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Editorial

I recently went to see the film Made in Dagenham which is a semi-fictional account of a group of women machinists working at Ford, whose strike action in 1968 was the catalyst for the introduction of the UK's Equal Pay Act two years later. An uplifting portrayal of the events, if perhaps not entirely historically correct, which set me thinking about the thorny issue of the gender pay gap in SET. While we have certainly moved on from the days in which the principle of unequal pay for women was embedded by both employers and trade unions in their assumptions about wage entitlements, the rhetoric of the gender pay gap is still a major element in current discourses about women in SET. The new statistics guide just published by the UKRC provides some useful figures in this respect, including two possibly surprising facts - firstly that the pay gap in SET within the UK is smaller than in other sectors, and secondly that professionally qualified women in SET working part time in the UK actually earn *more* per hour than their full time counterparts.[1] It is clear that the issue of equality of pay, promotion and working conditions for men and women in SET is now more complex and multifaceted than in the late 1960s and one that merits further research.

We are delighted to have Sharon Bell's perspective piece about the status of women and SET in Australia, which follows up on the national perspective from Korea in our previous issue. Drawing on her research report for the Australian government, which can be viewed as a supplementary file to this article, Bell offers a series of practical measures to implement culture change. She wisely warns against 'premature abandonment of a half-prosecuted gender agenda' (p.448), which she sees as a danger in the Australian context but which could equally be applied in across the globe. She stresses the need for top-level commitment to ensure that change continues to be embedded.

The importance of top-down leadership in setting the agenda for organisational change is also the theme of the article by McNeely and Hopewell. The authors focus on a fascinating and very under-researched area, namely the speeches of university leaders on the issue of women and STEM (prompted in part by the now infamous pronouncements of Harvard President Larry Summers in 2005). The 'speech events' are explored using a discourse analysis method, corpus analysis, which looks at the use of selected keywords across a body of related texts. The authors examine the frequency of use of keywords, how these keywords are associated with each other, the contexts in which these keywords are spoken and explore how these contexts relate to each other across both time and place. In particular, in exploring the extent to which gender and diversity are addressed relative to STEM disciplines in higher education, McNeeley and

Hopewell illustrate how 'the public face and position of the university, embodied in its leaders, … suggests strategic policy directions and public accountability' (p.328).

Moving to on another under-researched area, Goldberger and Crowe focus on gender inequality in the agricultural sciences and identify gender differences in scientists' doctoral training, farming experience, engagement in professional networking and ties to private industry as factors that influence differential career outcomes. The authors also touch on an important issue that has wider implications, that of research productivity and how this impacts on gendered differences in career progression, echoing recent research by Leahey and Hunter reported in Amanda Goodall's article in the Times Higher Education Supplement (THES[2]). While Goldberger and Crowe's paper is focused on agricultural scientists, the issues raised are applicable across the academic spectrum. In academic life, publication and citations are key factors in career progression. The fact that women continue to publish less than their male colleagues, especially after becoming parents, affects their promotion and progression prospects and indeed can be a contributory factor in the gender pay gap within universities.

Barnard, Powell, Bagilhole and Dainty's overview of research literature about women in SET provides an important resource about the current state of UK research in this area. They conclude that existing research '… has a tendency to situate women as part of the problem' (p371) – and they show how essentialist constructions of science and gender underpin much of the research. Other themes identified in the literature include barriers facing women professionals in SET and their assimilation into work place and professional cultures. Their final section challenges some of the assumptions behind the so called business case for gender equality, concluding that future research must be 'multi-faceted, evidence-based and policy oriented' (p.361).

Turning to another important component of the story of under-representation namely stereotyping, Wyer, Schneider, Nasser-McMillan and Oliver-Hoyo note that while women are well represented in some science and engineering fields (such as psychology and the biological life/sciences) stereotypical representations of masculinity and science are still pervasive. However these stereotypes are complex and do not neatly map on to the assumptions that are often used as explanations for women's under representation. The students in this study drew on a nuanced set of stereotypes, which included notions of what the authors classify as 'professional competencies' and 'interpersonal competencies'. Several of these competencies were ascribed to both male and female scientists resulting in a complex interpretation of influence of stereotypes on participation in STEM fields, one that challenges the notion that it is the gender-based culture of science that 'puts women (and some men) off' .

The case study by Eppes, Milanovic and Sanborn demonstrates the importance of local departmental cultures in successfully embedding gender equality changes – most important were a set of formalised processes combined with strong leadership and mentoring. Interestingly they point out that this can be done without external funding and with limited resources, an important lesson for organisations that are perhaps inhibited from taking action by the imagined resource implications, particularly in the new climate of austerity hitting the higher education sector in many countries.

