Male and female participation and progression in Higher Education[1]

Introduction

1. There has been a longstanding widespread interest, concern and debate about the lower average attainment of boys in schools and colleges in the UK[2]. More recently attention has focussed on the growing differences between men and women in relation to participation and achievement in higher education. The Higher Education Initial Participation Rate (HEIPR) for 2007-08 is provisionally estimated to be 37.8 per cent for men and 49.2per cent for women (DIUS 2009).

2. In this report we look at the past trends in higher education participation in the UK, we examine what sort of higher education men and women enter and what happens after entry. We then look at the differences in participation between men and women for different ethnic and socio-economic groups, and for countries outside the UK. Finally we explore the possible reasons why the participation rate for women is higher, ask whether it matters, and consider what should be done.

Trends in higher education participation

Young participation

3. In 1992-93 the participation rate for women, as measured by the Age Participation Index (API)[3], exceeded that for men for the first time. Since then the difference in participation rates has increased. Figure 1 shows the API rates for men and women from 1972-73 to 2000-01[4].

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[1] The review of the evidence in this report was carried out by John Thompson, formerly data analyst at HEFCE, to whom HEPI is greatly indebted. We would also like to thank analysts at HEFCE and DIUS for providing additional information presented in this report.

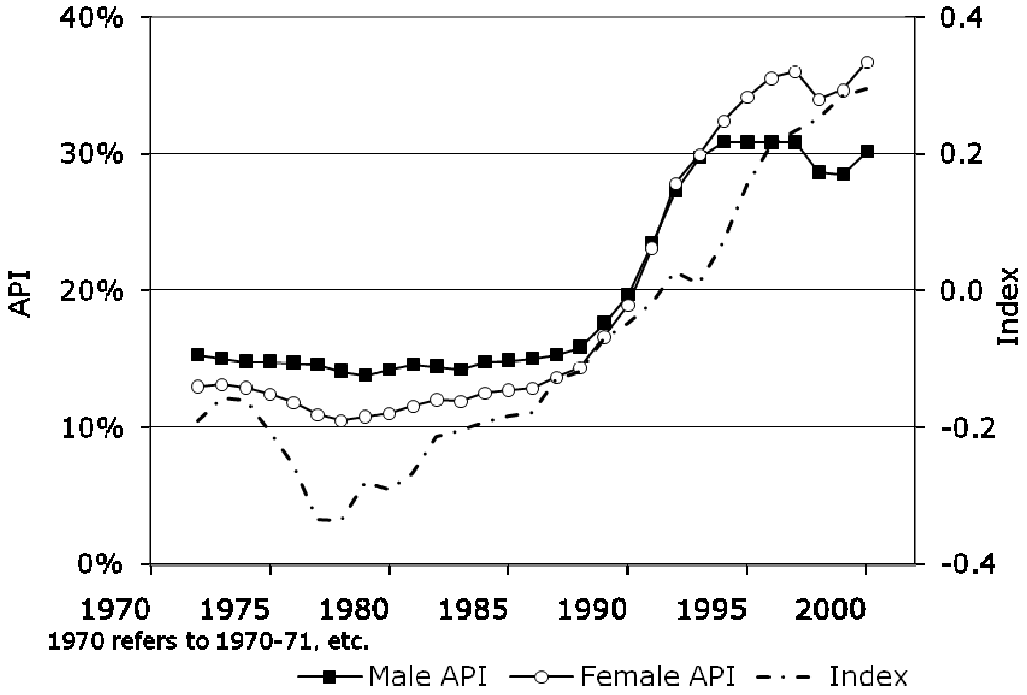
[2] The DCFS and predecessors have funded a range of initiatives relating to lower average attainment of boys. See the DCSF 'Gender and achievement' website at: nationalstrategies.standards.dcsf.gov.uk/search/inclusion/results/nav:46260

[3] A full definition of the API, along with a description of its properties, is provided in HEFCE report 2005/03 (HEFCE 2005), pages 191 to 192. The API can fluctuate simply because of the way that it is constructed, without an actual change in participation. Thus the dip in participation in 1998, which many have interpreted as due to the introduction of fees, was an epiphenomenon of changes in the population and the API algorithm. However, the relative values of the APIs for men and women should be more robust than the API itself.

[4] Data for figure 1 provided by DfES, predecessor of DIUS.

4. In this report we have used an 'inequality index' based on odds ratios. An index value of zero represents equality. Positive values reflect a higher participation by women, negative a higher participation by men. The same absolute value (positive or negative) represents the same magnitude of the inequality[5].

Figure 1: API by sex 1972-73 to 2000-01



5. We can also see that the positive value of the index in 2000-01 is larger than the negative value in 1972-73, indicating that the inequality in favour of women is greater at the end of the period than the inequality at the beginning in favour of men, though there were two years, 1977-78 and 1978-79, when greater inequalities are observed, which were in favour of men.

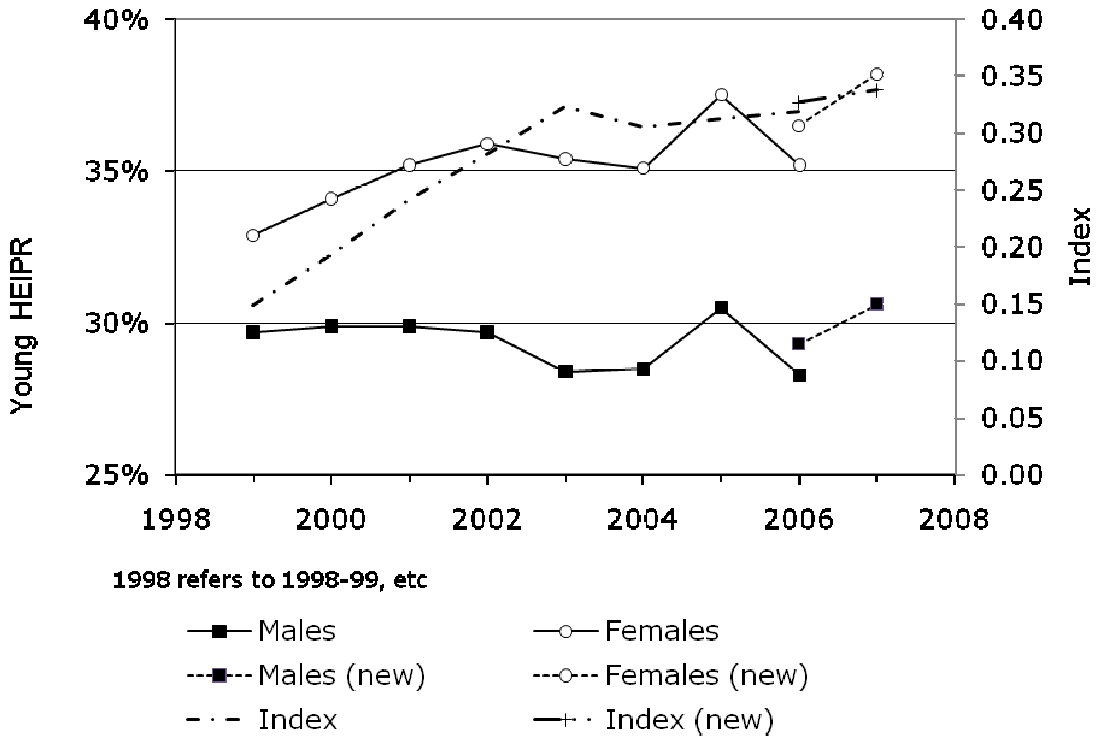
6. The API has since been replaced by the Higher Education Initial Participation Rate. (HEIPR). The HEIPR differs in a number of respects. It relates only to English domiciled students, rather than the UK, and it covers a wider age range. By taking the young (under 21) component of

[5] The index is the natural logarithm of the odds ratio. For example, the index for the 2000-01 API is calculated as follows:
Female API = 36.7%, male API = 30.2%
Female odds / male odds = (36.7 / (100 – 36.7)) / (30.2 / (100 – 30.2)) = 1.34.
Index = Loge(1.34) = 0.294

the HEIPR we have a measure somewhat closer to the API. Figure 2 shows the young HEIPR from 1999-00 to 2006-07[6].

7. For the years where both the API and HEIPR are available (1999-00 and 2000-01) the sex inequality shown by the API is greater. This will in part be due to the fact that sex inequalities for entrants from Scotland and Wales are greater than for England[7] . However, we see that the trend of increasing inequality in participation, as measured by the gap between participation rates or the index has continued at least until 2003-04. Indeed, as measured by the inequality index, the inequality in favour of women in 2007-08 as measured by the young HEIPR (0.34) is the same as that in favour of men in 1978-79 as measured by the API, the greatest inequality observed since 1972-73.

Figure 2: Young (17 to 20) HEIPR by sex 1999- 00 to 2007-08



8. Looking in more detail at the Young HEIPR we see a 'spike' for both males and females in 2005-06. This is because the HEIPR is based on entry rather than age cohorts, and shows an artificially high participation for 2005-06 and a low participation for 2006-07 due to students who would normally have entered in 2006-07 aged 19 instead entering in 2005-06 at 18, thereby avoiding the increase in fees.

[6] Data for figures 2 and 3 from DIUS 2009

[7] See HEFCE report 2005/03 (HEFCE 2005), pages 28 to 30

9. For the most recent HEIPR publication (DIUS 2009) DIUS changed the methodology but were only able to recalculate values using this new method back to 2006-07. The values for both methods are shown in table 2, with the new values plotted as dashed lines. The new method increased the HEIPR for both men and women, with women having the greater increase which resulted in an increase in the inequality index. It is not clear whether the new or the old method gives the most accurate measure of the relative rates of participation for men and women[8].

10. Female participation grew between 1999-00 and 2002-03 which resulted in a widening inequality up to 2003-04. Since then the picture is somewhat complicated by both the 'fees blip' and the new HEIPR methodology. Though the trend is not clear, over the most recent period, from 2006-7 to 2007-08, the inequality index and gap in participation rates increased.

11. If we look at the components of the young HEIPR by single year of age, it is clear that the largest part of the difference between men and women is accounted for by entry at 18. Using measures based on age rather than entry cohorts, the HEFCE investigation of young participation also showed that almost all the inequality between men and women resulted from entry at 18, and that changes in entry at 18 accounted for the growth in this inequality between 1994 and 2000 (HEFCE 2005a).

