The Decline in Student Applications to Computer Science and IT Degree Courses in UK Universities

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Introduction

The research described in this report was undertaken for the Council of Professors and Heads of Computing (CPHC). The primary aim was to investigate the recent decline in applications to undergraduate courses in Computing/IT at British universities. Many institutions have experienced a drop in the number of applications since 2001, and while a number of explanations have been proposed on the basis of anecdotal evidence, it is likely that the underlying causes are complex.

This project attempted to use national statistics to identify trends in applications and recruitment to Computing/IT courses, and to compare the situation of Computing/IT with that of other subjects. In addition, primary research was undertaken in order to examine perceptions of the subject among secondary school pupils during the education stages when decisions about university entry are generally made. Part One of this report describes the outcomes of an analysis of the annual datasets made publicly available through the UCAS website. Part Two presents the results of a fieldwork phase during which a questionnaire was administered to pupils in 8 schools and colleges, and a small number of focus group interviews were conducted. Usable questionnaire returns were received from 858 pupils.

The UCAS statistics were used to identify general trends in applications and admissions to Computing/IT courses, to compare different subdisciplines within this field, and to set Computing/IT alongside other subject areas. Issues such as gender balance and demographic patterns (e.g. the distribution of applications among different age, ethnic and social class groups), as well as levels of pre-entry attainment are explored. The bulk of this analysis applies only to UK home students.

Part Two discusses the findings of the primary research with GCSE and A-level students. Participants were asked to complete questionnaires on their subject choices, their reasons for taking or dropping Computing and/or ICT, their plans for post-16 education, and their attitudes to Computing/IT as a subject and as a career. The focus group interviews explored some of these issues in more detail.

Some of the findings are suggestive and potentially useful in developing strategies to increase recruitment to Computing/IT courses. However, it is very important to note that this survey was limited by time and resources, and that it must not be assumed to represent the views of *all* secondary school pupils in the UK. This is largely because of constraints in the sampling procedures, which were determined by region and by the willingness of individual Schools to take part, as well as by the time available for the analysis of data. It was not possible to undertake the rigorous procedures to ensure genuine representativeness of the sort described in, for example, etb 2005 (p.3).

This project took place alongside a series of ‘scoping events’ organised by the CPHC and the BCS and funded by HEFCE under the ‘STEM’ initiative to increase the number of students entering higher education courses in a range of ‘strategic’ science, technology and mathematics subjects. Preliminary reports of some of the findings presented in this document were used in the discussions at these events, and an interim report was made at the 2006 CPHC/BCS conference.

PART ONE: ANALYSIS OF UCAS FIGURES

1:1 Student numbers

In the discussion which follows, all data is based on an analysis of the annual datasets released by UCAS. Unless otherwise stated, the figures for 'computing' represent the group of 'core computing' subjects as defined by UCAS. These are Computer Science, Software Engineering, Information Technology and Artificial Intelligence. In some cases it has been possible to separate figures for each of these disciplines. However, separate data relating to social class and ethnic origin is not available for computing. Therefore the sections on these issues relate to data for the group of subjects Computing and Mathematical Sciences (CMS), which also includes Mathematics, Statistics, Operational Research, combinations with these subjects and with Computing/IT, and other subjects in this general field.

Figures have been generated for four measures: these are the total number of applications to undergraduate courses from UK home students, the total number of acceptances, the total number of acceptances to degree-level programmes, and the total number of acceptances to HND and other diploma-level programmes. Where only two figures are presented in this report, these are normally for the total number of applications to all courses and the total number of acceptances to degree-level programmes, unless otherwise stated. All of the figures in this document relate to UK home undergraduate applicants *only*.

The number of UK home students applying to study Computer Science and related subjects has undergone a series of dramatic changes over the past decade. UCAS figures for the number of applications, acceptances, acceptances to degree courses and acceptances to HND/Diploma courses show a sharp rise which peaked in 2001 (Chart 1/Table 1). Applications rose by 15.8% and acceptances to degree courses by 13.6% in 1999, and the increases in 2000 and 2001 were only slightly smaller. Applications then fell by almost 20% and acceptances to degree courses by 8.6% in 2002, and similar trends were seen in 2003. In 2004 the drop in applications was more dramatic, but only a slight fall occurred in 2005[1].

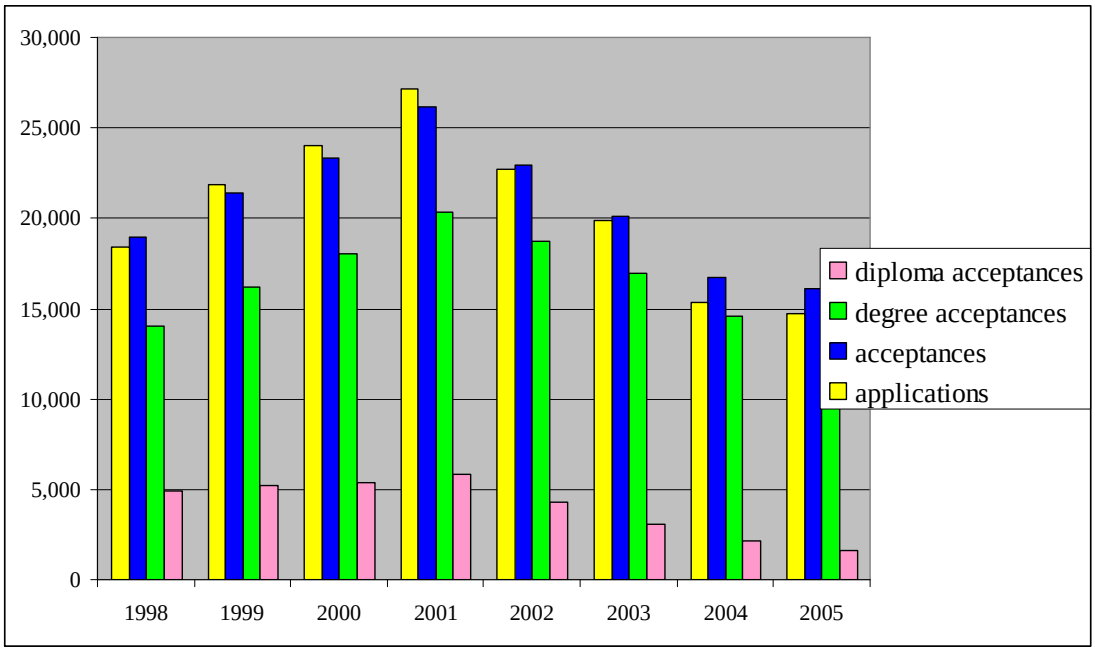

Chart 1: applicants and acceptances to undergraduate courses in core Computing disciplines

[1] The dramatic fall in diploma acceptances is probably due to the phasing out of some HND courses as Foundation Degrees become more widely established.

	applications	acceptances	degree acceptances	diploma acceptances
2005	14,708	16,130	14,489	1,641
2004	15,357	16,725	14,561	2,164
2003	19,856	20,071	16,987	3,083
2002	22,702	22,979	18,719	4,260
2001	27,177	26,160	20,335	5,825
2000	24,016	23,352	18,004	5,348
1999	21,856	21,436	16,227	5,209
1998	18,403	18,918	14,018	4,900

Table 1: applicants and acceptances to undergraduate courses in core Computing disciplines

	applications	acceptances	degree acceptances	diploma acceptances
2005	-4.4	-3.7	-0.5	-31.9
2004	-29.3	-20.0	-16.7	-42.5
2003	-14.3	-14.5	-10.2	-38.2
2002	-19.7	-13.8	-8.6	-36.7
2001	11.6	10.7	11.5	8.2
2000	9.0	8.2	9.9	2.6
1999	15.8	11.7	13.6	5.9

Table 2: percentage change, year on year, in applications & degree acceptances, core Computing

In 2004 the total number of applications to all courses in core Computing disciplines fell below that recorded in 1998, and in 2005 the total number of acceptances to degree courses in this subject area was less than 500 higher than in 1998.

The number of acceptances grew more slowly than the number of applications in 1999. At the point of greatest expansion in 2001, the two were very close indeed. However, the number of acceptances has since then fallen less than the total number of applications.

During the same period, the total number of applications to HE rose steadily to 2004/5, with a slight drop in 2005/6. However, the overall decline (9.3% in applications, 4% in acceptances to degrees) was larger than that seen in core Computing disciplines.

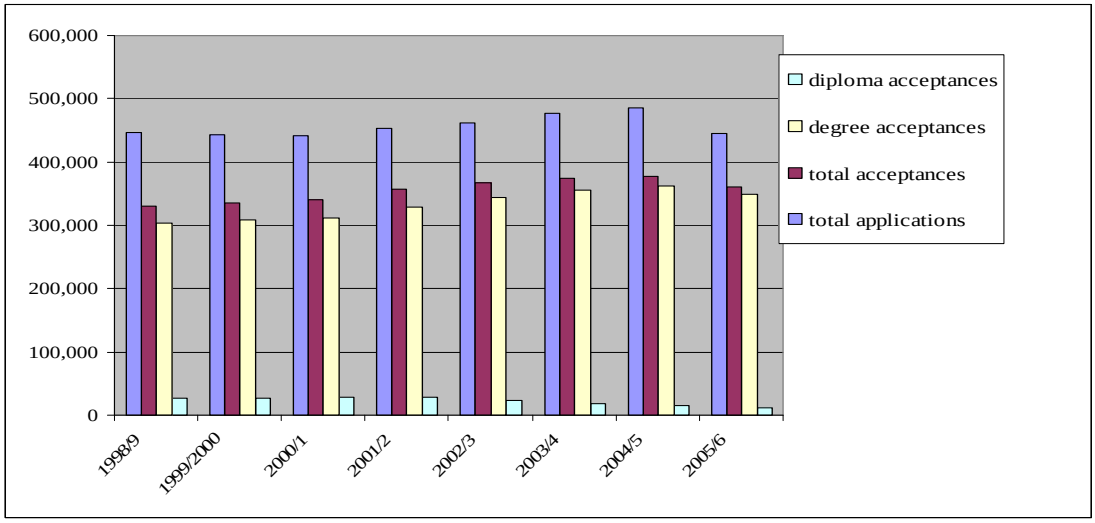

Chart 2: applicants and acceptances to undergraduate HE courses, all subjects

Computing has also seen a decline in numbers by comparison with other subjects. In pre-clinical medicine and dentistry, the biological sciences, physics, chemistry and engineering, the number of applications and acceptances actually *rose* in 2005, despite the overall drop shown by the UCAS figures. This may be attributable to the initiatives which have been designed to increase pupil interest in these subjects. Even in subjects where numbers have fallen, the proportions involved have not been as dramatic as they have in core Computing disciplines. However, the smaller drop in the number of applications and acceptances which was seen in Computing in 2005 may mean that it is to some extent in line with other science subjects. Chart 3 and Tables 3 and 4 illustrate the trends discussed.

