WHY WiSE?

Women in science

The issue of women's under-representation in science has become one of increasing concern over recent years. Although the number of women with STEM qualifications is growing, women working in STEM academia remain a minority – especially in top positions [1]. In marked contrast to men, many women with STEM qualifications do not work in STEM areas and are more likely than men to leave the STEM sector at every stage of the career pipeline. Those who do remain in the workforce are still segregated by occupation (horizontal segregation) and by grade (vertical segregation) [2], and are still paid less than their male counterparts [3]. This gender disparity represents a quantifiable loss to the economy and society, and has an impact on individuals, departments and institutions. At the same time, employers in key sectors are reporting large impending shortages of people with STEM qualifications; whilst the need to grow the STEM sector to drive economic recovery has been well-recognised by the UK government [4]. Essential to this growth, will be the realisation of the full potential of the STEM research base, whose excellence depends upon maximising the talents and skills of *all* its highly-qualified people [2].

The ‘leaky pipeline’

Despite an increasing number of women gaining science undergraduate and postgraduate degrees, there has been little change in the number of women advancing to senior positions in STEM academia, with a profound gender imbalance in grade A academic posts still observed in the vast majority of European countries – even in disciplines where women are well represented [1] [5] [6]. Some analysts perceive the presence of this gap to higher levels as intractable, owing to a lower success rate of women at every career level; others expect the gap to close over time, although this may take many years [7]. What is becoming clear, however, is that simply getting more women into STEM studies will singularly not solve the problem. If ‘getting in’ to the career pipeline has been seen as the issue, ‘getting on’ and ‘staying on’ have received much less attention. The issues of organised resistance to change and the persistence of barriers to career progression must also be addressed [5].

Barriers to progression:
Free and constrained choice

Women’s under-representation in STEM academia results from a complex set of interrelated factors [8]. Some women will have made the positive choice to pursue careers in other sectors, sometimes due to the practical hurdles of family responsibility. Biological factors (fertility choices and work-home balance issues) have been shown to hinder women in all STEM fields, and in maths-intensive fields, career preferences and ability differences have been shown to have an impact [9]. Gender imbalances in STEM, however, have also been shown to be the result of cultural factors that relate to attitudes in the workplace (ingrained cultural and societal issues), the organisation of science and technology with concomitant difficulties in accessing career resources, low female representation at senior levels, and a lack of positive role models [2]. Whilst empirical evidence regarding the causes for women’s under-representation in STEM has gaps and inconsistencies, even among those researchers who believe that women’s choices are the most explanatory factor, they concede that these choices are subject to constraints and socio-cultural influences [10].

Conscious and unconscious bias

Although studies have shown that men and women have equally strong commitment to their academic careers, findings also suggest that the under-representation of women in STEM is most convincingly explained by an academic culture that provides women fewer opportunities, limited support and inequality in leadership [6]. Women have been shown to receive less professional support than men [7], receive grants less often and smaller grant allocations [3] [7] [9], receive fewer citations [10] and fewer scientific awards [11]. Faculty recommendation letters have been found to differ in language use and praise by sex of the evaluated individual [12], and male applicants rated as significantly more competent and hireable than females with identical applications [13]. Where blind peer review processes are employed, women have been shown to benefit [14], although even with gender-blinded grant application committees, differences in gender success rates have been shown to remain. Subtle differences in the grant applications of men and women (such as the number of publications listed and the impact of these publications) have been shown to combine to real effects that are reflected in female success rates. In addition, women often have less time to carry out research, a heavier teaching load, and a greater burden to carry outside the laboratory. Together these factors constitute a harmful mix that results in women frequently being less successful than men over the course of their careers [7].

WiSE@Lincoln: moving forward

Addressing today's causes of under-representation requires focussing on education and policy changes that will make institutions responsive to the differing biological and social realities of men and women [9]. Many UK STEM departments have begun to look at ways in which they can address these issues – for example, by engaging with the Athena SWAN award system. Here at the University of Lincoln, it is the intention that all SET Schools hold at least an Athena SWAN Bronze Award by August 2015. The WiSE@Lincoln initiative has been developed to address our current gender-related concerns for recruitment, retention and progression. It aims to provide support, guidance and inspiration for our women in SET disciplines, whilst feeding into activities already in place at the University for the wider academic community (e.g. *The Lincoln Academy*, and the *Women into Research Network*).

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