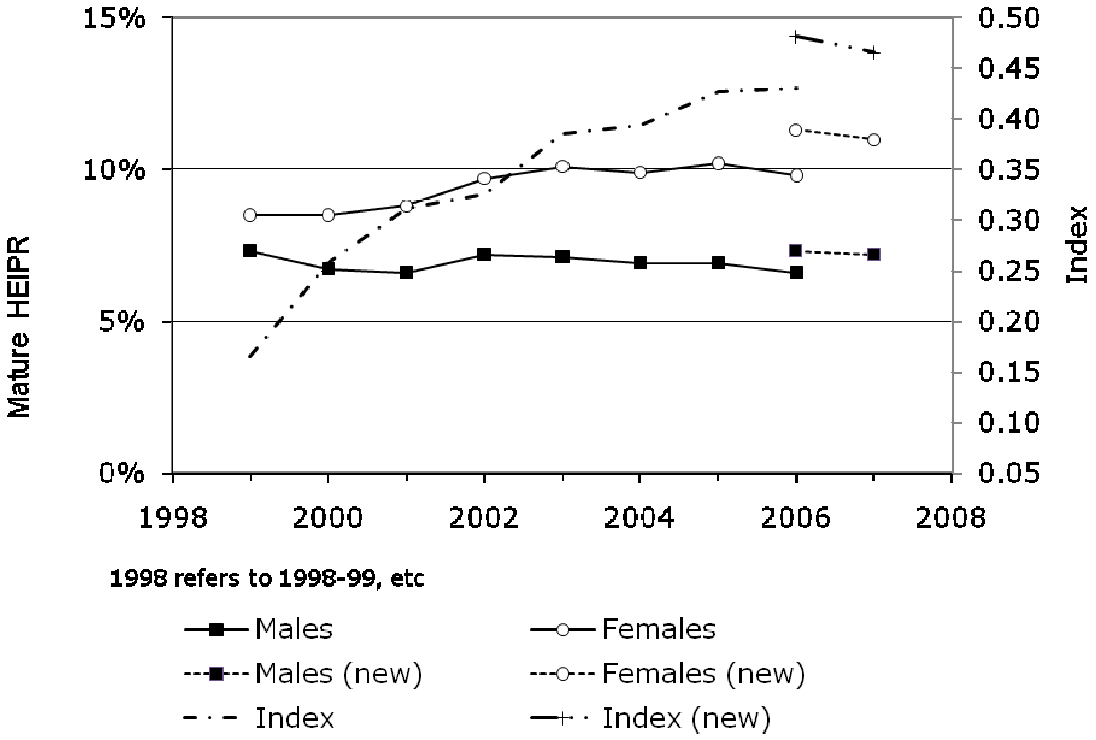
Mature participation (21 to 30)

12. The 'young' component of the HEIPR accounted for 34.3 percentage points of the total of 43.3 per cent (2007-08). Not only is the mature contribution a smaller component, the uncertainties in its calculation are also much greater, because of the uncertainties in population estimates, particularly for men, and the greater difficulty in establishing whether an entrant has entered higher education before. The changes resulting from the change in methodology for calculating the HEIPR brought about a greater proportional increase in the mature participation rates, particularly for women. We need to bear this in mind when looking at the mature

[8] The old method made use of a field based on information provided by applicants as to whether they had entered HE previously. The new method relies solely on data matching to see if there is a student record in a previous year. Generally, surveys show a lower response rate for men, so the suggestion that men were less likely to reveal earlier HE experience is plausible. Alternatively, name changes are more likely for women, and though the matching process allows for name changes, the chance of failing to make a match will be increased if a name change occurs. These explanations are not mutually exclusive, and both may be part of the reason for the increase in the inequality found with the new HEIPR methodology.

HEIPR component taking entrants aged from 21 to 30. These are shown in figure 3. We see that, rather than providing a means for men to 'catch up', mature entry adds to the participation gap between men and women, and, as for young entry, the inequality over the period is increasing. The inequality for 2007-08, as measured by the index, was greater for mature than for young entrants.

Figure 3: Mature (21 to 30) HEIPR by sex 1999-00 to 2007-08



The over thirties

13. The DIUS have also published a HEIPR which includes participation by students between 31 and 60 (DIUS 2009). For these students it is not possible to determine with any confidence whether they are initial entrants. The figures are therefore likely to be inflated, and that needs to be appreciated. However, these figures also showed very much higher rates for women, so much so that the difference is unlikely to be due to weaknesses in the data. Between 1999-00 and 2007-08 the rates for women were 11 to 13 per cent, while for men they were 6 to 7 per cent.

14. Apart from those in their mid and early thirties in 2007, these cohorts will have been 18 when the young participation rates (as measured by the API) were higher for men than for women, so for the older age groups mature participation will provide a means of 'catching up'.

What sort of higher education?

15. Some commentators have suggested that women enter 'lower status' HE. Dr Burke, a sociologist of gender and education, summarised this viewpoint as follows:-

> "Many women are studying in lower-status universities; many are mature or part-time students. The university continues to be a space where class privilege is maintained and women's participation is limited to the bottom of a hierarchical continuum."

Quoted in "Class rifts eclipsed by sex divide", a report by Paul Hill in the Times Higher Education Supplement, 21 January 2005.

16. As we have seen, participation rates by mature women are higher than for men, but the young participation rate is also higher. Indeed women have a higher participation rate for each single year of age from 17 to 30.

17. Table 1[9] shows the full- and part-time participation rates for men and women. It shows that though women do have a higher part-time participation rate than men, they also have a higher full-time participation rate.

Table 1: HEIPR (2007-08) components for men and women by mode

Mode	**Men**	**Women**
Full-time (including sandwich)	32.4%	41.4%
Part-time	5.5%	7.8%
Full- and part-time	**37.8%**	**49.2%**

Source: HEFCE unpublished analysis

18. Table 2 shows the HEIPR components for different subjects. The proportions of men and women vary markedly by subject. In table 2 the subjects are ranked in order of difference in participation between men and women. Women have higher subject specific participation rates for all subjects apart from Technologies; Physical Sciences; Architecture; Building and Planning; Mathematical and Computer Science and

[9] Tables 1, 2 and 3 are from an unpublished analysis by HEFCE using a different version of the Individual Learner Record (ILR) for students registered at FECs, giving very slightly different HEIPRs from those published by DIUS. In these tables the HEFCE rates are adjusted pro-rata to give the same totals for men and women overall.

Engineering. Apart from 'Architecture' and 'Building and Planning' these are 'strategic subjects' for which government believes there is insufficient student demand, and where competition for places is less demanding. In other words, men are overrepresented in the less popular subjects.

19. Table 2: HEIPR (2007-08) for men and women by subject group

Subject group	**Men**	**Women**
Subjects allied to Medicine	1.3%	5.9%
Education	0.6%	3.6%
Creative Arts and Design	3.9%	6.2%
Biological Sciences	3.3%	5.3%
Social studies	3.0%	5.0%
Linguistics, Classics and related subjects	1.0%	2.6%
Law	1.3%	2.3%
Combined	1.0%	1.9%
European Languages, Literature	0.5%	1.1%
Veterinary Sciences, Agriculture and related subjects	0.3%	0.7%
Business and Administrative studies	5.6%	5.9%
Historical and Philosophical studies	1.8%	2.1%
Medicine and Dentistry	0.6%	0.8%
Mass Communications and Documentation	1.3%	1.4%
Eastern, Asiatic, etc, (non European languages)	0.2%	0.2%
Technologies	0.5%	0.3%
Physical Sciences	2.2%	1.6%
Architecture, Building and Planning	1.8%	0.6%
Mathematical and Computer Science	4.0%	1.2%
Engineering	3.7%	0.5%
All subjects	**37.8%**	**49.2%**

Source: HEFCE unpublished analysis

20. It is worth noting that while women are underrepresented in the physical sciences, this is not the case for natural science as a whole. The participation rates for physical and biological sciences are 6.9 per cent for women compared to 5.5 per cent for men.

21. While men are overrepresented in the less popular subjects women have higher subject specific participation rates in a number of very popular subjects which can lead to high salaries, in particular the clinical subjects and law. However, it is the case that overall the profile of subjects taken by women is a factor in reducing their average graduate salaries.

22. The only example of an initiative to encourage a group of students defined by their sex to take up a particular subject described in the HEFCE equality scheme (HEFCE 2007a), is a project to encourage women to study engineering. Given that so few women study this subject, and that it has been identified as a 'strategic subject', this in itself is not remarkable, but the lack of any identified initiatives to encourage men to take up, say, teaching means there is a lack of balance.

23. The idea that women's participation "is limited to the bottom of a hierarchical continuum" seems to have gained wide acceptance[10]. Assessing these claims is difficult because the 'ranking' of institutions is a question of judgement. Table 3 shows the components of the HEIPR by institution type according to a commonly assumed hierarchy of prestige.

24. We can see from table 3, for all the types of institution identified, women have an equal or higher institution type specific participation rate. Given the differences between men and women in their choices of subjects, for individual institutions that specialise in particular subjects, women may be poorly represented, but there is no evidence that women are under-represented in what are often perceived to be the top of the hierarchy of institutions.

Table 3: HEIPR (2007-08) for men and women by type of institutions

Type of institution	**Men**	**Women**
FE College	2.5%	3.1%
College of Higher Education	1.4%	2.2%
'Post-92' university	18.0%	23.8%
'Pre-92' HEI (not Russell group)	8.6%	11.3%
Russell group (not Oxford or Cambridge)	6.5%	8.0%
Oxford and Cambridge	0.7%	0.7%
All types of institution	**37.8%**	**49.2%**

Source: HEFCE unpublished analysis

[10] For example see "Academe still male bastion, assert female scholars", a report of a seminar on the impact of feminism on higher education (Times Higher Education, 10 July 2008).