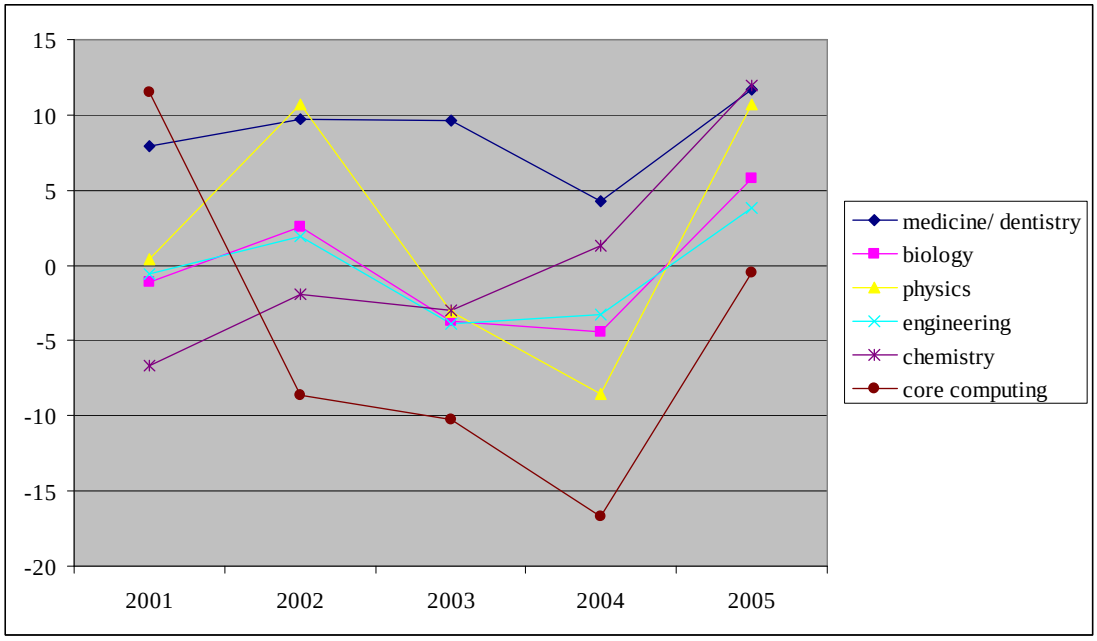

Chart 3: percentage change in number of acceptances to degrees, science disciplines

	medicine/ dentistry	biology	physics	engineering	chemistry	core computing
2005	11.7	5.8	10.7	3.8	12.0	-0.5
2004	4.3	-4.4	-8.5	-3.3	1.3	-16.7
2003	9.6	-3.7	-3.1	-3.9	-3.0	-10.2
2002	9.7	2.6	10.7	1.9	-1.9	-8.6
2001	7.9	-1.1	0.4	-0.6	-6.7	11.5

Table 3: percentage change in number of acceptances to degrees, science disciplines

	medicine/ dentistry	biology	physics	engineering	chemistry
2005	8,220	4,459	2,728	15,262	3,171
2004	7,262	4,201	2,435	14,684	2,790
2003	6,953	4,384	2,642	15,163	2,754
2002	6,287	4,545	2,725	15,754	2,836
2001	5,675	4,425	2,433	15,452	2,889
2000	5,229	4,474	2,423	15,548	3,083

Table 4: number of acceptances to degrees, science disciplines

Other subjects which have enjoyed an increase in the number of applications and students include business studies, humanities, social studies, law, and creative arts and design. Tables 5 and 6 illustrate the change in the number of degree acceptances in each of these disciplines.

	law	business studies	social studies	creative arts & design	humanities	modern languages
2005	2.2	6.3	12.5	11.0	6.5	2.0
2004	4.2	2.3	6.5	6.4	-0.9	-0.5
2003	9.2	1.0	2.0	6.9	2.1	-3.7
2002	13.1	6.9	-14.2	6.3	2.0	-
2001	9.6	3.6	2.1	7.9	-	-

Table 5: percentage change in number of acceptances to degrees, non-science disciplines

	law	business studies	social studies	creative arts & design	humanities	modern languages
2005	16,710	35,637	26,582	39,471	30,505	5,650
2004	16,350	33,383	23,254	35,144	28,523	5,539
2003	15,667	32,630	21,753	32,899	28,783	5,564
2002	14,227	32,318	21,321	30,638	28,190	5,771
2001	12,360	30,104	24,356	28,709	27,618	3,090
2000	11,172	29,035	23,836	26,445		

Table 6: number of acceptances to degrees, non-science subjects

Different trends can be observed within the four 'core computing' disciplines. Table 7 shows the number of applications and degree acceptances in each subject area within the core computing group, and Table 8 shows the percentage change, year on year.

	Computer Science		Software Engineering		Information Technology		Artificial Intelligence	
	Applications	Acceptances - degree	Applications	Acceptances - degree	Applications	Acceptances - degree	Applications	Acceptances - degree
2005	11,554	10,127	734	1,128	2,397	3,162	23	72
2004	11,730	10,171	767	1,078	2,823	3,237	37	75
2003	14,722	11,623	1,012	1,249	4061	4048	60	147
2002	16,609	12,492	1,219	1,436	4,811	4,684	63	107
2001	24,054	15,988	3,046	4,239			77	108
2000	21,600	14,383	2,334	3,497			82	124
1999	19,783	13,109	1,986	3,016			87	102
1998	16,658	11,415	1,671	2,482			74	121

Table 7: number of applications and degree acceptances, core Computing disciplines

	Computer Science		Software Engineering		Information Technology		Artificial Intelligence	
	Applications	Acceptances - degree	Applications	Acceptances - degree	Applications	Acceptances - degree	Applications	Acceptances - degree
2005	-1.5	-0.4	-4.5	4.4	-17.8	-2.4	-60.9	-4.2
2004	-25.5	-14.3	-31.9	-15.9	-43.9	-25.1	-62.2	-96.0
2003	-12.8	-7.5	-20.5	-15.0	-18.5	-15.7	-5.0	27.2
2002	-44.8	-28.0	-149.9	-195.2			-22.2	-0.9
2001	10.2	10.0	23.4	17.5			-6.5	-14.8
2000	8.4	8.9	14.9	13.8			-6.1	17.7
1999	15.8	12.9	15.9	17.7			14.9	-18.6

Table 8: percentage change in number of acceptances to degrees, non-science disciplines

The numbers in Artificial Intelligence are really too small to provide useful indications of trends. Focus group evidence suggests that this area in particular may be subject to 'fashion' and to the appeal of the 'trendy' course title, but the evidence available is little more than anecdotal. It appears that a number of students who apply initially to a course in a different area will eventually join an AI course, perhaps as they learn more about the subject during the process of application.

In Software Engineering, a very dramatic fall occurred in 2002, followed by a smaller but still severe decline in 2003 and 2004. The initial drop in Computer Science was smaller, but a less serious decline in 2003 was followed by a fall of 25% in 2004. Both of these disciplines saw only very small declines in 2005. By contrast, Information Technology suffered a fall of 17.8% in 2005. This represented an improvement on the previous year, but suggests that trends in this subject may be different from those which operate in the more 'technical' areas.

1:2 Gender balance

The low number of women who choose to study computing has been the subject of much concern and many initiatives during the period considered. Table 9 and Chart 4 show the percentage of women who applied for or were accepted to places on courses in the core Computing disciplines. These show that as the total number of Computing students rose, the proportion of women also rose, reaching a high point in 2001.

	applications	acceptances	degree acceptances	diploma acceptances
2005	14.4	15.8	15.8	15.7
2004	15.7	16.0	16.3	14.6
2003	15.9	16.3	16.5	15.0
2002	17.1	17.3	17.5	16.3
2001	17.8	18.2	18.4	17.2
2000	17.3	18.6	18.6	18.6
1999	17.0	18.2	18.1	18.9
1998	16.0	17.5	17.1	18.6

Table 9: Percentage of applications from and acceptances granted to females for courses in core computing disciplines

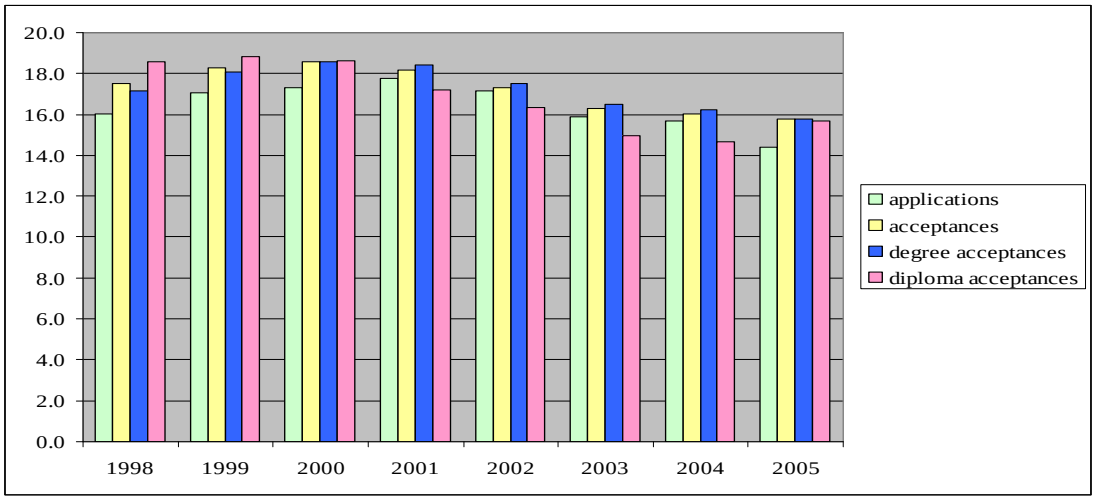

Chart 4: Percentage of applications from and acceptances granted to females for courses in core computing disciplines

However, with the decline in overall numbers has come a decline in the proportion of students who are female. This is now lower than it was in 1998. On Diploma courses, the proportion of women was higher than on degree courses in the late 1990s, but following a substantial fall in 2001 and 2002, the proportion is now almost identical to that for degrees. This may be the result of a higher number of women choosing to study to degree level if they opt for Computing at all.

