

Research Briefing No. 11

Tomorrow's Women, Tomorrow's World

What do key statistics indicate about women's engagement in SET education and employment in the present and in the future?

The occasion of the 2009 UKRC Annual Conference with its theme: the science, engineering and technology workforce and workplace in 2030, has given us an opportunity to review the data we have been gathering from 2002 onwards and use it as the basis for some simple statistical forecasting about women's engagement in SET¹ education and employment in 2030.

We have used a simple forecasting technique² which presumes constant growth i.e. that the changes we have seen in the last five years will continue at the same rate into the future. Some might argue that the present (unpredicted) economic problems are likely to slow – or even reverse - the rate of growth we have seen. On the other hand, others might argue that since previous post-war recessions have not halted the continuous long-term increase in the participation of women in SET, there is no reason to think that this one will. It might even be that the rate of growth will accelerate as science and engineering are now being positively promoted as the growth sectors of the future. Whatever position you take we hope that our forecasts give you data to fuel your thinking.

In this short briefing we used five statistical indicators of the participation of women in SET: in education (GCE A level and Higher Education), in employment, and in positions of power (SET professors and women on the boards of SET FTSE 100 companies). In each case we show you where women will be in 2030 if growth continues at the same rate as it has been in the last five years. In many cases the 2030 situation will be a long way away from a state of equity with men. We hope these forecasts contribute to the debate about where we can best make an impact to improve women's participation in SET, and increase the UK's future capacity in SET.

WHERE ARE WE NOW?

- Girls are 42.4% of GCE A level students in STEM subjects.
- Women make up 33.5% of all higher education (HE) students in SET disciplines.
- Women represent 18.5% of SET employees.
- Women hold 9.0% of directorships in the UK FTSE 100 companies in SET sectors.
- 8.0 % of all SET professors are female.

WHERE WILL WE BE IN 2030?

- Girls will be 45.7% of GCE A level students in STEM subjects.
- Women will make up 39.4% of all HE students in SET disciplines.
- Women will represent 20.9% of SET employees.
- Women will hold 18.0% of directorships in the UK FTSE 100 companies in SET sectors.
- As many as 28.3% of SET professors will be female.

WHEN WILL WE ACHIEVE EQUAL PROPORTIONS OF WOMEN AND MEN?

- Female and male GCE A level students in STEM subjects will be equally represented in 2058.
- Female HE students in SET disciplines will reach 50% representation in 2069.
- Proportion of women in SET employment will not reach 50% in the 21st century.
- Gender equality among directors of the UK FTSE 100 SET companies will be achieved in 2073.
- Women SET professors will reach equal representation with their male peers in 2045.

Post Compulsory Education

- The proportion of girls among all students undertaking STEM subjects at A level has increased by 0.6 percentage points in the last five years. If this increase continues at the same rate, by 2030 girls will be 45.7% of STEM A level students. Girls and boys will be equally represented by 2058.
- The overall figures disguise the fact that in 2007/8 girls made up only 7.5% of all computer science students and 21.4% of all physics students.