25. For all types of institution, apart from Oxbridge, women have a higher participation than men. For Oxbridge the participation rates are equal[11]. The high participation rates of women in post-92 HEIs and further education colleges (presumably these are what are meant by 'lower ranked') does mean that the proportion of women students attending the 'higher ranked' institutions will be slightly lower than the corresponding proportion of male students, even though women also have equal or higher participation rates than men in those institutions. 40.8 per cent of women entered pre-92 and 17.8 per cent entered Russell group universities (including Oxford and Cambridge). This compares with 42.2 per cent and 19.4 per cent for the equivalent proportions for men. This may be what misleads some to believe that women are disadvantaged with respect to participation at high status institutions.

Beyond HE entry

26. Participation usually means entry to higher education which may involve no more than a short period of study before leaving without a qualification[12]. For the most part we follow this convention. To explore all aspects of students' achievement and gains from higher education would greatly extend the scope of the discussion. However, in this section we look at some of the main post entry milestones and consider whether and how this alters our interpretation of the participation gaps described so far.

Participation as successful completion

27. Table 4 shows the how the lower completion rate for male students reduces their participation rates relative to female students when we take 'participation' to mean successful completion of an undergraduate programme rather than just entering a programme and possibly leaving before qualifying.

[11] For 2007-08 the Oxbridge participation rate for women was very slightly lower than for men. However about another extra 14 women entrants would have given them a higher rate than men. The difference is not significant, being smaller than the expected year on year fluctuations. In 2006-07 the participation rate for women was very slightly greater than that for men, by a similar non-significant number.

[12] To be included in the count of HEIPR entrants students have to have studied for at least six months.

28. The successful completion rates are estimates of the proportion of the English domiciled cohort starting at aged 18 in 2000-01 and at 19 in 2001-02 at an HEI who will qualify within six years of starting[13]. We can see that the difference in participation rates increases from just under five percentage points to six percentage points when we move from 'entry' to 'completion' participation rates.

Table 4: Participation as entry and as successful completion

	Men	**Women**
Participation 'as entry' rates	26.8%	31.6%
Participation 'as successful completion' rates	22.5%	28.5%

29. The lower completion rates for men are also demonstrated by the non-continuation rates as defined for performance indicators. Non-continuation from the year of entry generally represents about half the failure to qualify from full-time degree programmes. Table 5 shows these non-continuation rates for men and women[14].

Table 5: Non-continuation rates from year of entry

(2005-06 home entrants to full-time first degree programmes at UK HEIs).

	Men	**Women**	**Actual difference**	**Expected difference**
Young entrants	7.9%	6.5%	1.4%	0.6%
Mature entrants	17.0%	12.3%	4.7%	1.9%

[13] Full details of how the entry and successful completion rates were derived are given at section 4.8 (page 125) of HEFCE report 2005/3 (HEFCE 2005).

[14] Table 5 from unpublished analysis by HEFCE. Data definitions follow those used for PIs published by HESA. The expected differences were obtained by calculating 'benchmarks' for male and female students in the same way that benchmarks for HEIs are calculated. See www.hesa.ac.uk for full description of the PIs under 'Performance Indicators'.

30. The 'expected differences' in table 5 are the differences in continuation rates that would be expected if the rates for each combination of subject and entry qualifications were the same. Because men and women study different subjects and have different entry qualifications, we do expect women to have lower non-continuation rates, but these factors account for less than half of the actual differences.

31. More sophisticated analyses of non-completion through the whole of a programme of study for young entrants starting in 1997-98 show that after taking into account a wide range of factors (not just subject and entry qualifications), men are still less likely to qualify. (HEFCE 2003, HEFCE 2005).

Getting a first

32. The difference in the proportion of first class honours awarded to men and women graduates has been a subject of wide interest[15]. If we consider the whole population, rather than just those who graduate, given that there are more men than women in the populations of the relevant ages, equality between the sexes would mean that less than half, about 49%, of those gaining firsts would be women[16]. In fact 56% of all the home graduates gaining firsts at UK HEIs in 2007-08 were women. This is unsurprising given the higher entry participation and completion rates for women[17].

33. However, most attention has been focussed on statistics which discount the differences in entry rates and completion, and concentrates on those students who graduate. If we look at the degree class profiles for men and women in this way we find that though the percentage of women gaining a 'good' degree (that is a first or upper second) is higher than for men, men have a slightly higher proportion of firsts. Table 6 shows the degree class profiles for men and women.

34. Statistics like those set out in table 6 have received a variety of explanations, including the idea that the lower proportion of firsts for women reflects a difference in their approach to study, willingness to take risks, and ability to cope with the stress of examinations.

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[15] See the paper by Woodfield (Woodfield et al, 2006a) for review of the discussion around the proportions of men and women gaining a first.

[16] The average percentage of women of the individual age populations of the HEIPR, weighted by the numbers of initial entrants is 48.6 percent.

[17] Percent of firsts gained by women, and figures in table 6 from HESA reference statistics. See www.hesa.ac.uk under 'View statistics online'.

Table 6: Degree class profiles (2007-08) home graduates from UK HEIs).

Class of degree	**Men**	**Women**
Firsts	13.9%	13.0%
Upper seconds	46.0%	50.9%
'Good' degrees - firsts or upper seconds	**59.9%**	**63.9%**
Lower seconds	31.6%	29.3%
Thirds or pass degrees	8.4%	6.8%
All classified first degrees	100.0%	100.0%

35. However, it has been pointed out that the differences in the proportions of firsts can in part be explained by taking into account the different proportions of firsts awarded, and proportions of men and women, within broad subject grouping[18]. A more extensive analysis of a sub-set of the 2004-05 'graduating cohort' found that there was no significant difference in the probability of men gaining a first, compared to women, after other factors, including subject studied, were taken into account (DfES 2007a)

Postgraduate study

36. Postgraduate study is not necessarily the 'better option'. For some graduates gaining a place on their chosen postgraduate course would be just what they were aiming for and represents success. For others, such a path is taken only after failing to secure the job they want. Their preference would be to go straight into employment. We should not, therefore, view a higher postgraduate participation rate as necessarily advantageous. Nevertheless, it is interesting to see what these rates are for men and women.

37. DIUS publish a HEIPR type postgraduate participation rate, the PGIPR (DIUS, 2009). Table 7 shows the components of this overall postgraduate participation.

[18] The paper by Woodfield (Woodfield et al, 2006a) showed that by taking into account the differences in broad subject groupings (Arts, Core Sciences, Non-core sciences), most of the differences between men and women could be explained.

Table 7: PGIPR (2007-08) for men and women by programme type

Type of PG programme	Men	Women
PGCE	1.0%	2.7%
Taught (not PGCE)	5.1%	7.4%
Research	0.7%	0.6%
All	**6.8%**	**10.6%**

Sources: DIUS communication

38. Table 7 shows that men do have a higher PGIPR for research rather than taught programmes. The DIUS analysis may have underestimated the number of entrants to research programmes, though we have no reason to think that this will affect the relative rates between men and women. Research postgraduates can be missed when students start with a taught MPhil which then develops into a PhD. Detecting these cases is not straightforward, but it has been done by HEFCE. This analysis confirms the higher participation by men, but also shows that between 1996-97 and 2004-05 the numbers of women starting PhD programmes increased by 12 percent, while the numbers of men decreased by 14 percent, so that by 2004-05 47.9 percent of the starters were women[19], just slightly lower than what would be expected from the relative size of the relevant populations.

Employment outcomes

39. Given the centrality of the demands for equal pay to the achievement of equal opportunities, it is natural to ask what happens to men and to women graduates when they enter the labour market. We know that on average female graduates earn less than male graduates[20], but to fully answer this question would take us outside the scope of this report, into a complex area with its own extensive literature. Here we aim to present some observations as a context for the differences in higher education participation, and to inform the discussion as to whether the inequalities in HE participation matter.

[19] These figures were supplied by HEFCE. They refer to the numbers of UK domiciled students, but were otherwise as reported in HEFCE, 2009a, tables 11 and 13.

[20] See for example references in this report: Elias et al, 1999; Machin et al, 2003; Purcell et al, and Chevalier, 2007;

40. It is important to appreciate that the statistics on graduate pay, and other employment outcomes, usually do not take account of the differences in participation or graduation rates. We have seen that women have a equal or higher participation rate at all types of institutions (table 3), and their participation rate at, say, the Russell group institutions is higher than for men. However, because their advantage is even greater at other institutions, the proportion of initial entrants going to Russell group institutions is 17.8 per cent for women and 19.4 per cent for men. Given that graduates from these institutions on average earn more, this will tend to reduce the average graduate salaries of women compared to men. Similarly, women's participation rates in subjects that lead, on average, to higher salaries is also not fully reflected in the calculation of average graduate pay. Take, for example, business and administrative studies. Women have a higher participation rate (table 2), but the proportion of entrants taking this subject is 12.0 percent for women and 14.7 percent for men. For engineering and the physical sciences, which are also associated with higher salaries, women do have lower participation rates, but this disadvantage is amplified by the high participation rates in other subjects when calculating average graduate salaries.

41. We can reflect differences in participation in HE rates by taking the average salaries of all those in employment. For young employees (aged 22 to 29) the pay for men and women are similar[21]. Of course, such a statistic is the result of a large number of factors, not just the relative HE participation rates of men and women. However, if we are limiting our consideration to graduates, there is no easy way of presenting descriptive salary statistics which take the higher participation of women into account, and this should be borne in mind when interpreting the figures.

42. There are some other technical issues that also need to be highlighted. Most of the statistics relating to participation are based on administrative records, and while these are not perfectly complete or accurate, there is no reason to think that there are material inaccuracies which are specific to men or to women. Employment outcomes, however, are based on surveys, and the response rates for these surveys tend to be higher for women than for men. This can in part be addressed by calculating weighted averages or through statistical modelling, but this may not allow for all of the possible response biases. Finally, the reported salaries are not verified. If there are any systematic differences between

[21] The median hourly pay, excluding overtime, for full-time employees between 22 and 29 was £10.11 for both men and women in 2008,though men had a higher mean pay, £11.45, compared to £11.17 for women. See Office of National Statistics 2008a. See the ONS National Statistics Annual Survey of Hours and Earnings, Results 2008, table 6.6a.

men and women, in say, a tendency to exaggerate, then these will be reflected in the derived statistics.