Over the same period, the proportion of all undergraduate students in HE who are female has *increased*. Table 10 shows the proportion of applications from and acceptances to female students for all subjects. As in the core Computing disciplines, the proportion of women on diploma courses is lower than the proportion of women on degree courses, but this represents a rise rather than a fall since the late 1990s. In all subjects, a slightly higher proportion of women apply than are accepted; this is the opposite of the pattern seen for the core Computing disciplines.

	applications	**acceptances**	**degree acceptances**	**diploma acceptances**
2005	55.5	54.4	54.7	43.6
2004	55.1	54.4	54.9	41.5
2003	54.3	53.7	54.4	41.5
2002	53.8	53.3	54.2	41.4
2001	53.4	52.9	54.1	40.8
2000	53.4	53.0	54.0	41.7
1999	53.1	52.6	53.7	40.8
1998	52.8	52.1	53.3	40.0

Table 10: Percentage of applications from and acceptances granted to females, all subjects

By themselves, the figures for Computing indicate that the gender imbalance in this subject area is not being effectively addressed, despite the fact that there are *more* women applying and being admitted to university. Figures for other subject areas, however, suggest that it is difficult to shift traditional 'gender trends' in subject choice, and possibly even that these have become more entrenched in very recent years.

Table 11 and Chart 5 show the proportion of acceptances to degree courses in Physics, Chemistry, Biology and Engineering which were granted to female applicants:

	biology	**physics**	**engineering**	**chemistry**
2005	56.6	21	11.3	38.7
2004	60.1	16.3	11.3	41.5
2003	59.6	18.2	11.1	42.7
2002	60.8	19.2	11.7	43.3
2001	59.9	19.1	15.2	42.4
2000	61.2	18.5	14.9	41.9
1999	56.9	19.3	14.6	40.3
1998	57.40	19.3	14.3	39.3

Table 10: Percentage of degree acceptances granted to females, physical sciences & engineering

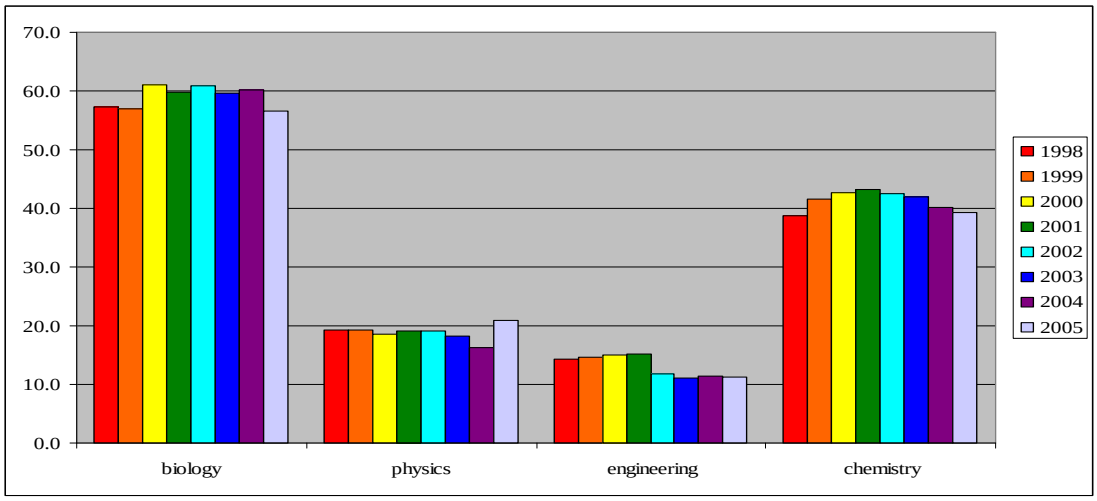

Chart 5: Percentage of degree acceptances granted to females, physical sciences & engineering

In Chemistry and Engineering, the proportion of students who were female increased between 1998 and 2001, just as it did in the core Computing disciplines. The proportion of female Physics students remained fairly stable during this period, and in Biology, the traditionally 'female' science subject, the overall trend was an increase, with its highest point in 2000 and a second small 'peak' in 2002. However, between 2002 and 2005, the trend was for a decrease in all areas. In Chemistry and Biology, the proportion of female students in 2005 was the lowest seen during the period surveyed, and in engineering the proportion appear to be stable at around 11%, with no sign that a return to the higher levels of female representation seen around the turn of the century. The exception to these trends in is Physics, where the decline was sharply reversed in 2005 and the proportion of students who are female rose to over 20%. This may represent a 'blip', or it may reflect the outcomes of particularly effective programmes to increase female participation in Physics courses.

Table 11 and Chart 6 show the representation of women among students accepted to degree courses in medical subjects.

	medicine & dentistry	**nursing**	**medical technologies**
2005	57.9	92.7	72.1
2004	59.9	92.2	72.4
2003	61.6	92.5	69.9
2002	61.2	91.5	75.9
2001	58.2	91.6	-
2000	59.1	92.5	-
1999	56.8	92.6	-
1998	55.60	92.3	-

Table 11: Percentage of degree acceptances granted to females, medical subjects

The decline in the proportion of females studying medicine and dentistry occurs later than the decline seen in the other physical science subjects, but it is still marked. In Nursing and Medical Technologies, the 'traditional' gender stereotype is for *women* to prefer these subjects. While female numbers have not actually increase on these courses, they have remained remarkably stable over the whole period, suggesting that if women are not choosing 'male' subjects, men are not showing any new interest in 'female' ones.

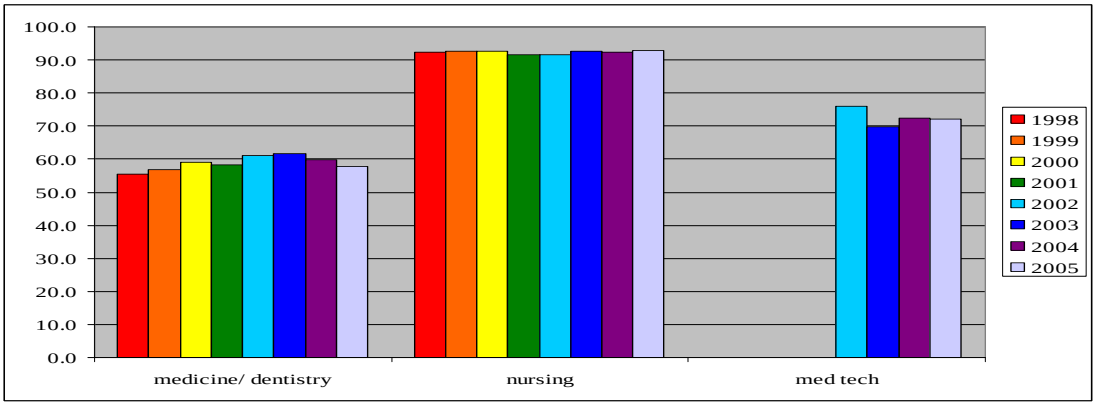

Chart 6: Percentage of degree acceptances granted to females, medical subjects

The Humanities, Modern Languages and Social Sciences are also sometimes seen as 'female' subjects. The figures for these subjects show some evidence of an entrenchment of gender stereotypes in subject choice, but this is by no means as strong a suggestion as the one which can be drawn from the data for the sciences. In the Humanities, the proportion of degree places which are granted to females is almost 10% higher than it was in 1998, but this has not occurred through a gradual increase. This could be due to variations in the subject classifications used by UCAS, or it could show a genuine trend. Social Studies had almost exactly the same proportion of female students in 2005 as in 1998, but it is difficult to identify a clear pattern over the whole period. The proportion of female students in Creative Arts and Design and in Law appears to increase gradually between 1998 and 2004, but both subjects show a fall in 2005, while female numbers declined during the period in both Modern Language and – perhaps more surprisingly – Business Studies.

	Law	business studies	social studies	creative arts & design	humanities	modern languages
2005	63.2	47.4	60.5	60.2	61.4	68.6
2004	64.0	48.7	57.6	61.5	62.1	68.4
2003	64.5	49.1	55.5	60.9	51.1	68.9
2002	64.3	50.1	55.6	60.4	63.4	70.0
2001	63.8	50.3	60.8	58.7	53.2	71.4
2000	63.8	50.0	60.5	59.2	64.2	69.3
1999	62.2	51.1	61.0	58.5	53.8	71.8
1998	61.8	50.2	60.9	58.2	53.0	70.8

Table 12: Percentage of degree acceptances granted to females, non-science subjects

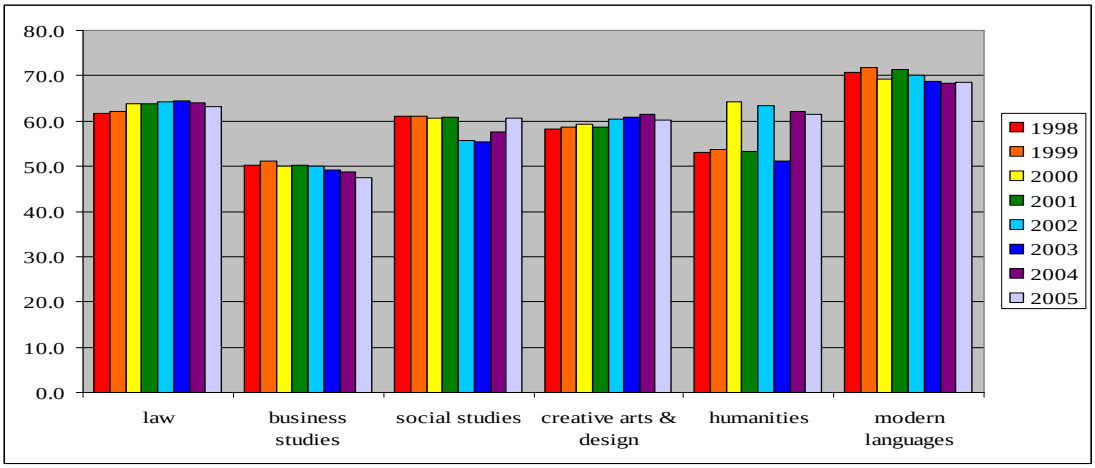

Chart 7: Percentage of degree acceptances granted to females, medical subjects

The various subjects within the Computing field show different patterns of female representation. Table 13 and Chart 8 shows the proportion of applications which come from females alongside the proportion of degree places awarded to females in each of the different 'core' Computing areas.