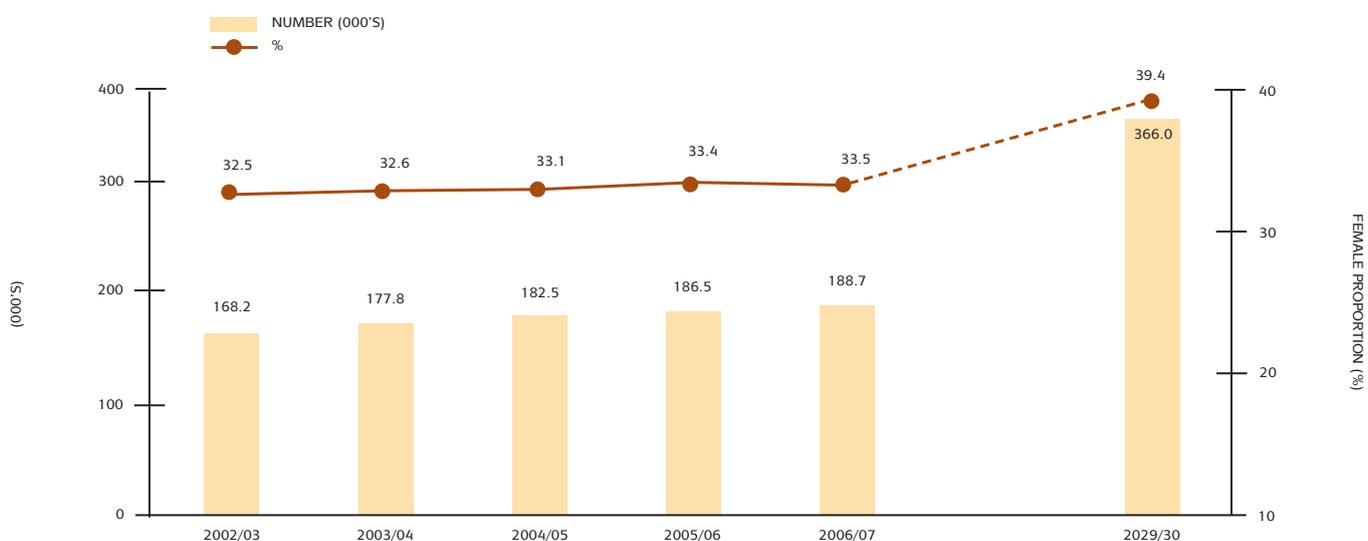
The 2030 forecast for girls undertaking STEM subjects at A level in England



Higher Education

- The proportion of women among all SET undergraduate and postgraduate students increased by 1.0 percentage point in the last five years. If this increase continues at the same rate, by 2030 women will be 39.4% of all students taking SET-related subjects, and they will achieve equal representation by 2069.
- Women are 33.5% of all students in SET disciplines, but they make up only 15.9% of engineering and technology students and 21.4% of computer science students.

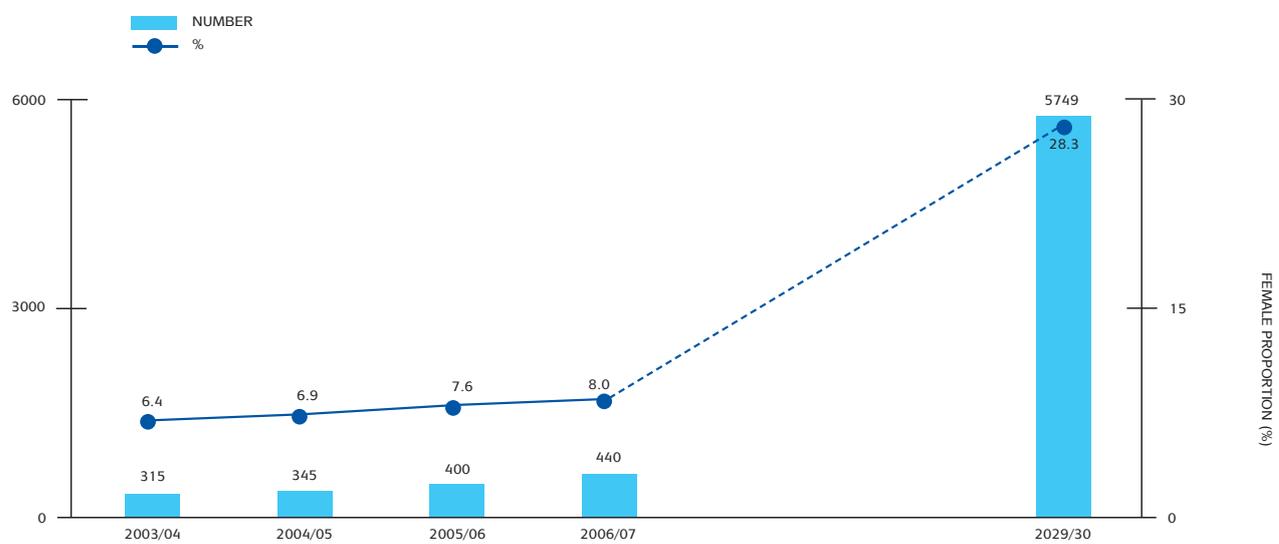
The 2030 forecast for women undergraduate and postgraduate students in SET at UK HE institutions