43. We can gain insights into the reasons for the differences in salaries from detailed surveys. The 'Moving On' (Elias, et al, 1999) and subsequent surveys (Purcell, et al, 2005) provide such details for students graduating in 1995 and later. Since then the HESA Destination of Leavers from Higher Education (DLHE) surveys and the DLHE Longitudinal surveys are providing data which enables this original research to be updated.[22]

44. The Moving On study showed that male graduates had higher unemployment after graduation, but that they had higher salaries both shortly after graduation and later. Since these results were first reported a more detailed analysis of the data collected has given us a greater understanding of what lies behind these differences. Through extensive descriptive statistics, and some interviews with graduates, Purcell shows how a mixture of discrimination and choice could lead to the wage differentials (Purcell et al, 2006). It seemed likely that women were discriminated against in those highly paid private sector occupations in sectors dominated by men, like engineering, but that women are also overrepresented in lower paid public sector occupations, at least in part through the value they put on job security and socially useful work, rather than simply to avoid discrimination.

45. Chevalier took the 'Moving On' data and constructed a statistical model of pay so that the explanation of the pay gap could be quantified (Chevalier, 2007). He found that 84 percent of the pay gap could be explained by three roughly equally sized components. The first consisted of educational effects, the most important being subject choice, confirming the findings of Machin (Machin et al, 2003). The second consisted of occupation effects, size of firm, sector, public versus private, etc. Finally there were character trait effects. Women were more altruistic and valued their job environment more, they were less career driven or financially motivated. However, these made a smaller difference than childrearing expectations. Even before they have decided to have children, women with a stronger preference for childrearing earn less, partly due to a reduced job search.

46. Of course discrimination, or the perception of discrimination, could be the cause of the occupation choices, and the values and career expectations that made up the character traits could be a rationalisation of low pay. But this analysis does show that the issue is complex, and that in addition to inequalities in opportunity at least part of the differences in employment outcomes of men and women graduates

[22] Annex A presents key statistics on employment outcomes for men and women from the most recent HESA surveys.

appear to be a result of the choices they make regarding the nature of the employment they seek.

Sex, ethnicity and socio-economic background

47. In the discussions about the lower achievement of boys at school, the point has often been made that 'boys are not homogeneous' and that other attributes are associated with differing levels of achievement. In particular, it is pointed out that girls from disadvantaged socio-economic backgrounds have low levels of success at school. By focussing on sex differences in this report, we are not implying that other differences are unimportant, just that they are outside the scope of this investigation.

48. We will, however, look at both ethnicity and socio-economic background in the context of the differences between men and women. Is the overall higher participation rate for women found for different ethnic and socio-economic groups? Or, to put the same question in a different way, are the differences between these groups greater or smaller for men than for women?

Relative participation of men and women from different ethnic groups

49. There is some uncertainty about the participation rates by ethnic group, both with respect to the relative rates for men and women, as well as the absolute values[23] . Until recently, the most reliable figures available to us showed that for all ethnic groups, apart from those identified as Pakistani and Bangladeshi, women had higher HEIPR participation rates than men in 2001-02.(Connor, et al, 2004). Since then a study using school and higher education administrative data to calculate rates of HE participation at aged 18 (in 2004-05) or aged 19 (in 2005-06) for pupils at English state schools has shown that these rates of young participation are higher for women than for men for all ethnic groups, including those identified as Pakistani and Bangladeshi (Broecke et al, 2008).

[23] The possible variation in the ethnic identity returned by the applicant to HE (recorded in the student data), and the head of household (recorded in the Census population data) could well be different for men and women.

Participation of men and women from different socio-economic backgrounds

50. This section is confined to a consideration of 'young' participation', typically entrants at ages 18 or 19 or entrants under 21, as there is very limited information on the backgrounds of mature students [24].

51. There are a variety of attributes used to define socio-economic background. The National Statistics Socio-economic Classification (NS-SEC) is based on sociological theory, but most other measures are pragmatic, making use of the data that is available. These include a variety of classifications based on the characteristics of the area where people live and a number of classifications based on young people's taking up means tested benefits, in particular free school meals.

52. Before looking in detail at the findings for specific measures, it is worth setting out some of the general findings, and the issues in presenting the data. Firstly, whatever measure of socio-economic background is used, women have been shown to have a higher participation than men for each socio-economic group. Secondly, apart from when the 'free school meal' attribute is used, the effects of sex and socio-economic background combine in such a way that men from more disadvantaged backgrounds have a participation rate slightly lower than would be expected from the two attributes.

National Statistics Socio-Economic Classification NS-SEC)

53. Table 8 shows the full-time young participation rates to higher education by their sex and their National Statistics Socio-Economic Classification (NS-SEC).

[24] Apart from some small scale surveys, the only information available on the socio-economic backgrounds of mature students has been derived from the ONS Longitudinal Study (Purcell, et al, 2006). For children aged 12 to 16 in 1981 the researchers found the graduation rates for the period between the 1991 and 2001 Censuses, that is at ages 23 to 36. Most of these would be mature entrants. Though this mature participation (that is the graduation rate) was higher for higher social classes (defined from 1981 Census), the inequalities were less than for young participation, so that this mature entry did make some contribution to widening participation. The patterns for men and for women were similar.

Table 8: Young (18-20) full-time HEIPR (2006-07) for men and women by NS-SEC

NS-SEC classes	Men	Women
4,5,6,7	16.2%	22.0%
1,2,3	35.7%	43.5%
All (including unknown, unclassified, class 8)	26.6%	33.4%

Sources: DIUS communication (for total figures) and DIUS, 2008.

54. There are many difficulties in establishing participation rates by NS-SEC, and it is possible that these could affect the relative rates of men and women[25]. However, the differences are so large that we can be confident that women have higher participation rates for both NS-SEC classes.

55. The difference between men and women is smaller for the lower groups, 5.8 percentage points compared to 7.8 percentage points for the higher groups. Though such percentage point differences are often cited, we think that they may be misleading. To see why consider the case of an extremely disadvantaged group with a very low full-time young participation of, say, 6 percent for females. The male participation would need to be negative for the gap between the sexes to be greater for this disadvantaged group than for the population as a whole. It makes more sense to look at the inequality index as used in figures 1 to 5. The inequality index is 0.38 for the lower NS-SEC classes compared to 0.32 for the higher, showing that the inequality is greater for the lower socio-economic groups than the higher.

56. Here our interest is in the participation of men and women, rather than between NS-SEC classes, but if we look at the columns in table 8 we can compare these inequalities. In the DIUS publication they are shown as percentage point differences, 19.5 percent for men compared to 21.4 percent for women. However, the smaller gap does not imply a smaller

[25] Many of these are described in DIUS, 2008 and in the report that established the method used (Kelly et al, 2007.) A key issue is the applicants' descriptions of their parents' occupations. It is possible that these could differ systematically between girls and boys. Also there is some confusion about how class 4 should be treated, with contradictory advice from ONS. They advise that it "is not recommended that users create an ordinal scale by combining the self-employed in Class 4 with the intermediate Class 3", while doing exactly that for their 3 class hierarchical version. See ONS descriptions (Office of National Statistics, 2008b).

sex inequality for men, who have lower participation overall. This is shown by the inequality indices which are 1.1 for men and 1.0 for women implying that the socio-economic inequalities are greater for men.

Free school meals (FSM)

57. Table 9 shows the participation rates to higher education for pupils from state schools by their free school meal status.

Table 9: HE entry at 18 (2004-05) or 19 (2005-06) by FSM status

(English domiciled pupils at state schools in England in year 11)

	Men	**Women**
Free school meals claimed and entitled	10.9%	14.4%
Free school meals not claimed or not entitled	27.4%	35.4%
All (including missing FSM status)	24.8%	32.3%

Source: DIUS communication. Data follows definitions used by Broeke et al, 2008 though not included in that report

58. We can see that for both groups boys are less likely than girls to progress to higher education, but that the inequality between the sexes, as measured by not only the percentage point difference, but also by the inequality index (0.32 for FSM, 0.37 for not FSM), is greater for those who have not claimed or are not entitled to free school meals. This differs from the pattern found using NS-SEC groups as our socio-economic classification. This may be something about the FSM status[26], or it may be the result of excluding pupils from independent schools, or a combination of both of these.

59. The DIUS study (Broecke et al, 2008) reported rates by ethnicity, free school meals and sex. These show that behind the figures in table 9 a further story is revealed. The participation rates for those identified as 'white' is lower in each of the four categories, but particularly for white males in the free school meals category who have a participation rate of just 6.4%.

[26] For a review and analysis of what free school meal status represents see Hobbs, 2007.

Low participation areas

60. Young people can be classified by the areas where they grew up and this provides another way of disaggregating participation by relative socio-economic advantage. This approach has been used by HEFCE to derive participation measures of home students from the cohort that entered HE in 1994-95 aged 18 or 1995-96 aged 19 through to those entering in 2000-01 aged 18 or 2001-02 aged 19 (HEFCE 2005a). A range of area definitions were used, but the main one divided the population into five approximately equal sized groups from those with the lowest to the highest HE participation.

61. This analysis showed that women had higher participation rates than men for each of the five categories of the area classification. The proportional sex inequality was found to be greatest for the lower participating quintiles. Over the six years of the study, the proportional sex inequalities were shown to be growing for each of the quintiles, with the fastest growth for the lowest participation group.

Areas with high proportions of council housing.

62. A model based on data assembled for the HEFCE participation study (HEFCE 2005a) showed a significant interaction between sex and the proportion of council housing in the ward the young person came from. Unsurprisingly, young people from wards with high proportions of council houses are much less likely to enter higher education, but also, boys have lower participation relative to girls in these areas compared to areas with lower proportions of council housing (Corver, 2007).

