduation experiences in the labour market. There were six interviews in phase one (two per year) and two in phase two (one per year). We chose to focus only on those students who are still in our cohort, that is, only four male and three female engineering students. A summary of the participants by self-reported social class, university, degree grade, current destination and current salary at interview eight (PP2) is shown in the table below.

Table 1: Details of the participants

Pseudonym	Social Class	University	Degree Grade	Current Destination	Current Salary
Craig	Middle Class	Bristol	First	Graduate scheme (construction machinery)	£28,000 (starting salary)
Nicholas	Middle Class	UWE	2:2	Graduate scheme (automotive)	Not disclosed
Rob	Working Class	UWE	2:1	Graduate scheme (marine technology)	Mid-20,000s (starting salary)
Marcus	Working Class	Bristol	2:1	Graduate scheme (automotive)	£31,500 (starting salary)
Lizzie	Working Class	Bristol	First	1) Internship (aerospace) 2) Graduate scheme (automotive)	1) £14,500 per year 2) Not disclosed
Jennifer	Middle Class	Bristol	First	1) Waitress (full time) 2) Graduate scheme (aerospace)	1) Minimum wage 2) £26,000 (starting salary)
Amber	Middle Class	UWE	2:2	1) Internship-environmental consultancy firm 2) Exam invigilator 3) Cover work in secondary school 4) Intern design engineer 5) Pub work 6) SEN teaching assistant	1) £10 per day 2) Not disclosed 3) Not disclosed 4) £24,000 5) Not disclosed 6) £22,000

Findings

In the first interviews there was little difference in the attitudes and aspirations between male and female engineering students. However, as the study continued, patterns of gender differentiation emerged. The narratives indicate that the female graduates lacked a long-term career planning attitude and had difficulty in constructing possible selves as engineers. Our data indicated that the most likely reasons for this might be the gender stereotypes that are reproduced within the university and the workplace, as well as the lack of 'script' available to them.

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Aspirations

Both the male and the female participants, throughout university, had constructed their ideal selves to be academically successful. However, the female participants, as research already suggests (Lips, 2004), were less confident about their academic abilities. Whilst at university, all the participants aspired to work in 'hard-core' engineering occupations that would give them high status. After the first interview though, the female participants appeared to gradually abandon their ambitions to work in hard-core engineering positions and be confused as far as their goals were concerned:

"At first I was like 'oh yeah I definitely want to be an engineer' [...] but I feel like being here [at university] has made me realise like there's more to life than just studying and wanting to be an engineer or whatever it is. So I'm like 'oh do I really want to do this'" [Jennifer, Transcript 6]

Career planning

The male participants, while at university, tried to get the most relevant job experience or knowledge possible through obtaining internships and studying abroad for a year. Upon leaving university and their movement throughout their occupations they appeared determined and confident. At the job application stage they made strategic choices thinking about the long-term from the very beginning:

"I sort of moved on from [company 1] because I thought although I'm enjoying what I'm doing, it hasn't got the longevity there for the size of the company to move up or expand. There's only so far you can go before you hit the glass ceiling and that's you finished." [Rob, Transcript 7]

Once accepted on to a graduate scheme, they continued planning ahead and appearing to be ambitious.

Interestingly, we managed to find only few instances of career planning in the interviews with our female participants as they have shown much lower levels of career planning throughout and post-university:

"I'm like 'oh do I really want to do this?' I feel like I'm having a bit of a mid-life age 20 crisis." [Jennifer, Transcript 6]

As a result of their uncertainty none of the female engineering graduates were at first working in engineering graduate schemes. Jennifer waitressed at a local pub for a year, despite the fact that she had secured a graduate scheme, in order to save money for travelling; Lizzie initially did an internship while Amber, who originally aspired to work for Formula 1 [Transcript 1], after two internships with two engineering companies, decided to change career and is currently a teaching assistant. She described her efforts to remain in engineering as: "I was more trying to convince myself that it was what I wanted to do, but it's not" [Transcript 7].

These findings posed further research questions about why these young female engineering graduates were not able to plan for their careers. The lack of a career planning attitude might be attributed to the lack of a 'script' to follow as they chose to follow a career in a male-dominated field. As Dasgupta and Stout (2014: 24) note, "[a]ccess to role models and mentors influences successful professional development". Indeed, Lizzie [Transcript 8] admitted that she was initially 'overwhelmed and daunted' by engineers as she did not see them as being 'like her':

"Because like when I was at work, obviously I'm in an environment with lots of engineers who are all – like to me – scary because they're all like 'oh they're...' you know they've gone through it, they're wise in their engineering, but I'm still there and having to talk and interface with them on a day to day basis, so when I went to interviews I wasn't as overwhelmed and daunted by these people." [Lizzie, Transcript 8]

In the quote above, we can witness not only the insecurity of Lizzie towards her 'wise' - male - colleagues but also the 'rite of passage' she went through and her adaptation to the dominant engineering culture (Dryburgh, 1999). It would appear that Lizzie would benefit from having a mentor who could provide her with support, exposure, acceptance and protection (Durbin, 2010; Durbin and Tomlinson, 2014; Lopes *et al.*, 2015).

Influences and stereotypes

Another reason why the female graduates might have gradually 'blocked' their aspirations towards their initial ideal selves could be linked with the notion that they were highly concerned about parenthood and the negotiation between their public and personal lives:

"It's something that I've been worrying about actually. I would quite like a family one-day [...] I don't know how that works. It's like you don't want to be a part time mum, part time job. You don't want to have to compromise one or the other." [Jennifer, Transcript 4]

Therefore, within this data one issue appears to be that female engineering graduates, in a sense, are 'not allowed to' see themselves in a position of status within the engineering industry if they want to have a family later on.

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"I think it's something you'd have to take into consideration in a career because you wouldn't be able to climb the ladder within a business. I don't think you'd have the motivation for that whilst maintaining a child." [Marcus, Transcript 4]

Conclusions

Our data indicate that the female engineering graduates, as opposed to their male colleagues, appear unable to develop a career planning attitude that allows them to maintain their motivation towards building and establishing a successful career in the engineering industry. As a result, they have less developed possible selves in relation to their careers. We could argue that the possible selves available to engineering graduates are definitely embedded with specific sociocultural values: men aspired for managerial jobs and expected to be the main providers (see Marcus) while women saw themselves as those who would be responsible for the raising of the children. But what can be done in order to encourage young women see themselves as engineering professionals?

There have been numerous government and charity-led initiatives in the UK in order to encourage young women to see themselves working in STEM. Other initiatives, such as 'Mentoring Professional Women in Aviation and Aerospace' (Lopes *et al.*, 2015), focus on the retention, nurturing and development of women in engineering in particular.

These initiatives undoubtedly enable some women to consider engineering as a future occupation. However, as Williams (2015) argues, the low numbers of women in STEM professions does not appear to be solely a pipeline issue but a gender bias one. In order to tackle bias, we need to understand:

“...the complex processes which are cultural and structural and which are also political (legislative changes and ideological beliefs) as well as functional and strategic (changes in job descriptions for particular positions.” (Evetts, 1998: 154)

In addition, we argue that a ‘possible selves’ conceptualisation indicates that we need to encourage young women and men to strive for “alternative imaginaries” (Bastalich *et al.*, 2007: 395) to find a new engineering image which disrupts established norms, divisions, practices and inequality.

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About the authors

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