	Computer Science		Software Engineering		Information Technology		Artificial Intelligence	
	Applications	Acceptances - degree	Applications	Acceptances - degree	Applications	Acceptances - degree	Applications	Acceptances - degree
2005	11.9	13.5	8.6	8.5	28.4	25.9	4.3	6.9
2004	12.8	13.9	10.8	9.2	29.2	26.3	10.8	12.0
2003	12.3	13.3	9.2	10.1	30.4	27.8	16.4	0.0
2002	13.7	14.6	8.6	9.8	31.2	27.8	11.1	14.0
2001	18.4	19.3	12.7	15.3			13.0	13.0
2000	17.7	19.5	13.9	15.2			13.4	12.9
1999	17.5	18.9	13.1	14.7			6.9	9.8
1998	17	18	12	14			8	19

Table13: Applications from females and degree places awarded to females as a proportion of all applications/places awarded, core Computing disciplines

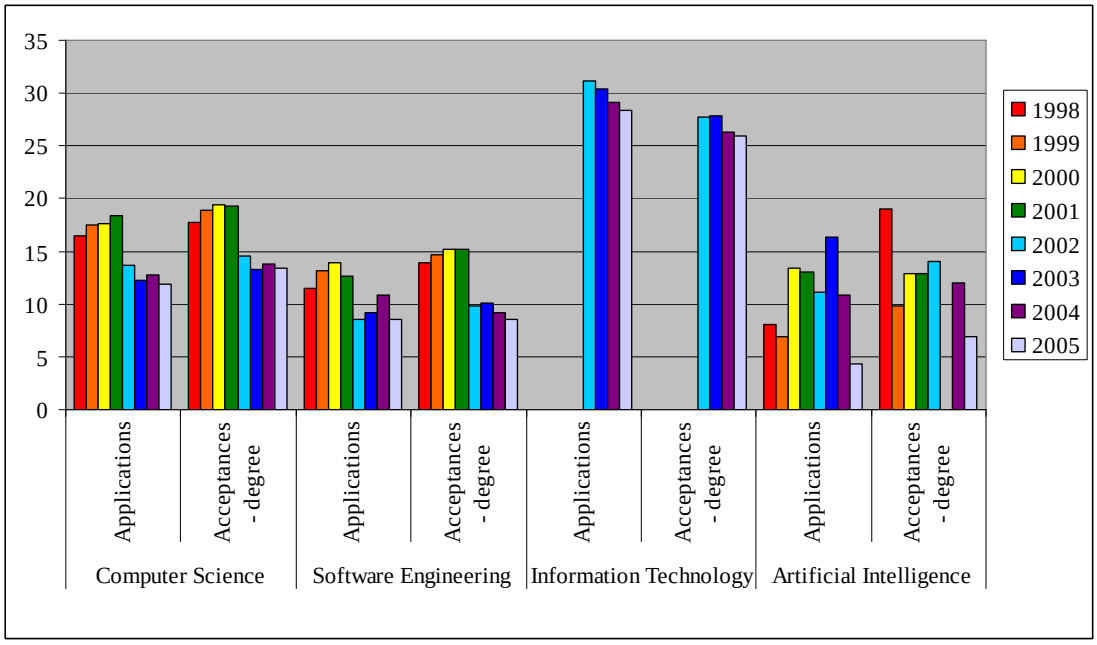

Chart 8: Applications from females and degree places awarded to females as a proportion of all applications/places awarded, core Computing disciplines

The figures for Artificial Intelligence are, again, too small to allow any firm conclusions. However, in the other subject areas a decline in the proportion of students who are female can generally be seen. The exception to this trend is in Software Engineering, when the sharp drop in the proportion of *applicants* who are female following the peak in 2000 and 2001 is followed by another small increase, reversed in 2005. The proportion of women who are admitted to degree courses in this area, however, declines steadily from 2002.

In Computer Science, the proportion of females declines fairly steadily from 2002, with a small rise in 2004 which is reversed in the following year. Perhaps more surprisingly, the number of females applying to study Information Technology declines steadily over the period for which figures are available, despite the greater popularity of this subject among women. This latter trend may be related to the decreasing female numbers in Business and Management studies, demonstrated in Table 12.

1:3 Age profile

A potential area for widening participation in Computing is among mature-age students. Computing is associated with good career prospects, and is often seen as a destination for people who change careers; in addition, university Computing departments may attract those who are already working in this field and wish to update their skills. On the other hand, older students may opt for part-time or FE courses rather than degree or diploma programmes in HE, and computing professionals may prefer to upgrade their skills through vendor qualifications or other training in the workplace.

Table 14 and Chart 9 show the proportion of applications and acceptances to degree courses for students aged over 21.

	all subjects		core computing disciplines	
	applications	degree acceptances	applications	degree acceptances
2005	21.4	17.6	18.4	25.0
2004	25.5	21.8	24.8	27.2
2003	22.7	19.8	19.7	22.8
2002	22.2	19.5	20.4	23.0
2001	21.6	18.8	20.8	22.3
2000	21.1	18.1	19.2	21.3
1999	21.1	18.4	20.4	22.0
1998	22.0	19.1	22.6	23.8

Table 14: proportion of applications and acceptances to degree courses, students aged over 21 – all subjects and core computing disciplines

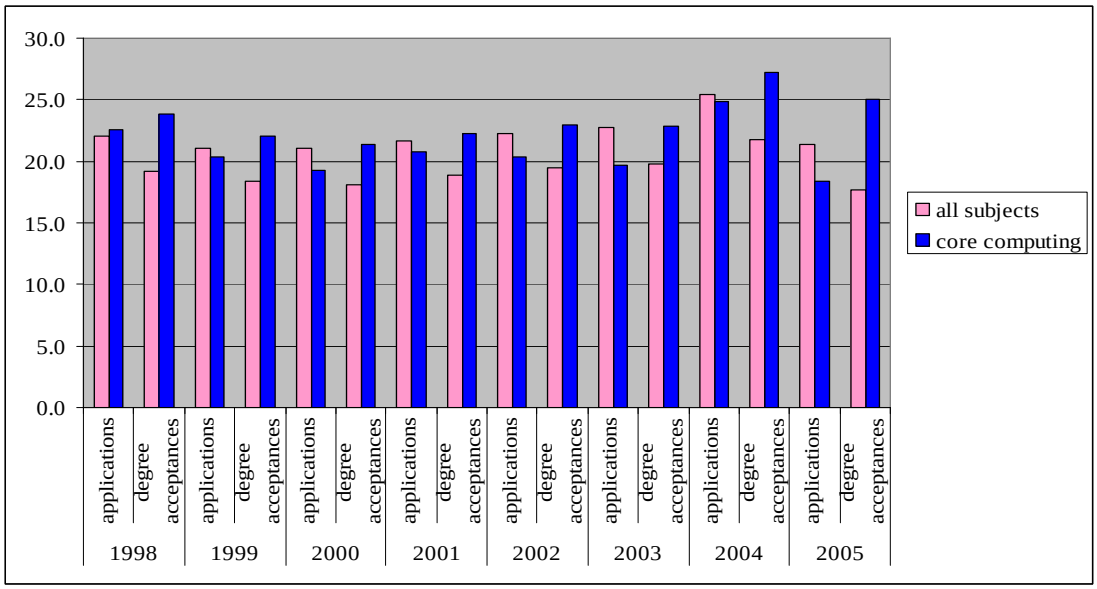

Chart 9: proportion of applications and acceptances to degree courses, students aged over 21 – all subjects and core computing disciplines

It appears from these figures that, while the proportion of mature-age *applicants* to Computing courses is similar to or slightly below the proportion of all undergraduate applications, the proportion of acceptances to degree courses for students aged over 21 is considerably higher than the rate for all subjects. This was especially marked in 2005, when the proportion of mature-age applicants fell substantially from the previous year, but this trend has been observable for the whole of the period considered.

The breakdown of mature age groups is also rather different in computing from the one which can be observed across all subject areas. Charts 10a – 10e show the figures for this breakdown for the year 2005 – 2001 (trends for 1998 – 2000 are similar).

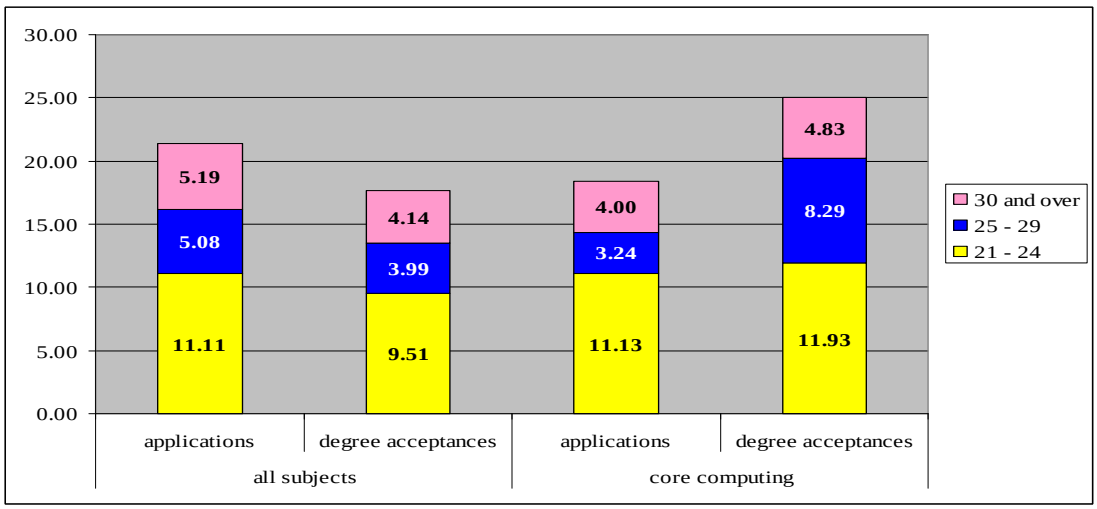

*Chart 10a: applications and acceptances to degrees, all subject areas & core computing disciplines, **2005***