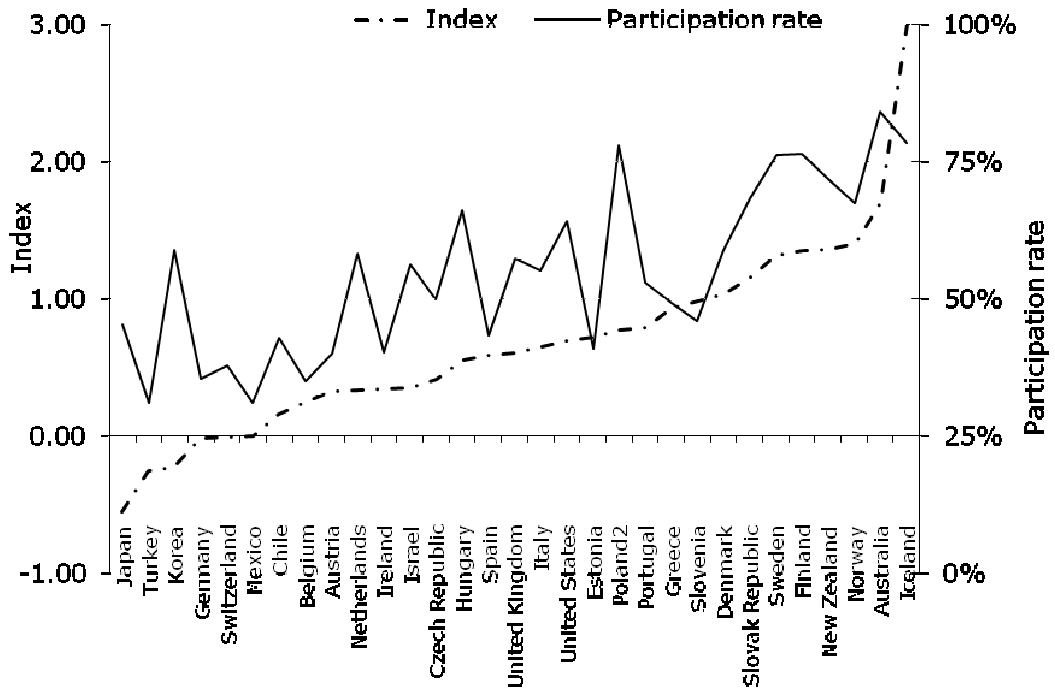
International comparisons

63. International comparisons of participation rates are very unreliable, and misleading[27]. The relative rates for men and women may tell us something, if the data peculiarities within each country apply, more or less equally, to men and women. Figure 4 shows the participation (or

[27]Unfortunately OECD HE participation statistics have misinformed much commentary and policy formulation. The OECD rates, like the HEIPR, are based on the sum of rates for different ages, but because the algorithms have to be applied to the country with the least sophisticated data system, the resulting figures are highly inaccurate and volatile. The inclusion of 'international' students and uncorrected double counting makes comparisons of the absolute participation between countries or through time unsafe. New Zealand provides a good illustration. The female participation rate for 2004 (reported by OECD in 2006) was 104%, which, though technically possible, seems implausible. By 2006 (reported in 2008) the rate was down to 85%.

'entry') rates by country, ranked by the same inequality index as was used with API and HEIPR figures.

Figure 4: Differences between entry rates for men and women by country



Source: OECD 'Education at a Glance (2008) table C2.1

Entry rates for tertiary type A (approximately first degree) programmes in 2006.

64. It appears that the UK is fairly typical. The only countries where the OECD participation rates for men are a percentage point or more higher than for women are Japan, Turkey and Korea. The UK is sixteenth, out of thirty one countries when ranked by the equality index as shown in figure 4. A review by OECD (Vincent-Lancrin,2008) shows that the UK is typical in other respects as well. In most OECD countries women have caught up and overtaken men since the 1990s. Women now tend to have higher participation for all age groups. Women tend to have lower participation at the doctoral level, but they are rapidly catching up.

Reasons for higher female participation rates

Young participation

65. The lower educational achievement of men compared to women does not start with participation in higher education. There is an extensive literature on the lower achievement of boys in school. Here we present some of the key statistics.

66. Key differences in attainment prior to entering HE are summarised in table 10.

Table 10: Participation and achievement at levels 2 and 3 (England, 2006)

	Male	**Female**
Per cent with five or more A*-C GCSEs	54%	63%
Average GCSE and equivalent point score	282	346
Per cent in full time education at 16	72%	82%
Per cent achieving 2+ A-levels (or equivalent) at 17	30%	39%
Per cent of A level entries passed*	97%	98%
Per cent of A-level awards at grade A	24%	26%
Average tariff points per A-level awarded	86	89

Sources: DfES (2007b) and references therein plus information provided by DfES directly.

*The small number of 'A' level entries not passed include those upgraded, no award (absent/declined) and pending.

67. Are the differences in achievement at levels 2 and 3 sufficient to explain the differences in young HE participation rates? The answer, at least for pupils at state schools, is 'yes'. Indeed the differences in achievement at level 2 alone have been shown to be sufficient to explain the observed differences between male and female young participation (Broecke et al, 2008). To understand the reasons for the difference in young HE participation we will therefore look at how the current achievement gap at level 2 emerged.

Changes in attainment at level 2

68. The attainment of boys and girls has been different, since records began in the 1950s. Of those who entered O-level, girls did better in particular subjects, for example, in English, while boys did better in mathematics. However, overall the percentage of girls and boys achieving five or more O-levels was very similar, with less than two percentage points difference up to 1986. Beyond 16, at the beginning of this period

there had been big inequalities in the proportions of girls and boys who went on to study A-levels, and then to university, with girls clearly disadvantaged. But up to 16 we could summarise the attainment of girls and boys as 'different but equal'[28].

69. Since the late 1980s, girls have caught up and overtaken boys in attainment in level 2 mathematics[29], while maintaining or extending their advantage in the subjects where they traditionally did well. The proportion gaining five GCSEs at grade C or higher (equivalent to O levels) has increased more than for boys, opening up a clear advantage for girls. This is shown in figure 5.

70. There have been numerous suggestions as to why the achievement gap should have occurred, but the timing has convinced some that the replacement of 'O' levels by GCSEs in 1988 is an important factor[30]. It is not clear from figure 5, but the start of the trend in favour of girls seems to have started earlier. In 1986 the difference was 1.6 percentage points, the second highest advantage for girls ever recorded. This could have been a blip but in 1987 it jumped to 3.5 percentage points. The interpretation is complicated by the fact that CSE grade 1 passes were included for these two years but not earlier, and the CSE teaching and assessment had many of features that GCSEs were to incorporate[31]. In 1988, the first year of GCSE, the gap increased to 6 percentage points and in just nine years, by 1997 it was over 10 percentage points. Nobody has found an alternative to the introduction of GCSEs that could plausibly explain the scale, speed and timing of the opening of a large achievement gap, so though we cannot be sure, the introduction of GCSEs is the most likely cause.

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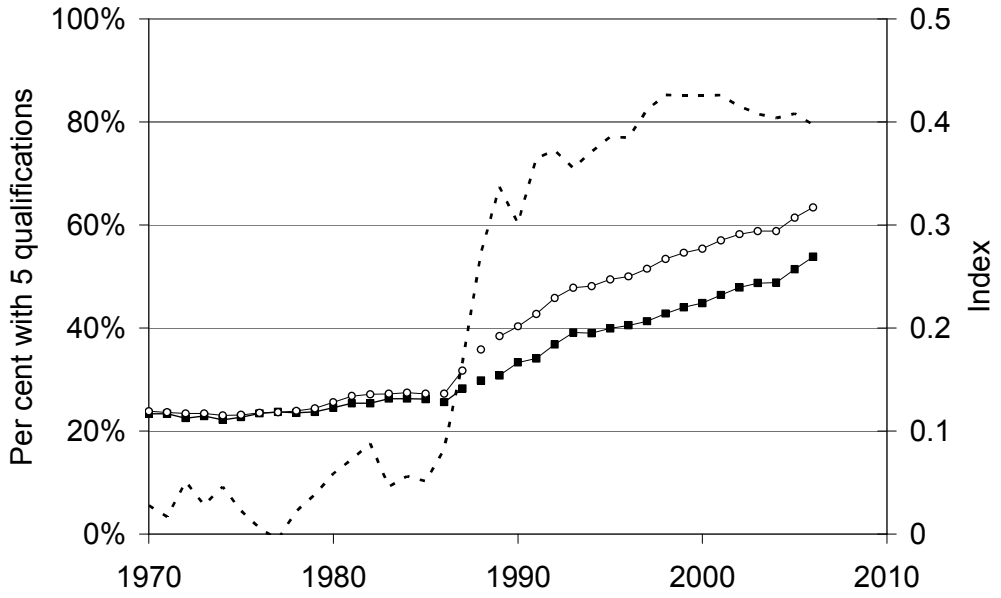
[28] For a fuller description of the changes see the DfES review (DfES, 2007b).

[29] Girls overtook boys with respect to the proportion getting a grade C or higher in 1999 (DfES 2007b , figure 3.11) and the proportion getting an A* overtook boys in 2008 (JCQ, 2008). Note that the JCQ figures include candidates for all ages without regrading corrections. The corrected and age specific figures from DCSF are not available for specific grades by sex.

[30] Machin considered other explanations but concluded that the change to GCSE was important. (Machin, et al, 2005).

[31] Unfortunately, according to DCSF, the proportions gaining O-level A-C only are not available for 1986 and 1987.

Figure 5: Percentage of school leavers with five O-levels or A*-C GCSEs



Source DfES 2007b

■ = boys; O = girls; Dotted line = inequality index.

1970 - 1985 O-Level passes (A-C after 1974)

1986-1987 O-Level A-C or CSE grade 1

1988 GCSE A-C, O-Level and CSE grade 1

1989-2006 GCSE A-C (A* introduced from 1994)

71. If the introduction of GCSE coincided with the opening of an achievement gap through a time series of different cohorts, what is the evidence for a given cohort? How does the GCSE assessment compare with others?

72. Differences between boys and girls are found right back to before they start school (DfES 2007b), so is the difference found at GCSE simply the result of evolution of these differences? Not if we accept the analysis carried out by Machin et al (Machin et al, 2005). They showed that the gap between girls and boys at GCSE was not strongly influenced by controlling for achievement in the final assessment of key stage 2 at age 11, so that the change in the gap over time must have been due to changes in the secondary school years.

73. If we look at the assessment at the end of key stage 3, at aged 14, there are some important differences compared to GCSEs. As with other assessments, girls do better at English as found in GCSE, but there are

differences in the results for Mathematics and Science. If we look at the headline figures for pupils achieving level 5, girls do slightly better than boys for Mathematics and Science as well, but about 70 per cent or more of the cohort achieve these levels, a higher proportion than gain grade C at GCSE. Better comparisons can be made by looking at the proportions achieving levels 6 and 7. The proportion of boys gaining level 6 or higher and level 7 or higher in Mathematics and Science has been equal to or greater than the proportion or girls[32] achieving these levels.