One of the strategies that is frequently advocated in debates about under representation of girls and women in SET is that of single sex education and training. In an environment

without competition from boys, so the argument goes, girls do better at STEM subjects, and women learning new skills as adults fare better in terms of both personal empowerment and learning outcomes in a women only setting[3]. Roxanne Hughes explores this topic in her paper *Keeping Women in STEM fields* in the context of a single-sex living and learning community for undergraduate students, using a narrative life story methodology.

There are four books reviewed in this issue of the journal. *Becoming an engineer in public universities* edited by Borman, Tyson and Halperin is a collection of rich empirical material drawn from the US university sector, and is reviewed in this issue by Jorg Muller. Muller notes the importance of representing an integrated picture with voices of administrators and staff as well as students, and concludes that this book would be a useful resource for educational institutions that are starting to think about implementation of gender and other equality measures.

This is similar to the conclusion I draw in my own review of *Women and Information Technology* edited by Cohoon and Asprey where I stress the value of evidence-based research on issues of under-representation. The editors not only collate a collection of diverse and interesting field studies, but also use the volume to provide a synthesis of existing research in a similar exercise to the paper by Barnard et al. While a deep knowledge of the existing literature is important for academic scholars, the value of a distilled and readable summary is immediately apparent for policymakers or practitioners who may not have the time to absorb original source materials.

In her review of *Who's afraid of Marie Curie* by Linley Erin Hall (which by the way is not a biography of the famous Nobel prize winner, but an overview of the issues facing women entering science and technology careers) Ruth Wilson gives us a very personal perspective using her own journey through the book. In the process Wilson provides a useful and eloquent explanation of some of the jargon used in the gender and SET literature.

Performing Gender at Work by Elisabeth Kelan, reviewed here by Diane McCarthy, draws on much of Kelan's empirical work with IT companies but also offers a deep theoretical analysis that is equally applicable to other SET industries. As McCarthy notes, 'the strength of Kelan's work lies in her ability to get inside employee networks within transnational and prestigious IT organisations and make them transparent….. The doing of gender in ICT is more than equal numbers (p.478).

In the final credits of the film Made in Dagenham we are told that Ford is now one of the leading employers in supporting diversity and inclusion. Indeed the company is now very proud to claim that the original woman who became the model for the iconic Rosie the Riveter was a Ford worker. Alan Mulally, CEO, sums up their business case for diversity:

> The more we embrace our differences within Ford—diversity of thought, experience, perspective, race, gender, faith and more—the better we can deliver what the customers want and the more successful Ford will be…It's the only business case we need—the only way to satisfy diverse customers is to include their perspectives inside the company" [4]

The company has clearly transformed itself significantly since 1968, and there is potentially a lot to learn about women and SET from the operations of this global enterprise. But we should remember that the catalyst for change came from the Ford women workers, and from the UK government's equal pay legislation, not from company bosses. It is an indication of how far we have come since 1968 that an organisation like Ford now wants to be seen as a leader in the field of diversity and equality.

This issue marks the anniversary of the publication of our first issue in October 2009. The International Journal of Gender Science and Technology is now becoming well established and attracting increasing numbers of submissions and citations as well as proposals and plans for forthcoming special issues. None of this would have been possible without the support and contribution of our peer reviewers, listed below, to whom I would like to extend our sincere thanks and appreciation.

Clem Herman, on behalf of the editorial team: Jennifer Carr, Elizabeth Whitelegg, Helen Donelan, Barbara Hodgson and Gill Kirkup.
The Open University.

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ENDNOTES

[1] See p130 of Women and Men in SET – the UK Statistics Guide 2010 – available from http://www.theukrc.org/files/useruploads/files/final_sept_15th_15.42_ukrc_statistics_guide_2010.pdf.

[2] Leahey and Hunter (2010) 'Parenting and Research Productivity: New Evidence and Methods', *Social Studies of Science*, June 2010, quoted in Goodall A. 'Sisters Winning Formula', *Times Higher Education Supplement*, 30 Sept 2010, pp36-39

[3] Herman C. (2006) 'Crossing the Digital Divide: Experiences of gender and technology in a community ICT Centre' in Trauth, E. (ed) *Encyclopedia of Gender and Information Technology,* Hershey, PA, USA: Idea Group,

[4] http://www.ford.com/dynamic/metatags/article-detail/mulally-diversity-message-626p.