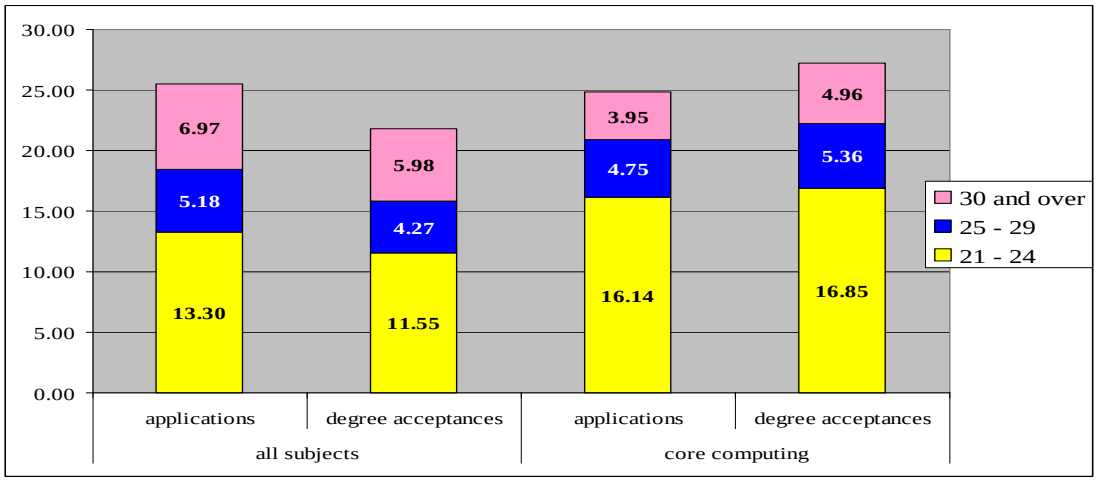

*Chart 10b: applications and acceptances to degrees, all subject areas & core computing disciplines, **2004***

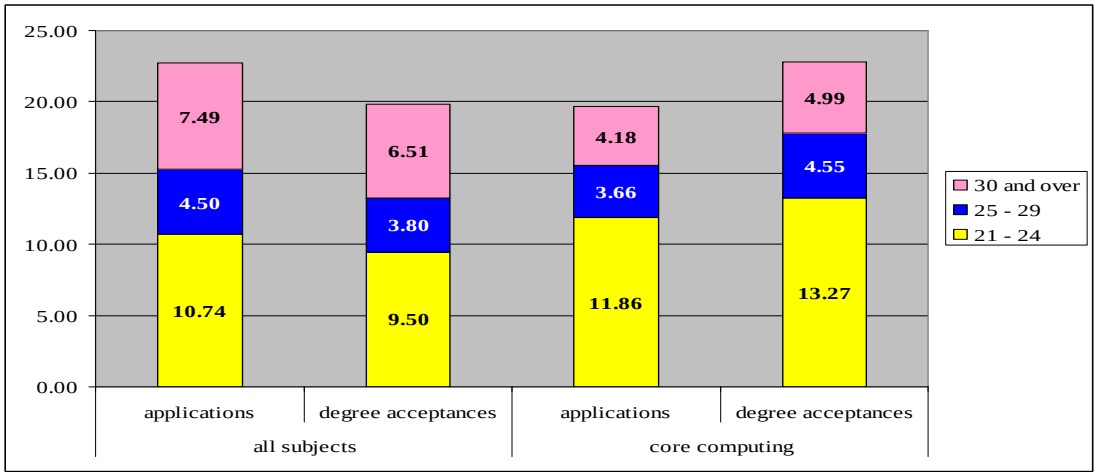

*Chart 10c: applications and acceptances to degrees, all subject areas & core computing disciplines, **2003***

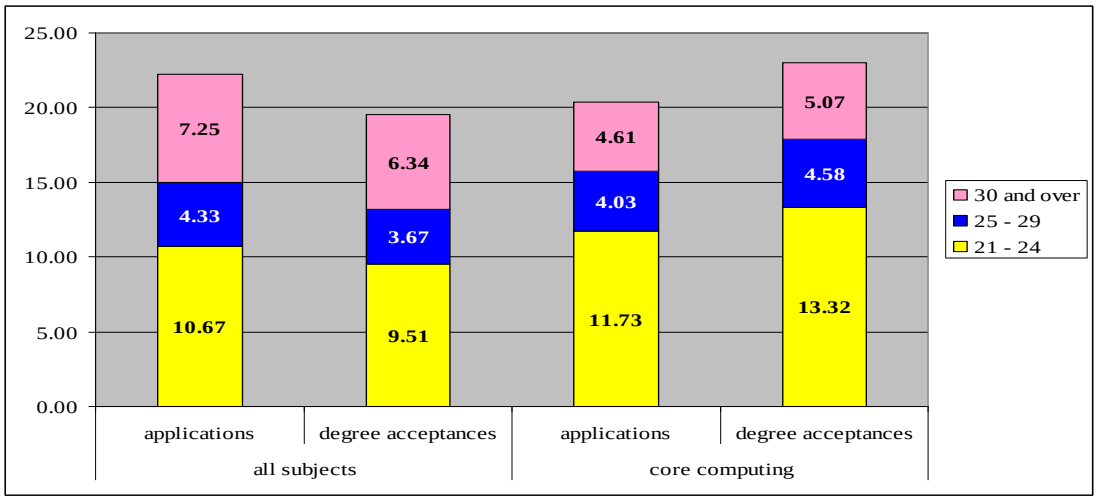

*Chart 10d: applications and acceptances to degrees, all subject areas & core computing disciplines, **2002***

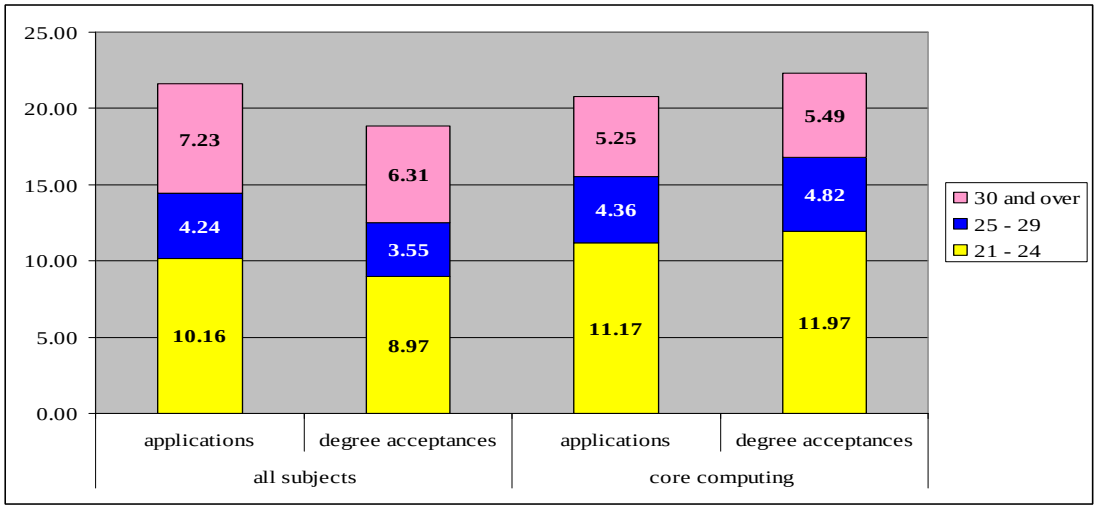

*Chart 10e: applications and acceptances to degrees, all subject areas & core computing disciplines, **2001***

Prior to 2005, the proportion of applications and acceptances for the 21-24 age group is generally higher in core Computing disciplines than in the student population as a whole. In other words, these subjects appear to attract the youngest group of 'more mature' students rather more strongly. Among students aged 25-29, the proportion of applications is similar in core Computing disciplines to the average for all subjects. However, a higher proportion of acceptances to degree programmes are granted to students in this age group in core Computing disciplines than in the university population as a whole. Among students over 30, the proportion of both applications and acceptances is higher in core Computing disciplines than across all subjects.

In 2005, some of these patterns changed. The proportion of applications from the 21-24 age group was almost identical in core Computing disciplines to that seen across all subjects, although the proportion of acceptances to degree programmes was slightly higher. However, the proportion of both applications and acceptances to degree courses for students aged 25-29 was considerably higher in core Computing disciplines than across all subjects. Among those over 30, the proportion of applications was slightly lower in core Computing disciplines, but the proportion of acceptances to degree courses was very similar.

The implications of this for widening participation among older students are unclear. It seems that full-time undergraduate courses in Computing may be less attractive to older students than higher education courses in general, but that university departments are inclined, for whatever reason, to admit a high proportion of older students who do apply.

Charts 11a and 11b show the proportion of applications and acceptances for mature-age students to other science disciplines in 2004 and 2005.

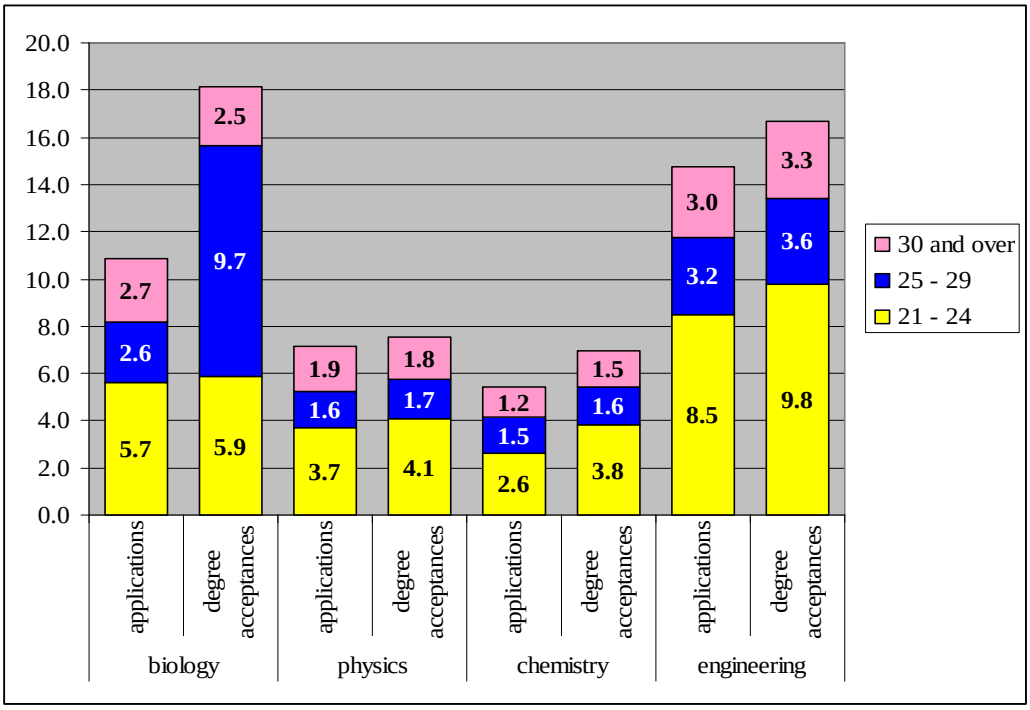

Chart 11a: applications and acceptances to degrees, science disciplines, ***2005***