74. For 2006 we have a an alternative assessment taken at about the same time as GCSEs provided by the results of the OECD 2006 Programme for International Student Assessment (PISA) study. This involved assessment of 15 year olds in reading, mathematics and science. The UK component involved 502 schools and over 13 thousand pupils (OECD, 2009). In England, as well as in the UK as a whole, girls scored better on the reading assessment, but boys got more correct answers on both the mathematics and science questions (Bradshaw et al 2007, OECD 2007). What is more, the boys higher overall science score was mostly due to their better results in "explaining phenomena scientifically", the competency which is closest to traditional science learning and assessment. This contrasts with GCSEs, where girls did better in both mathematics and science, apart from the very small advantage for boys in the percentages gaining A* and A grades in mathematics[33].

75. Finally, an ongoing study into the SAT tests, used in the USA for university admissions, has shown that boys also do better with this test than they do with GCSEs (Kirkup, et al, 2008). This study was based on a sample of students who were taking A-levels, and therefore is not suitable for making a simple direct comparison with GCSEs, like the PISA study. However, the researchers modelled SAT scores carefully controlling for GCSE and A-level attainment, allowing subject specific effects, like A-level mathematics grade on the SAT mathematics score. They found that boys did better on mathematics and critical reading components of the test when compared with girls with equivalent GCSE and A-level results. There was no difference in the writing component, though when the score for the essay question was removed, the boys appeared to do better on the

[32] See DCSF Statistical First Release 20/2008 (DCSF 2008) for the most recent 2008 figures and earlier DCSF and DfES Statistical First Releases for previous years.

[33] In 2006 the percentages of male candidates in England gaining A* in mathematics was 4.2% compared to 4.0% for girls, and gaining A* or A was 13.2% compared to 13.1% for girls. The cumulative proportions of boys gaining other grades or higher were lower than for girls. Boys did do better at additional mathematics but there were very small numbers of candidates. (JCQ, 2008).

remaining SAT writing score, after allowing for GCSE and A-level achievement.

76. So differences at key stage 2 assessment at aged 11 cannot explain the differences at GCSES. The key stage 3, PISA and SAT tests, as well as O-levels, all show the same pattern, with girls doing better at English, and boys doing better or at least as well as girls at mathematics and science, while for GCSE girls do better in all three subject areas. Why should GCSEs favour girls?

77. Firstly, while the syllabuses for particular subjects differed for different boards, there were some consistent changes with the introduction of GCSEs. For example, GCSE mathematics typically saw the emergence of 'investigations'. Students were asked to come up with conjectures and support them with examples along with a narrative to explain their thinking. Teachers were advised that a short proof (as distinct from a long narrative) was not acceptable. As the QCA review pointed out, requirements for extended writing within mathematics are of little relevance to the subject (QCA 2006), and also it would be expected that girls would be more successful than boys in meeting such requirements. Another example is provided by French, which with the introduction of GCSE saw a radical change in the tasks and style of communication to something closer to CSE rather than O level (Stobart et al, 1992a). This change also seems to have favoured girls.

78. Secondly, with the introduction of GCSEs came a large increase in coursework. This component was later reduced, but it was still greater than for O-levels where it had no role in most subjects. The changes in relative achievement between boys and girls from 1985 (O-level and CSE) to 1988 (GCSE) roughly corresponds to the extent of coursework introduced with GCSE (Stobart et al, 1992a). However, subsequent reductions in the coursework component did not always show a corresponding change in the relative achievement of girls and boys (QCA 2006). For 1994 coursework in English was reduced to 40 per cent. Previously two-thirds of candidates had been assessed with 100 per cent coursework, yet there the performance gap between girls and boys widened slightly. For Mathematics between 1991 and 1993 there had been a compulsory minimum of 20 per cent coursework which became optional in 1994. The introduction of compulsory coursework saw a reduction in boys' advantage in this subject, a reduction that was slightly reversed in 1994. However, it is not possible to clearly identify coursework as a factor separate from more general longer term trends and confounding factors like the change in syllabuses described above.

79. To assess the impact of coursework it is better to look at the coursework and examination marks within the same assessment. Such a comparison was made for 1991 English and Mathematics GCSEs in a study

commissioned by the Schools Examination and Assessment Council (SEAC), a predecessor of the QCA (Stobart, 1992b)[34]. In order to see whether boys are worse than girls at coursework relative to their examination results we need to estimate their coursework marks controlled for examination marks; that is we need a comparison of coursework marks for girls and boys with the same examination marks. And to see how any differences convert into different proportions of girls and boys gaining given grades, we need to look at the profiles of marks with and without the coursework component. Unfortunately, neither of these were provided by the SEAC study, so we can only try to estimate the impact of coursework from the mean marks. For English Language the differences in mean marks between girls and boys were almost exactly the same for written examination and coursework components, with girls achieving higher mean marks in both. For English Literature the difference was slightly greater for the examination component, again with girls doing better at both the examination and coursework. So for these subjects there is no evidence of girls doing relatively better at coursework. For Mathematics the picture is quite different. Across two syllabuses and three tiers (foundation, intermediate and higher) girls had higher mean marks than boys for the coursework components, whereas boys generally had higher mean marks for the examination components. The only exceptions were for the higher tier of one syllabus where girls had slightly higher mean marks for one written paper and very similar marks for the other. The researchers concluded that, for mathematics, "girls show a small but consistent mark advantage on coursework". Interpreting what 'small' means is difficult in the absence of 'with and without coursework' mark profiles, but from our own estimates, we have concluded that the differences in mean coursework marks are consistent with the improved achievement in mathematics of girls relative to boys.

80. Further information on the mean marks for examinations and coursework is available for 1997 assessments in English, Mathematics and Science (Elwood, 1999). Girls did better in all the coursework assessments. Again for English girls did better at examinations and coursework. The examination marks in the other subjects were more complicated with different relative results depending on the tier, examination paper and syllabus, but boys on the whole did better in the examinations relative to the coursework compared to girls.

81. The question as to whether girls do relatively better in coursework than in examinations compared to boys has been confused with a related but quite distinct question as to the extent to which coursework

[34] The study was based on GCSEs awarded by LEAG (now part of Edexecel): English Language (1200), English Literature (1210) Mathematics syllabus A and Mathematics syllabus B.

contributes to the differences in overall grades[35]. This depends on the weight assigned to the different components when calculating the total mark, and the spread of marks in the different components. In the SEAC and subsequent studies these two factors have been combined in calculating an "achieved weight". The size of these achieved weights, while relevant to an assessment of the contribution of coursework, does not tells us anything about the extent to which coursework effects the relative achievements of girls and boys. To see why this is so, consider the following scenario. If all boys had the same coursework mark, and all girls had the same coursework mark, so that there were zero achieved coursework weights for girls and for boys, the difference in coursework marks between boys and girls could still account for their different grade profiles. Without coursework marks controlled for examination results we cannot be certain, but from the mean marks for boys and girls in coursework and examination components, it does look as though coursework has tended to favour girls in mathematics and science. The "achieved weights" do not modify this conclusion.

82. These results refer to the direct effects of coursework. There may be indirect effects if girls and boys are motivated or demotivated by coursework to different degrees. If, as some have suggested, peer pressure and a specifically male culture leads some boys to at least appear to make little effort (DfES 2007b), they may have particular difficulties with coursework. Also, in so far as the boys' attitude involves a challenge to authority, a form of assessment which places the teachers in control may be demotivating.

Continuing beyond level 2 through to higher education

83. Figure 5 suggests the gap in GCSE achievement has stabilised. Both the percentage point difference and the inequality index reached their maxima in 1998. Though five A*-C GCSEs may no longer be the best statistic to describe those most likely to go on to higher education, using most other measures of GCSE attainment we do not find significant increases in the related inequality indices after the end of the 1990s. A possible exception is mathematics and related subjects, where girls' relative progress as measured by success in getting top grades has

[35] Writing about the results from the SEAC study, Elwood stated that from the achieved weighting analysis "it is possible to argue that coursework has a limited effect in boosting girls' overall subject marks" (Elwood, 1995). It is possible to so argue, so long as it is appreciated that it only applies to boosting one girl's mark compared to another girl's mark, not in boosting girls' marks compared to boys'. This is not how these and other remarks have always been interpreted.

continued. In 2008 female candidates in England had a higher proportion of A* grades for the first time in mathematics and physics[36] (JCQ, 2008).

84. As we have already shown, the inequality in young participation to HE has continued to grow strongly up to 2003-04, and the most recent figures show the inequality increased further between 2006-07 and 2007-08. As previously noted, the recent DIUS analysis (Broecke et al, 2008) showed that given their prior qualifications, and indeed just their GCSE results, the participation rates of men and women entering at 18 in 2004-05 and 19 in 2005-06 were as expected. However, they also confirmed the earlier analysis which showed that this is a relatively recent phenomenon, dating from around 2000-01. Before then women's HE participation was lower than would be expected given their prior qualifications[37].

Other reasons for the growing inequality in HE participation

85. The introduction of GCSEs is not the whole explanation for the gap in HE participation, nor could it be given that the higher HE participation rate for women is an international phenomenon. There must be other factors, probably common to other countries, which have led to the low HE participation rates for men, relative to women. Numerous possible explanations have been put forward, many relating to the changed roles for women, in particular changes resulting from improvements in family planning and the increased opportunities for women to combine having a family with progressing in a career[38]. Here we look at two sets of explanations: the economic drivers which may provide a greater incentive for women to invest in higher education, and the changes in childhood experience which may have a different impact on the intellectual development of girls and boys.

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[36] The results for physics are more difficult to interpret because only a small proportion of the cohort are candidates, and more boys take the examination than girls.

[37] The robustness of these results, based on the Youth Cohort Study, are somewhat compromised by the high attrition rates of this series of surveys that differ for men and women. However, looking back to the 1970s, women did at least as well as men at 16, but had lower HE participation rates. Over the long term there must have been a catching up of women's post compulsory education progression rates, conditional on their level 2 achievement.

[38] See the OECD review (Vincent-Lacrin 2008) for an overview of the explanations that have been put forward for the trends found across the world. For a consideration of possible explanations in UK see Machin et al, 2005.