Female SET Academics

- Numbers of female and male academics (excluding professors) have increased since 2003/4 by 8.2% and 0.1% respectively.
- One in 4 academics (excluding professors) is female, showing a proportional growth of female academics since 2003/4 of 1.5 percentage points.
- Numbers of female and male professors have increased since 2003/4 by 39.7% and 15.0% respectively.
- The ratio of female students to female professors is 1 to 429, while the ratio of male students to male professors is 1 to 75.
- Women are less than 5% of professors in physics, mathematics, civil engineering, mineral, metallurgy & materials engineering, electrical, electronic & computer engineering, and mechanical, aero & production engineering.
- The proportion of women among all SET professors grew by 1.6 percentage points in the last 4 years. If this increase continues at the same rate, by 2030 women will be 28.3% of all SET professors. Women professors will reach equal representation with their male peers in 2045.

The 2030 forecast for female full-time SET professors at UK HE institutions



Women directors in the SET FTSE 100 companies

- The proportion of women among FTSE 100 directors in SET sectors increased by 1.0 percentage point in the last six years. If this increase continues at the same rate, by 2030 women will be 18.0% of all directors of SET FTSE 100 companies. Women will reach equal representation in 2073. The numbers of female directors have increased by 34.5% since 2003, explaining the relatively rapid predictive growth.
- Just over one in four companies in SET sectors had more than one female director on their corporate boards, while exclusively male boards still exist in 35.0% of SET companies.

The 2030 forecast for women directors in SET FTSE 100 companies



Employment in SET

- The number of women employed in SET occupations has increased since 2002 by 11.4%, while the number of men employed in SET increased by only 8.5%.
- Proportion of women among all employees in SET increased by 0.4 percentage points in the last 6 years. If this increase continues at the same rate, by 2030 women will be 20.9% of all SET employees. The proportion of women in SET employment will not reach 50% in the 21st century.
- There is a differential distribution of women in SET occupations. Women are 38.7% of science professionals, 5.4% of engineering professionals, 14.3% of ICT professionals and 18.8% of building professionals. The fastest growth was observed among female building professionals whose numbers almost doubled over the last 6 years, while the numbers of male building professionals have shown only a slight increase.

The 2030 forecast for women in SET occupations in the UK



Further copies of this research briefing and the others in the series are available from: www.ukrc4setwomen.org

FOOTNOTES:

1. STEM subject and SET occupational classifications

STEM subject classification:

http://www.ukrc4setwomen.org.uk/downloads/STEM_subjects.pdf

SET occupation classification:

http://www.ukrc4setwomen.org.uk/downloads/SET_occupation_classification.pdf

2. Forecasting

The exponential model for this analysis is based on the assumption of a constant growth rate, r . The model is described by the following:

$$P_{n+1} = (1 + r)P_n \quad (n = 0, 1, 2, \dots)$$

Where P_n is the population size at n years after some chosen starting time.

3. Data sources

GCE A level: DFES (2005 - 2007) & DCSF (2008, 2009)

Higher Education: HESA (2005 - 2008)

Students in Higher Education Institutions 2003/04 - 2006/07. Cheltenham, HESA.

HE Academic Staff: HESA (2005 - 2008)

Resources of Higher Education Institutions 2003/04 - 2006/07. Cheltenham, HESA.

SET employment: Office for National Statistics;

Quarterly Labour Force Survey, January - December, 2002 - 2007.

Distributed by the Economic and Social Data Service.

Female FTSE 100 in SET: Data were extrapolated from 'The 2003 Female FTSE Index',

'The 2004 Female FTSE Index', 'The Female FTSE Index 2005', 'The Female FTSE Report 2006',

'The Female FTSE Report 2007', and 'The Female FTSE Report 2008'

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