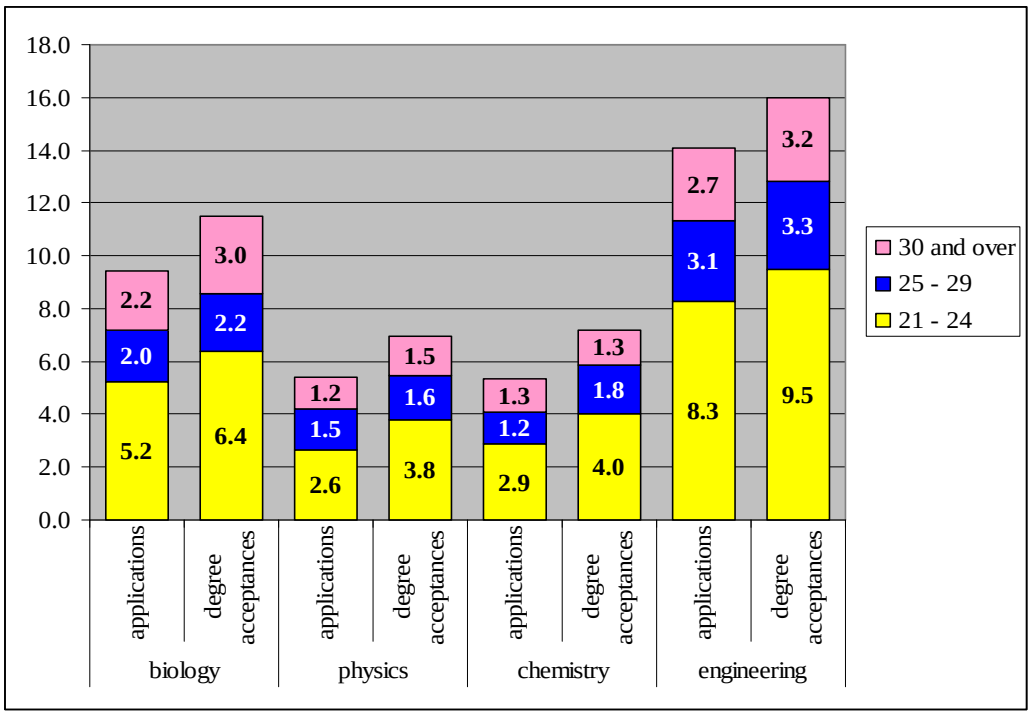

Chart 11b: applications and acceptances to degrees, science disciplines, ***2004***

As in Computing, the proportion of acceptances to degree courses from mature-age students is higher than the proportion of applications received from this group. For other science subjects, the overall proportion of mature-age applicants and students accepted to degree courses is lower than it is for the core computing disciplines. The number of applications was under 6% in 2004 for both Chemistry and Physics, although it rose in 2005 for Physics; no such rise was seen for Chemistry. Degree applications for mature-age students remain under 8% for both of these subjects. Engineering has a slightly older age profile, with applications around 14% and acceptances around 16% in both years, rising slightly in 2005. The sharpest change was in Biology, with applications rising from around 9% to around 11% and acceptances from around 11% to around 18%.

For all of these subjects, the proportion of students aged 25-29 and over 30 remains considerably smaller than it is in Computing, and the proportion of mature-age students accepted to degree programmes is also lower. However, the trend appears to be towards an older age profile, while this may not be the case for Computing.

1:4 Social class

Computing is regarded by many commentators as a subject with strong potential for widening participation among students from backgrounds in the lower class groups, and/or where there is little or no history of higher education within the family. This is partly because of the excellent job prospects offered by the subject, a factor which is believed to be especially influential on the subject choices of students from these backgrounds.

Charts 12a – 12c show the proportion of applications received from and degree acceptances awarded to students, broken down by social class background where this is known, for Computing and Mathematical Sciences and for all subject. Unfortunately, only limited data is available in this area, and for both Computing and Mathematical Sciences and for the university population as a whole, social class background cannot be determined for around one fifth of applicants and entrants. However, these figures suggest that Computing and Mathematical Sciences has indeed both attracted and admitted a higher proportion of students lower social class backgrounds.

In 2005, 20.2% of applicants to Computing and Mathematical Sciences courses came from the three lowest social class backgrounds, and 18.19% of students accepted to degrees came from these groups. This compares with 17% of all applications and 16.34% of acceptances to degree courses in all subjects. The different is greatest among students from routine and semi-routine backgrounds, with similar numbers coming from lower supervisory and technical backgrounds. By contrast, around 31% of applications and acceptances to degree courses in Computing and Mathematical Sciences relate to students from the two highest social classes, compared to 34.15% of applications and 35.68% of degree acceptances in all subjects.

The 2005 figures reflect a long-standing trend in Computing and Mathematical Sciences. 2005 in fact saw an overall fall in the number of students from lower-class backgrounds, and there was also a fall in their numbers in Computing and Mathematical Sciences. In 2004, 23.49% of applications in Computing and Mathematical Sciences were from students from lower class backgrounds, and in 2003 the figure was 23.43%. 21.27% of admissions to degrees in these subjects in 2004 were granted to students from lower class backgrounds, and the figure for 2003 was 20.86%. Similarly stable figures were seen for all subjects in 2004 and 2003, with around 19% of applications and 18.9% of admissions relating to students from backgrounds in these groups. The greatest contrast appears to be in the number of students recruited from the lowest class groupings, and the smaller number of Computing and Mathematical Sciences students from the higher social class groups also appears to be a consistent trend.

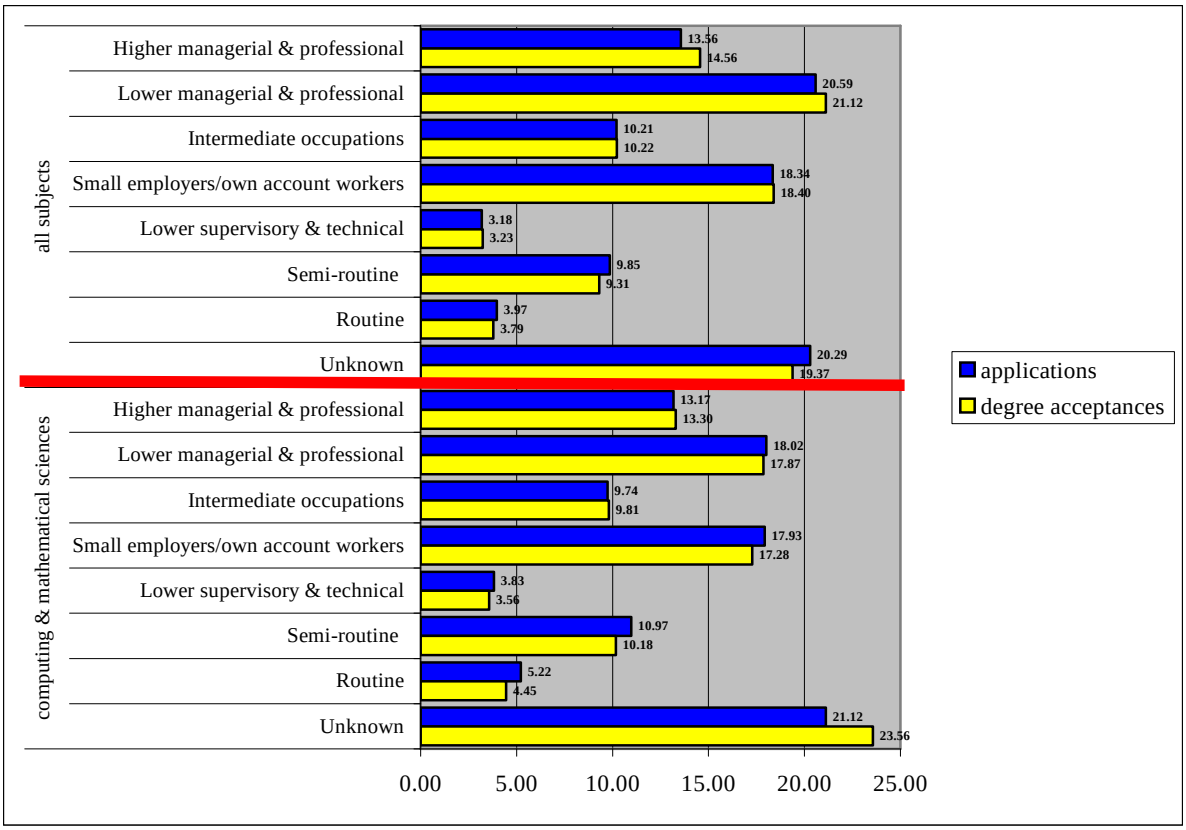

Chart 12a: 2005 Applications and acceptances to degree courses, by social class: all subjects compared to Computing and Mathematical Sciences

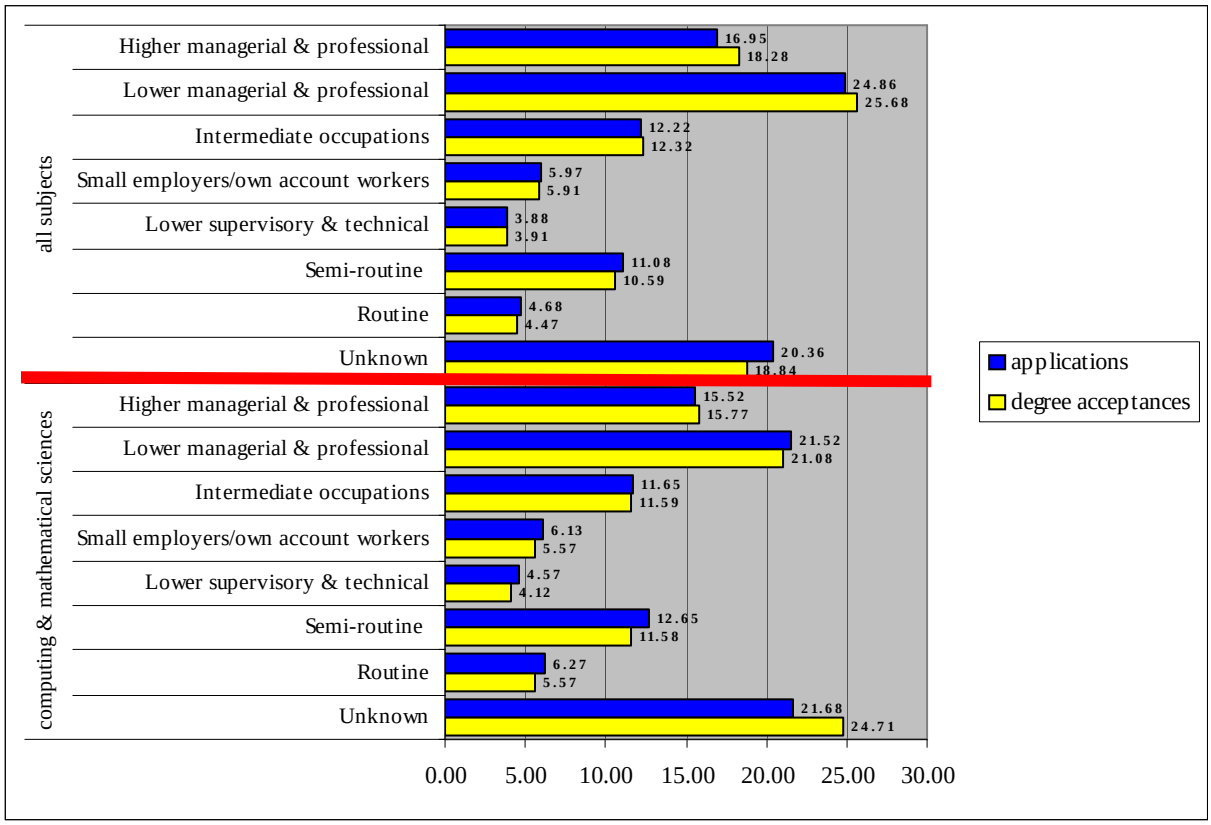

Chart 12b: 2004 Applications and acceptances to degree courses, by social class: all subjects compared to Computing and Mathematical Sciences