Economic drivers

86. Most estimates of the returns to higher education show higher returns for women than for men[39]. Though women graduates, on average, earn less than men, the difference is smaller than for non graduates. Put another way, there are less attractive employment opportunities for girls not going on to higher education than for boys. The numbers of women going into skilled manual occupations in construction and mechanics may be increasing, but they are still dominated by men. Following this argument, the expectation would be that if and when women were just as likely to become plumbers, electricians or car mechanics as men, the inequalities in HE participation over time would reduce.

87. There is an apparent weakness in this explanation, which has been pointed out by Machin and others (Machin 2005). Though most estimates seem to show that while women do still have higher returns from higher education, the difference in these returns between men and women has not increased, and may have decreased since 1990. However, this may simply be because the participation rates for women have increased so much more than for men. Consider women who entered professions like law and medicine. They used to be exceptional. It is likely, therefore, that they would have attributes which would make them more likely to be successful, which would not be allowed for in calculating the returns from higher education. Now it is normal for women to graduate in these subjects and enter these professions. The returns will not be skewed by high proportions of exceptional individuals. It may be the continued notional return for women from higher education, even if it has not increased, has been sufficient to continue to expand the gap in higher education participation. The advantage to women of higher education is more visible through the achievements of earlier cohorts, and the obstacles to entry to many occupations have been reduced or removed.

88. It may also be that the measurement of returns based on salary alone has been too narrow. Using broader measures of material well being, researchers have found that in the United States returns to women

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[39] For a recent summary see the UUK commissioned report (UUK 2007). In this report, as is usual, the uncertainties in the estimates of returns to HE are understated. Most studies take those with A-levels (or other level 3 qualifications) who do not enter HE as the 'counterfactual' so those who discontinued education at 16 but could have progressed are not included. In recent years very few young people with good A-levels do not go on to higher education, and these must therefore be untypical. The relative returns of men and women may be safer, and almost all studies show women's returns to be higher. However, the OECD ('Education at a Glance' 2003 and 2005 editions) evidence is exceptional. It is unclear why the OECD estimate differs from those reported by most other researchers.

from higher education appear to have increased faster than those for men. (Diprete et al, 2006)

89. Following the 'economic man' assumption, these higher returns are likely to lead to an increased investment by girls and their parents into their academic education[40] leading to the observed higher levels of educational achievement and the growing inequality in higher education participation.

Cognitive ability and changes in childhood experience

90. There are a range of tests which aim to measure underlying cognitive ability rather than specific knowledge learned through schooling[41]. These are said to measure 'intelligence', 'reasoning ability', and so on.

91. Over many studies the differences in IQ tests scores between males and females have been small and inconsistent, though tests which separate the composite abilities measured tend to show small differences, with females achieving higher average scores on verbal reasoning tests but lower average scores on tests measuring numerical ability[42].

92. In 2002 and 2003, 320,000 11 and 12 year olds in the UK, completed tests in verbal, non-verbal and quantitative reasoning (Strand et al, 2006). The boys on average did better on the quantitative test, and the girls on the non-verbal tests, though both of these differences were described as 'negligible'. There was a non-negligible but still 'small' average advantage for girls on the verbal reasoning test. Though these differences in means scores were all small, there was a larger difference in the variability, with boys having a wider spread of scores on all three tests. This is consistent with many other studies[43]. However, none of these differences are sufficient to explain differences in educational achievement. As the researchers sum it up:-

> "the lack of substantial sex differences in reasoning scores suggests there is no a priori rationale, based on mental ability differences, to expect a large gender gap in subsequent test or examination attainment at age 16. If we wish to look for explanations of the gender gap at GCSE we must look beyond conceptions of ability."

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[40] Some possible examples; girls do more homework, parents read more to their daughters. (DfES 2007b)

[41] Most tests do rely on reading and numeracy skills, and at least to that extent are dependent on educational attainment.

[42] Strand provides a review of the evidence (Strand et al, 2006).

[43] For example see Machin et al, 2008 and Johnson et al, 2008.

93. Somewhat different tests have developed from the Piagetian school of developmental psychology. Recent tests suggest that girls and boys achieve similar results with these tests too, but they suggest that this is a recent phenomenon (Shayer et al, 2007).

94. Over a period of nearly thirty years the same science reasoning test has been given to 11 and 12 year olds. The test assesses children's understanding of the concepts of heaviness and volume. Unlike IQ tests, the results show a decline in competence. Table 11 shows the results for one of the 15 questions put to the children. This question showed the most dramatic drop in success rates, but the overall pattern as between results at the beginning and the end of the study, and between boys and girls is similar for the other questions in the test.

Table 11: Success rates for displacement volume question

Year	**Boys**	**Girls**
1975-76	54%	27%
2003-04	17%	17%

The question follows other items in the test which lead up to it. The pupils are asked whether a metal block would displace more or less water than a plasticine block of identical dimensions when lowered by a thread to just beneath the surface of a cylinder filled with water, having first handled the blocks so that they are aware that the brass block is heavier.

95. Table 11 shows how the success rate has declined much more for boys, so that the advantage they had in 1975 has now gone. The reasons for these changes are not established, and may never be, but the researchers speculate that, at least up to 2000, they may be in part to do with changes in play. As the researchers put it:-

> "Passive exposure to many hours of television a week has increased since the 1960s when 1975 CSMS students entered primary school. Computer games may have usurped what might have been, for boys, many hours playing outside with friends with things, tools and mechanisms of various kinds rather than virtual reality."

96. Does this matter? Is being able to answer these questions correctly important? According to the researchers this test is predictive of achievement in both science and mathematics, and children are starting secondary school less prepared for the development of the underlying concepts. If this is the case, we may ask how we explain the continuing improvements in GCSEs and A-level science and mathematics results. Whether it is through grade inflation or improvements in teaching is not

directly relevant to the different results achieved by boys and girls. Boys have also lost their relative advantage compared to girls as they start secondary school, and this may be part of the reason why girls have continued to improve their GCSE mathematics and physics grades relative to boys twenty years after the introduction of GCSEs.

Mature participation

97. While the immediate drivers for demand for young participation can be understood in terms of level 2 qualifications, mature entry is more complex. Foundation Degree provision, which accounted for 1.8 percentage points to the 2005-06 HEIPR, and is expected to expand further in future, provides an example. For 2005-06 63% of the mature entrants were female. This is in part due to foundation degree programmes developed for those working with pre-school children, as teaching assistants, and in social care, all of which have a very high proportion of women (HEFCE 2008). To understand the reasons behind the proportions of men and women for other groups of mature entrants, it would be necessary to look in some detail at each area of study.

Does the lower HE participation and achievement of men matter?

98. This question can be approached from a consideration of concerns which can be grouped under three headings.

99. The first concern relates to questions of equity. The inequality in participation is greater now than the reverse inequality over 30 years ago. If we view higher education as having value in itself, then this is an inequality in itself. To the extent that participation has other outcomes, other inequalities may be mitigated or increased by the inequality in higher education participation. For example, the advantages for men in the labour market reduces the impact of lower participation on salaries, while the difference in life expectancy between men and women may increase as women gain the improved health associated with higher education.

100. The second concern relates to the supply of graduates to the labour force. Government has taken the view that there will be an increased demand for men and women with higher education qualifications, which provides part of the rationale for their 50% HEIPR target. Increasing participation rates of men to those of women would mean a large increase in the number of graduates and we would now be very close to the 50% target. The scale of the current gap can also be illustrated by calculating the increased number of male students that would be required for the HEIPR for men to match that for women. For 2007-08 the number is

130,000 just to equalise the full-time participation (Bekhradnia et al, 2008).

101. The third set of concerns relate to the other social and economic impacts should the inequality in participation rates continue to increase. According to the OECD review (Vincent-Lancrin, 2008) the share of females in HE enrolments in the UK could reach 70 per cent by 2025 if trends continued. Should the inequality reach these levels, what would be the consequences? Would it adversely affect the HE experience for men and women? Could it give rise to adverse stereotypes, particularly for men from disadvantaged socio-economic backgrounds, with a greater proportion of men amongst the socially excluded? So far little consideration has been given to such questions.

102. The justification for taking a sanguine attitude to the large difference in educational achievement in general, and HE participation and achievement in particular, is rarely set out in these terms. Rather a number of other arguments are used. The first is to claim that the women do not experience higher status higher education to the same extent as men. We have shown that this is not the case. Here we examine some of the additional arguments that are sometimes used.

<u>Differences in educational achievement as compensation for general wage inequalities</u>

> "it could be argued that the widening gender gap" [in educational achievement] "does not matter if this advantage either disappears by the time the girl enters the labour market or if it **helps to ensure greater equality for women in the labour market**" DfES 2007b. Emphasis added.

103. First we note that this statement takes it as a given that the sole purpose of education is the maximisation of salary in future employment. Let us, for the moment, accept this for the sake of argument.

104. It is not straightforward to judge whether or not equity is achieved on entry to the labour market. Some of the differences are due to choices of career, whether to seek employment in the public or private sector, and so on. Very few people, men or women, equate the utility of employment with the salary alone, and the evidence suggests that, on average, the salary tends to be less important for women. Part of the salary differences are a consequence of choices.

105. Some of these choices may be made to avoid discrimination, and there will be some direct discrimination as well. But these injustices need to be tackled directly, not by acquiescing in the lower educational achievements of men. The boy who does not achieve his potential at

school is not helped by a women earning less than she should, and the woman who is unfairly treated by her employer is not helped by the fact that some boys do not do as well in school as they should.

106. Many surveys have shown that most graduates value their experience in higher education for more than the employment it brings, let alone the salary they earn. And we know that higher education is associated with better health and other positive outcomes. So even if one was to accept the idea that the inequality in higher education participation should be accepted as a way of compensating for salary differences, there would still be an inequality in terms of the other benefits from higher education.

Numbers of women in senior positions

107. A variation in the 'one inequality justifies another' argument is to cite statistics on the relative numbers of women in senior positions. Statistics relating to senior positions in higher education are popular when making these arguments. For example, the majority of professors and nearly all Vice Chancellors are men. Apart from the fact that different types of inequality are operating, these examples fail to take account of the historic legacy of higher HE participation by men. In 2009 young participation rates for men were higher than that for women in the cohorts in their mid thirties and older, and almost all those in the more senior positions will come from these earlier cohorts.

