



**University of Salford**  
A Greater Manchester University

*Education in a Changing  
Environment Conference*

## **Women in SET: The Consequences of a Gendered Education System**

**Dr Haifa Takruri-Rizk MBE**

**School of Computing, Science and Engineering**





**University of Salford**  
A Greater Manchester University

# Acknowledgments

## **Co-Authors**

**Natalie Sappleton**

**Sunrita Dhar-Bhattacharjee**

## **ESF/UK funding**

[www.cse.salford.ac.uk/gender](http://www.cse.salford.ac.uk/gender)



# Outline

- \* Background
- \* Methodology
- \* The literature
- \* Our Data: School/family, university and industry experiences
- \* Conclusions



# Background

## Projects

- ✦ Developing Female Engineers' (DFE)
- ✦ 'Women in North West Engineering' (WEWIN)



# Methodology

- \* Literature Review
- \* Mix of quantitative and qualitative data collection
  - \* Online and paper questionnaires
  - \* Semi-structured Interviews
  - \* Focus groups
- \* Data analysis – SPSS & Nvivo



# Literature – Career/Teacher Advice

- ✦ In a study of the influence of **careers advisers and science teachers** on the choices of school pupils found that careers advisers were reluctant to challenge **young people's stereotypes** due to the model of guidance which they were expected to follow (Munro and Elsom, 2000)



# Literature – Ignorance & Stereotype

- ✦ **“7 out of 10 children** of secondary school age say they know either not very much or nothing at all about engineering. And when boys and girls are looked at separately, it emerges that **8 out of 10 girls** say that they have little or no knowledge of the professions. Only **four** per cent of girls say they are likely to consider engineering as a career. **Over half of all children still associate engineering with a dirty working environment;** two fifths think it will offer interesting work, but only a third associate it with good pay” (MORI School Survey, 2001).



# Literature – HE/ Learning Style

- \* Heather Stonyer from Auckland University of Technology, New Zealand, makes a point saying that “women prefer **engineering** to be linked to **social context** and needs...and to learn in **cooperative classrooms** that encourage engagement to peers” (Stonyer, 2002).





# Literature- Learning Style

- \* “Women tend to favour **relational learning**, which associates applications to theory. They enjoy **group work** and a **collaborative approach** when there is a critical mass of women in the group. To retain women who have chosen this path, it is important to provide **networking and mentoring** opportunities and create a climate that **integrates and respects feminine values**” (Frize, 2001, p.34).



## Literature – HE / Solutions

- ✦ Powell et al in a UK based study suggest that engineering and related courses have been **designed for male students**. They urge HE engineering to **review structures, culture, practices and curriculum** in order to retain female engineering graduates and improve the appeal of the sector to women (Powell et al, 2004).
- ✦ Williams et al (2002) developed an innovative staff development training offered by the Let's TWIST project. The training targeted academics teaching SECT subjects in further and higher education in the UK and in Portugal



# Literature – HE / Solutions

- ✦ Shull and Weiner (2002) investigated techniques to improve the retention of women in engineering studies by employing information technology to enhance the women's self-perception and motivation.
- ✦ Zeldin and Pajares (2000), they used the self-efficacy theory to apply teaching methods designed to embrace educational attributes, motivation, effort and persistence.