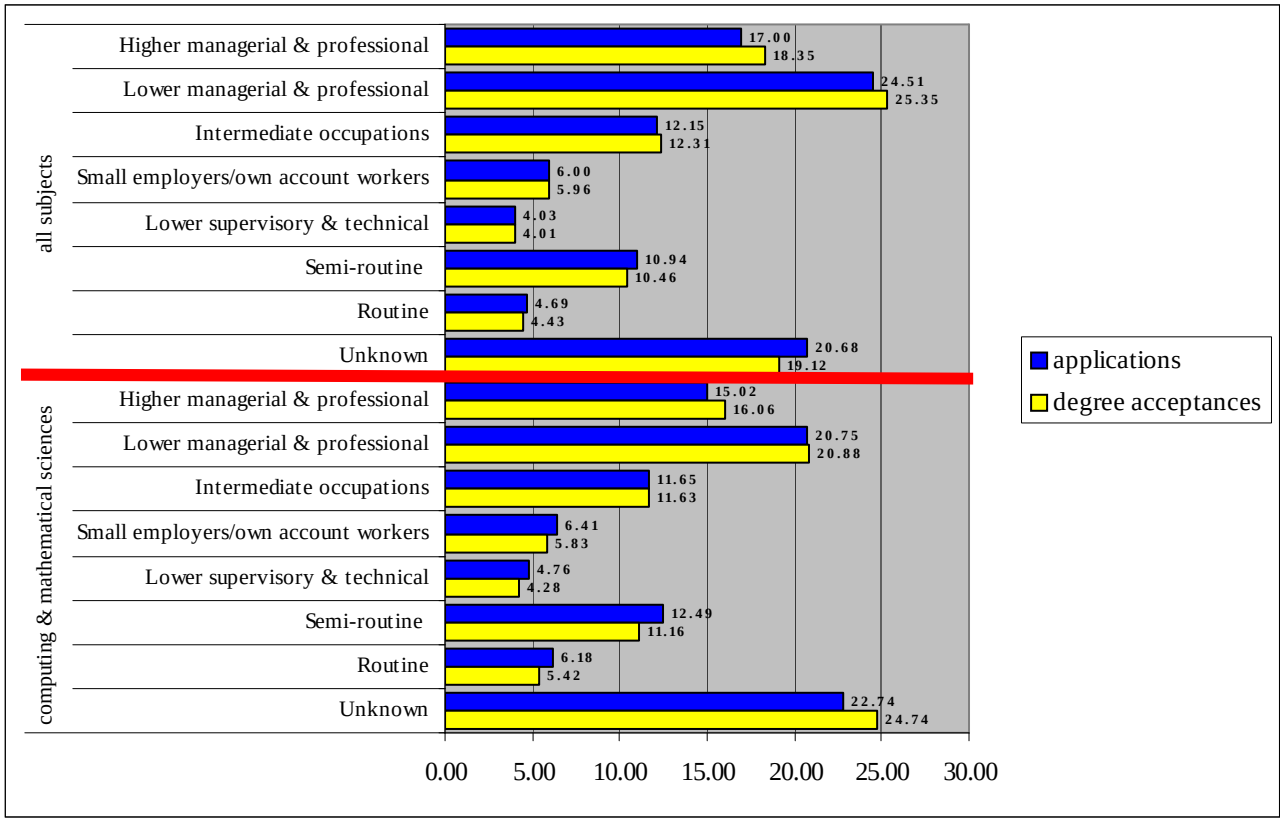

Chart 12c: 2003 Applications and acceptances to degree courses, by social class: all subjects compared to Computing and Mathematical Sciences

Table 15 provides a digest of figures for 1998 – 2005, demonstrating the stability of this pattern. The higher figures for 2001 and before appear because of changes in the methodology used by UCAS, rather than any actual change in the composition of the student population.

		applications	degree acceptances
2005	All subjects	17.00	16.32
	CMS	20.02	18.19
2004	All subjects	19.65	18.97
	CMS	23.49	21.27
2003	All subjects	19.66	18.90
	CMS	23.44	20.86
2002	All subjects	19.65	18.76
	CMS	23.32	20.59
2001	All subjects	24.35	23.23
	CMS	29.14	26.39
2000	All subjects	24.73	23.48
	CMS	29.29	26.30
1999	All subjects	24.90	23.54
	CMS	29.71	26.68
1998	All subjects	24.95	23.67
	CMS	28.87	26.43

Table 15: Percentage of applications and acceptances to degrees, students from lower social classes: all subject and Computing & Mathematical Sciences

Table 16 compares the figures for applications and degree acceptances relating to students from the lowest social class groups for a range of subjects between 2005 and 2000.

		applications	degree acceptances
2005	medicine	9.98	8.82
	subjects allied to medicine	20.19	18.35
	biological sciences	17.46	16.64
	physical sciences	15.57	15.18
	engineering	18.42	17.09
	humanities	11.34	10.77
	business studies	18.29	16.77
2004	medicine	11.63	10.11
	subjects allied to medicine	23.78	21.40
	biological sciences	20.31	19.60
	physical sciences	18.30	17.77
	engineering	21.65	19.88
	humanities	12.52	12.67
	business studies	18.90	17.32
2003	medicine	9.34	8.77
	subjects allied to medicine	20.81	18.64
	biological sciences	18.53	17.69
	physical sciences	16.07	15.96
	engineering	20.27	18.83
	humanities	13.40	13.12
	business studies	19.44	17.48
2002	medicine	9.34	8.77
	subjects allied to medicine	20.81	18.64
	biological sciences	18.53	17.69
	physical sciences	16.07	15.96
	engineering	20.27	18.83
	humanities	13.40	13.12
	business studies	19.44	17.48
2001	medicine	19.63	18.17
	subjects allied to medicine	35.34	33.81
	biological sciences	31.73	30.46
	physical sciences	30.66	30.33
	engineering	33.12	31.60
	humanities	27.41	27.07
	business studies	34.77	32.67
2000	medicine	20.47	18.65
	subjects allied to medicine	35.19	33.22
	biological sciences	31.64	30.45
	physical sciences	30.41	30.31
	engineering	33.79	32.20
	humanities	27.38	27.34
	business studies	35.18	33.18

Table 16: Percentage of applications and acceptances to degrees, students from lower social class backgrounds, range of subjects

These figures indicate that since the overall drop in Computing and Mathematical Sciences applications, subjects in these area have had a class 'mix' which is more similar to that of the group of Subjects Allied to Medicine than that of the physical sciences, medicine, the humanities or even business studies. Engineering has a similar profile, although it is still more 'middle class' than Computing and Mathematical Sciences.

However, around the time of the peak in application numbers, Computing and Mathematical Sciences actually attracted and admitted *fewer* students from the lowest social class groups than the majority of the subjects considered here, with the exceptions of medicine and the humanities. This may reflect relative levels of access to computer facilities, and hence experience of the subject. The prestige of the subject, discussed below, may also have shifted during the period examined.

1:5 Ethnic origin

Table 17 shows the percentage of applications from and degree acceptances to students from each ethnic background, for all undergraduate courses in the UK. Table 18 shows the same information for Computing and Mathematical Sciences only. These figures indicate that Computing and Mathematical Sciences attracts a substantially higher proportion of students from British Asian and Chinese backgrounds than is typical in the undergraduate population as a whole. The proportion of students from British Black backgrounds has generally been slightly higher in Computing and Mathematical Sciences than in all subjects; once again the atypical figure for 2004 may not indicate a changing trend. The proportion of students from a mixed ethnic background is very similar in Computing and Mathematical Sciences and in the population as a whole.

These figures suggest that Computing and Mathematical Sciences courses attract a higher proportion of applications from students from non-white ethnic backgrounds than do university courses as a whole, and that these courses admit a more ethnically diverse range of students than the average. This is in line with the trend noted in other studies such as Connor et al 2004 and Jones and Elias 2005.

It has not been possible to obtain statistics in which the ethnic origins of students are broken down by institution and/or region. However, anecdotal evidence suggests that participation in Computing and Mathematical Sciences courses by students from minority ethnic backgrounds may not be evenly spread across universities. It may be the case that, even in a subject with a high level of participation by minority students, these students are concentrated in their 'home' regions and in post-1992 institutions, mirroring some of the trends of participation by non-white students which are noted by writers on widening participation (Archer et al 2001, Connor et al 2004, DfES 2004, Reay et al 2005)[2].

Turner (1999) also suggests that there may be a mismatch between the number of computing students who come from non-white backgrounds, and the number of graduates from minority ethnic backgrounds entering employment in Computing, but once again, national statistics are not readily available in this area. Connor et al (2004, 85) note that disadvantage in the labour market is marked for certain non-white groups.

However, Jones and Elias (2004) argue that certain ethnic groups (Indian, African and Chinese) are highly represented in SET employment, while others (Caribbean and Bangladeshi) are underrepresented. They found that among non-white employees in SET, a relatively high proportion work in IT (Jones and Elias 2004, 13). While around 1.05 of the UK's White population work in IT, the figure is 2.83% for the British Indian population, 2.68 for the British Chinese population, 1.62% for the Black African population, and 1.47% for the British Pakistani population. By contrast, only 0.97% of the Black Caribbean population and 0.62% of the British Bangladeshi population were employed in IT in the period surveyed by Jones and Elias (2005, 42).