The difference between men and women is 'small' and the socio-economic disadvantage is more important

108. How much smaller are the differences in participation between men and women compared to the differences between people from different socio-economic backgrounds? By increasing the number of categories we can increase the socio-economic gap to almost any size we care to choose, so for a meaningful comparison we need two socio-economic groups not too different in size, say, for example, NS-SEC groups 1 to 3 and 4 to 7. In 2006-07 the sex gap for full-time young entrants was 6.8 percentage points while this socio-economic gap was 20.5 percentage points[44]. The sex gap is smaller, but it is a third of the socio-economic gap, and is not insignificant. Further, while the inequalities between socio-economic groups are at worst static, and may be declining, the sex gap has increased, and looks likely to continue to increase.

109. Raising awareness about the growing male-female gap does not mean that other differences, such as those by different NS-SEC groups, need be ignored. As we have seen, inequalities between socio-economic

[44] Socio-economic gap from DIUS, 2008, sex gap from table 8.

groups tend to be larger for men than for women. We would argue that the male female gap, far from being a distraction from concerns about socio-economic disadvantage, is an important aspect of it.

What should be done?

110. Given that the lower young participation for males can be understood in terms of prior educational achievement, most of the actions relate to raising aspirations and achievements in schools and colleges. The recent review of evidence on pupils (DfES 2007b) has a summary and discussion of the strategies for raising the attainment of boys in schools, and we will not consider these school specific initiatives here. Rather, we focus on what can be done by those involved with higher education, recognising that most actions need to be closely co-ordinated with what is going on in schools.

Recognition of the issue

111. As we have seen, there are those who, wrongly, claim that the higher participation of women is only achieved with low status higher education, and others who contrive to make the differences by sex seem insignificant by making contrasts with statistics which are not comparable. There seems to have been a determination to minimise the significance of the growing inequality in the rates of participation

112. Sometimes those involved with higher education policy give the impression of being like the generals fighting the last war. Consider the following extract from a report by the QAA on foundation degrees (QAA 2005).

> "Despite the providers' enthusiasm for widening participation, as yet there is little difference between the student profiles of the previous HNDs and the FDs [Foundation Degrees] replacing them. Many programmes continue to mainly attract men aged 18 to 24 with traditional entry qualifications who study full-time."

113. Is it the age, sex, prior qualifications or mode of study that leads the QAA to suggest that this provision does not widen participation? Presumably the fact that they are male is part of the problem, otherwise why mention it? The implication of this commentary is that for these foundation degree programmes to be judged a success, there would have to be more women entrants.

114. Fortunately, the first signs of recognition of the relatively low participation of men are now evident. In its submission to the Select Committee on Education and Skills, the DfES stated that they were "increasingly concerned about male participation" in higher education

(DfES 2007c). Though brief, this remark received wide media coverage, perhaps because of its novelty.

115. At an operational level HEFCE's 'Council Briefing' reported the 'Boys into HE' project organised by the East Midlands Aimhigher widening participation partnership (HEFCE, 2007b). HEFCE supported this initiative, recognising that "sex inequality is clearly an issue for widening participation" though it was felt necessary to affirm that social class remained the "number one priority" and assert that nothing should be done that might imply that "we are seeking to reduce the participation of girls and women". These remarks, unexceptional in themselves, may reflect the unfamiliarity and perhaps nervousness of policy makers about measures to increase participation by boys. There had been no corresponding cautionary statements in relation to earlier Aimhigher initiatives aimed at girls, like the projects to encourage girls to study engineering (HEFCE, 2004).

Aimhigher

116. Aimhigher is a government funded programme across England which aims to widen participation in higher education by raising the aspirations and developing the abilities of young people, particularly those from disadvantaged backgrounds[45]. Partnerships of schools, colleges and universities work together to meet these aims through a variety of activities including: visits to university campuses, residential summer schools, open days and mentoring schemes.

117. There is an awareness among Aimhigher partnerships that boys from disadvantaged backgrounds can be particularly difficult to reach, though taking positive action to address male under-representation does not yet appear as a major activity. Action on Access[46] identified 18 sets of reported activities between 2004-05 and 2006-07 where boys were the, or one of the, target groups. This is out of a total of three and a half thousand reported activities over this period. Of the 18 activities for boys, two were specifically for boys from minority ethnic groups, one for white working class boys, and three mentioned boys alongside other groups. Because the Aimhigher Partnership were not directed to list all activity in their monitoring returns, these reported activities will understate what is being done, and also it is likely that there were some reported activities

[45] See www.hefce.ac.uk/Widen/aimhigh/ for an overview of Aimhigher and links for further information. The evidence reported in this section was provided by HEFCE and Action on Access.

[46] Action on Access is the co-ordination team for widening participation in higher education in England and Northern Ireland. (See www.actiononaccess.org/.)

focussing on boys, which were not identified as such. Even so, the figures do suggest that boy focussed initiatives are currently at a low level.

118. Some of the details from the monitoring give an indication of the challenges in engaging with boys. One set of 'taster days', that is HEI visits for year 9 students typically aged 14, had only 48% boys even though 'boys' were the target group. This is a relatively high figure compared to the breakdown for summer school attendance. Between 2003-04 and 2007-08 the participation by boys was less than half that for girls (HEFCE, 2009b). This ratio was found to be consistent across regions, throughout the period and for different types of summer school, and from differing socio-economic backgrounds[47]. This is despite efforts by Aimhigher partnerships to attract more boys to summer schools.

Reducing non-completion

119. We have seen how the differences in participation between men and women are even greater when we interpret 'participation' to mean completing rather than starting an HE programme.

120. The higher non-completion rates for men can in part be explained by their subject choices and in part by their weaker prior qualifications, but there remains a difference which is not explained by these factors. Yet most of the discussion around the relative achievements of men and women on undergraduate programmes has been about a supposed under representation of women in the numbers of graduates gaining firsts. Even discounting men's lower HE entry rate and higher non-completion, this is no longer the case when we take into account the differing subject profiles.

121. It is not necessary for initiatives to reduce non-completion to be specific to men for them to reduce the gap in HE achievement. For example, improving retention in high risk subjects like engineering would also help more men than women. Another example, which is relevant across a wider range of subject areas, concerns attendance. Improving attendance records and developing strategies to indentify students at the early stages of disengagement from programmes could help all at risk students and reduce non-completion overall, but it may also reduce the gap in completion between men and women[48].

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[47] Participation by socio-economic background was not presented in the HEFCE report (HEFCE, 2009b), but HEFCE provided an unpublished analysis showing that the ratio of girls to boys was similar for different socio-economic groups.

[48] Studies of students at the University of Sussex (Woodfield et al 2006b, Farsides et al, 2007) showed that students' achievement as measured by examination marks and class of degree were strongly associated with attendance, and that

122. Even if the gap in HE completion rates were eliminated, a large participation 'as successful completion' difference would remain, but reducing non-completion could make a contribution and, unlike efforts to raise aspirations and achievements in schools, such initiatives are within the jurisdiction of HEIs.

Improving the evidence

HE completion and achievement

123. Though we know a lot more about non-completion now than ten years ago, it is still limited. There are large studies using analyses of administrative data sets, which are limited by the range of data available, and then there are small scale studies, based on either an institution or a department, or sometimes a small sample for several institutions which have more detailed information. These small scale studies suffer from the noise inherent in working with small numbers, and there is always a concern as to whether the findings are applicable to other institutions.

124. A large scale study involving collection of detailed information is impractical if organised from scratch, but the National Student Survey (NSS) machinery provides an opportunity to carry out such studies at relatively low marginal cost. Students at most institutions completing the NSS online are invited to complete a further online questionnaire. A bank of additional questions is prepared from which institutions can select a subset, and the results for each institution of this additional survey are made available to institutions. No results have ever been published using this facility and the current design does not make full use of the ability to ask further questions. Potentially the process could be developed to create a very powerful research instrument. The results would enable us to get a much better idea not just about the reasons for differences between men and women, but about a whole range of other questions.

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attendance, and other measures of commitment, accounted for a large part of the differences in achievement between men and women that remains after A-level grades are taken into account. It is likely that completion rates would similarly be associated. A study of students in four subject areas at the University of Glamorgan (Newman-Ford, 2008) showed consistent but different results. Here to, there was a strong association between attendance and achievement, though in this case there were no significant differences in either attendance or achievement between men and women. In terms of achievement, the University of Sussex is more typical of the sector as a whole, though the differences between these two studies does highlight the dangers of extrapolating from an analysis based on a single institution.

Assessment at the end of compulsory education

125. We have seen that boys do better with the PISA test than at GCSE. Also, while there is a large literature on coursework and other components of assessment, there are no published studies based on an analysis of the individual module completed by the individual pupil. With individual linked data and powerful statistical modelling, there is the opportunity to learn much more about how different pupils respond to different types of assessment. Such a study could consider a range of pupil attributes, not just sex, in particular ethnicity, school type, and socio-economic background.

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Abbreviations

API	Age Participation Index
CSE	Certificate of Secondary Education
DCSF	Department for Children Schools and Families
DfES	Department for Education and Skills
DIUS	Department for Innovation, Universities and Skills
FD	Foundation Degree
FEC	Further Education College
FSM	Free School Meals
GCSE	General Certificate of Secondary Education
HE	Higher Education
HEI	Higher Education Institution
HEFCE	Higher Education Funding Council for England
HEIPR	Higher Education Initial Participation Rate
HND	Higher National Diploma
HESA	Higher Education Statistics Agency
ILR	Individualised Learner Record
JCQ	Joint Council for Qualifications
LEAG	London East Anglia Group (an awarding body, now part of Edexcel)
NfER	National Foundation for Educational Research
NS-SEC	National Statistics Socio-economic Classification
PI	Performance Indicator
OECD	Organisation for Economic Co-operation and Development
PISA	Programme for International Student Assessment
QAA	Quality Assurance Agency

QCA	Qualifications and Curriculum Authority
ULEAC	University of London Examinations and Assessment Council (an awarding body, now part of Edexcel)
SAT	Trademark of tests used for college admissions in the USA
SEAC	Schools Examination Assessment Council, predecessor of QCA