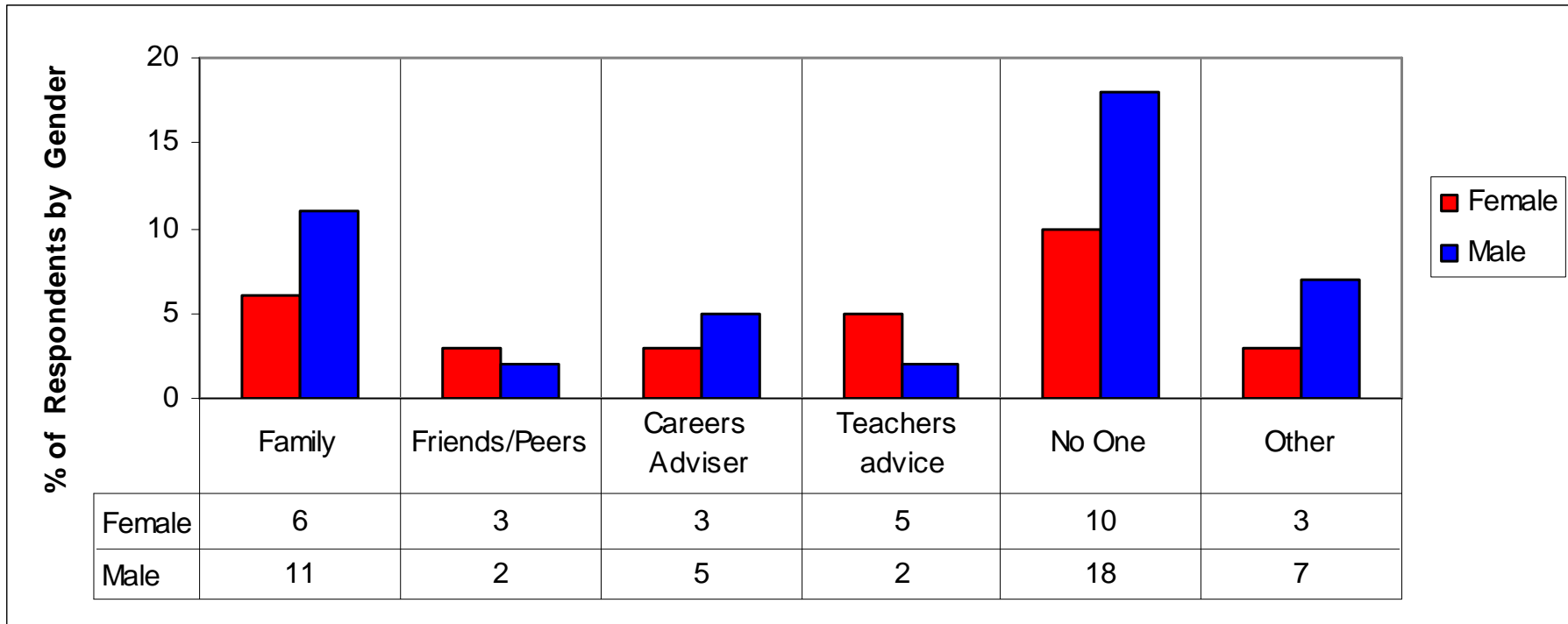


# Industry/Academia – The Outcome

- \* Women are considerably underrepresented in certain engineering-related occupational fields such as civil engineering (Gale, 1994)
- \* Many of them leave the profession altogether to pursue alternative careers such as teaching, while the main occupational outcome for men SET graduates is management (Smeaton et al, 1997, Fielding & Glover, 1999).
- \* Even in education and academia qualified female engineers are extremely underrepresented in senior positions (Bagilhole, 2002).
- \* Bebbington provides us with an extreme example: there was 148 civil engineering professorships in the UK in 1997/1998 – all held by men. In 2000/2001, this figure had increased to 185 professors – again, none of these were women (Bebbington, 2002).



# Who influenced your career choice?





## Family (Positive) / Career Advisor (Negative)

*“I’ve just always tinkered. ... My Dad is an Engineer so I’d got some idea of what it entailed but when I came to actually talk to my Careers Advisor he actually put me off. He actually said, ‘What on earth do you want to go and do Engineering for?’”*

**(Female Focus Group member, 26-30yrs )**



## School & Family

- \* *“...if I didn’t have my family members that were already in engineering... maybe I wouldn’t have managed to have discovered that avenue”*

**(Female in her 30s working in engineering, 30 - )**

- \* *“... if I go back to school, initially I was told that the work experience that I wanted to do, I couldn’t do and they sent me to a primary school to do work experience as a primary school teacher even though I had asked for laboratory technician or the army, which were options that were available at the time.*

**(Female, Managing Director, Industrial Engineering Firm, 31-45 yrs)**



## Career Teacher (Negative)

✦ *“...I went to see the careers teacher and she said, ‘Don’t you know what you want to do?’ and at the time I was...and she said, ‘Well have you considered being a nursery nurse?’ and I thought ‘Right’...”.*

**(Female Aeronautical Engineer, 26-30 yrs)**

✦ *“I don’t think schools promote it for girls. My careers, it’s a long time ago but my careers advice at school was absolutely rubbish. I think all the girls were told to be a teacher or a nurse and of course I went in and went, “No, I want to be an Engineer.” And they didn’t know what to say to me so that was it. You did it on your own.”*

**(Female Highways Engineer, 26 – 30)**





# The Image !

*“...they seem to get more women... on the Continent an engineer is a professional status akin to a doctor or something like that whereas in the UK we have a very queer status for engineers because people call engineers the guy who I would call the mechanic or something like that ... I mean there's... certainly an ignorance at school level; schools don't know what engineers do”*

Female, Managing Director, Oil and Gas Consultancy, 45+ yrs



# Higher Education- Denial

✱ *“I believe most women can’t see themselves in engineering roles so they do not pursue. Women’s own perception is the main factor. Prime time TV influences them”*

**(Male engineering student)**

✱ *“If a woman really wanted to go into engineering then they would and it would not bother them that it’s male dominated. IT’S WHAT YOU CALL DETERMINATION”*

**(Female engineering student)**



# Higher Education

- ✦ *“If a woman really wanted to go into engineering then they would and it would not bother them that it’s male dominated. IT’S WHAT YOU CALL DETERMINATION”*

**(Female engineering student)**

- ✦ *“What you do at Uni is completely different to what you do in the real world... I know lots of people that did leave... it wasn’t what they were expecting because I don’t think people know what to expect; but it was just alien to them and the sort of pressure that you are put under as soon as you start; the hours that you are expected to do, and the things that you are expected to deliver within the timescales...”*

**(Female Highways Design Engineer, 26-30 yrs)**



## Importance of practical/industrial experience

*“It gave my degree practical relevance. I found I was more focused when I returned to University to complete my degree. It also gave me confidence in my ability and made me feel certain I wanted to pursue a career in engineering”*

**(Female Engineer)**



## Industry - Barriers

- ✦ *“They’re not very family friendly. The hours, for instance, we work a 42-hour week, and that 42 hours is defined as you clock in and out... if you persisted in leaving early then you’d get slated”*

**Male, Chemical Engineer, 31-45 yrs**

- ✦ *“I never did any more hours than I had to... Well I wasn’t really committed as such... That’s partly why I didn’t progress. I think if you gave more hours and more determination and stuff...”*

**Female, Former Civil Engineer, 31-45 yrs**

- ✦ *“I have encountered problems visiting factories and sites where people tend to think I am the secretary and when they realise I am the engineer they look surprised”*

**(Female Engineer)**



# Conclusion

## Need for further action:

### School

- \* Better awareness of what is SET and the possible wide-ranging SET careers
- \* Better training for career teachers/advisors – stop career stereotyping

### University

- \* review structures, culture, practices and curriculum in order to retain female SET graduates and improve the appeal of the sector to women

### Industry

- \* Review the organisational culture and working practices – remove the barriers



**University of Salford**  
A Greater Manchester University

# Any Questions?



**H.Takruri-Rizk@salford.ac.uk**

**[www.cse.salford.ac.uk/gender](http://www.cse.salford.ac.uk/gender)**