[2] It is likely that the relatively high levels of participation among students from lower social class backgrounds is also geographically and institutionally uneven, again following the patterns described by Reay et al.

		Applications	Degree acceptances
2005	White	76.4	77.8
	All Black British backgrounds	5.2	4.4
	All Asian British backgrounds	8.5	8.3
	Chinese	0.9	0.9
	Mixed ethnic origin	2.6	2.6
	Other/unknown	6.4	5.9
2004	White	76.0	77.4
	All Black British backgrounds	4.5	3.9
	All Asian British backgrounds	8.6	8.5
	Chinese	1.0	1.0
	Mixed ethnic origin	2.2	2.3
	Other or unknown ethnicity	7.6	6.9
2003	White	76.0	77.3
	All Black British backgrounds	4.2	3.7
	All Asian British backgrounds	8.6	8.4
	Chinese	0.9	1.0
	Mixed ethnic origin	2.0	2.0
	Other or unknown ethnicity	8.3	7.7
2002	White	75.7	77.0
	All Black British backgrounds	3.7	3.2
	All Asian British backgrounds	8.5	8.3
	Chinese	0.9	1.0
	Mixed ethnic origin	1.9	1.9
	Other or unknown ethnicity	9.3	8.6
2001	White	75.7	77.6
	All Black British backgrounds	3.6	3.1
	All Asian British backgrounds	9.0	8.7
	Chinese	0.9	1.0
	Mixed ethnic origin	1.7	1.7
	Other or unknown ethnicity	9.0	7.9
2000	White	76.7	78.8
	All Black British backgrounds	3.8	3.2
	All Asian British backgrounds	9.0	8.6
	Chinese	0.9	1.0
	Mixed ethnic origin		
	Other or unknown ethnicity	9.6	8.5
1999	White	77.1	79.3
	All Black British backgrounds	3.6	3.0
	All Asian British backgrounds	8.7	8.1
	Chinese	0.9	0.9
	Mixed ethnic origin		
	Other or unknown ethnicity	9.6	8.7
1998	White	77.2	79.6
	All Black British backgrounds	3.6	2.9
	All Asian British backgrounds	8.3	7.7
	Chinese	0.9	0.9
	Mixed ethnic origin		
	Other or unknown	9.9	8.8

Table 17: Percentage of applications & degree acceptances by ethnic background, all students

		Applications	Degree acceptances
	White	68.4	66.9
	All Black British backgrounds	6.1	6.0
	All Asian British backgrounds	16.3	15.5
	Chinese	2.0	2.1
	Mixed ethnic origin	2.4	2.5
2005	Other/unknown	4.7	7.0
	White	66.16	65.32
	All Black British backgrounds	5.81	5.12
	All Asian British backgrounds	18.67	16.92
	Chinese	2.08	2.15
	Mixed ethnic origin	2.07	1.96
2004	Other or unknown ethnicity	5.21	8.53
	White	63.4	63.4
	All Black British backgrounds	5.7	5.2
	All Asian British backgrounds	21.6	18.8
	Chinese	2.0	2.1
	Mixed ethnic origin	1.7	1.7
2003	Other or unknown ethnicity	5.6	8.9
	White	61.0	60.2
	All Black British backgrounds	6.1	5.0
	All Asian British backgrounds	23.2	20.4
	Chinese	2.1	2.1
	Mixed ethnic origin	1.7	1.7
2002	Other or unknown ethnicity	5.9	10.7
	White	60.0	61.0
	All Black British backgrounds	5.7	5.1
	All Asian British backgrounds	23.9	21.7
	Chinese	2.1	2.2
	Mixed ethnic origin	1.5	1.5
2001	Other or unknown ethnicity	6.8	8.5
	White	61.2	62.5
	All Black British backgrounds	5.5	4.8
	All Asian British backgrounds	23.2	21.1
	Chinese	2.0	2.1
	Mixed ethnic origin	.	.
2000	Other or unknown ethnicity	8.1	9.6
	White	63.3	65.4
	All Black British backgrounds	5.5	4.4
	All Asian British backgrounds	21.6	19.2
	Chinese	2.0	2.1
	Mixed ethnic origin	.	.
1999	Other or unknown ethnicity	7.6	8.9
	White	65.3	66.4
	All Black British backgrounds	5.3	4.5
	All Asian British backgrounds	18.8	17.9
	Chinese	2.1	2.1
	Mixed ethnic origin	.	.
1998	Other or unknown	8.5	9.1

Table 18: Percentage of applications and degree acceptances by ethnic background, Computing and Mathematical sciences

Chart 13a shows figures for the percentage of students accepted to degrees who come from British Asian and British Black backgrounds. The overall figure for students from British Asian backgrounds has remained very stable since 1998. In Computing and Mathematical Sciences, however, the proportion of students from British Asian backgrounds rose as the total number of applications rose in the period prior to 2001. With the fall in applications since 2002, the proportion of students from British Asian backgrounds also fell, reaching its lowest level in 2005 (when there was also a fall in the overall percentage of students who came from British Asian backgrounds).

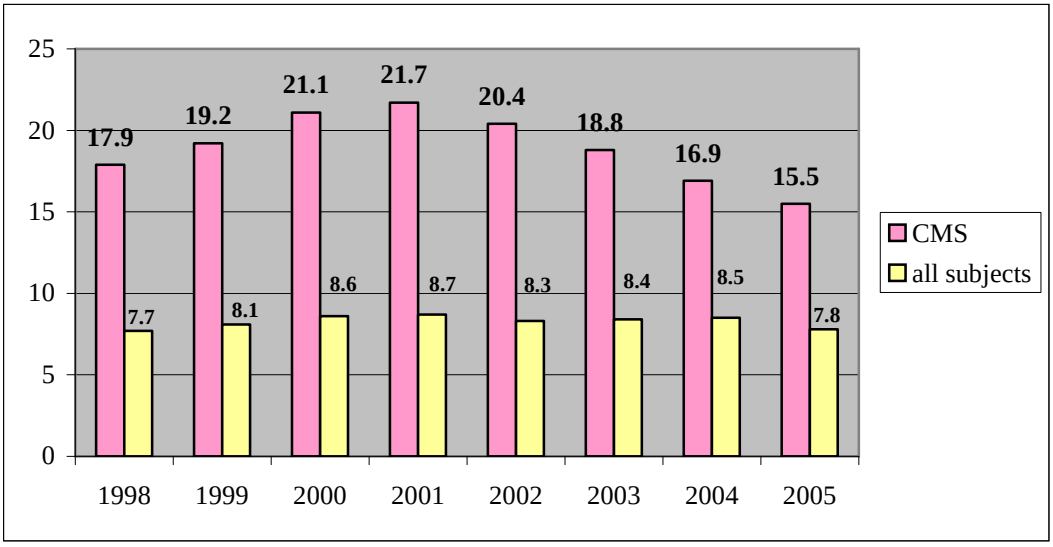

Chart 13a: Degree acceptances awarded to students from British Asian backgrounds, Computing and Mathematical Sciences compared to all subjects

The overall proportion of students of Black British origin has risen since 1998, with a steady increase to 2004 and slightly greater rise in 2005. The proportion of students from Black British backgrounds in Computing and Mathematical Sciences rose slightly to 2003, with a small fall in 2004 which was reversed in the following year.

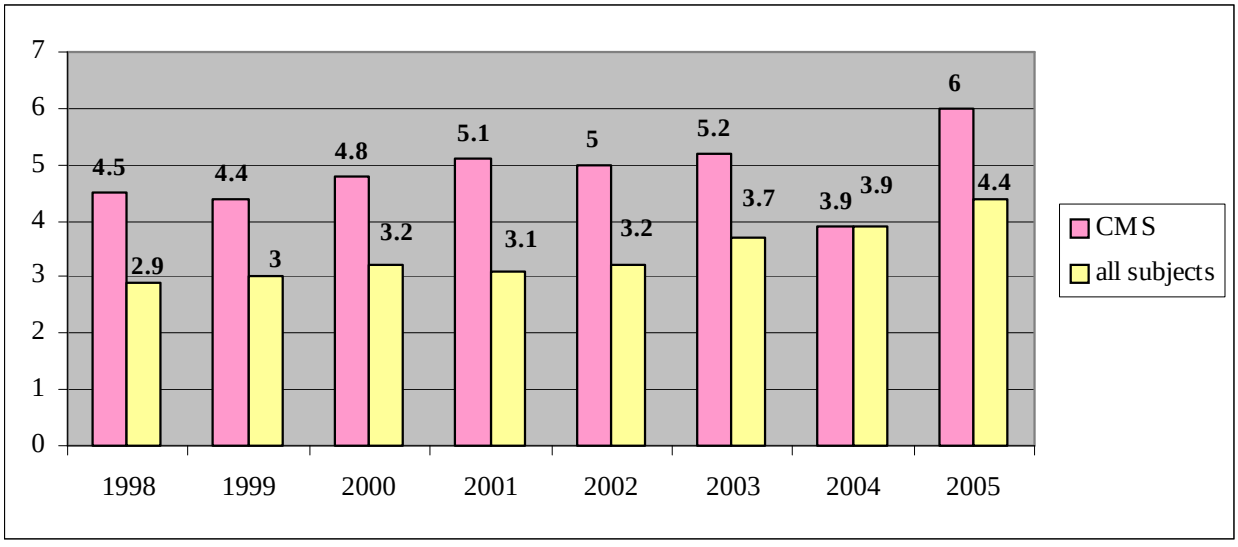

Chart 13b: Degree acceptances awarded to students from British Black backgrounds, Computing and Mathematical Sciences compared to all subjects

Tables 19a and b and Charts 14a and b show the proportion of students who were accepted to degrees in a range of subjects who came from British Asian and British Black backgrounds.

	CMS	medicine	subjects allied to medicine	biological sciences	physical sciences	engineering	business studies	humanities	all subjects
2000	21.1	23.1	9.5	7.1	4.4	8.9	10.8	2.2	8.6
2001	21.7	22.0	9.3	6.4	4.5	8.8	11.0	1.9	8.7
2002	20.4	20.8	12.1	5.2	4.2	9.7	10.8	2.9	8.3
2003	18.8	19.1	11.5	5.5	4.5	9.7	11.8	3.0	8.4
2004	16.9	21.4	12.5	6.1	5.0	10.0	13.0	2.9	8.5
2005	15.5	20.9	13.3	5.6	4.1	9.9	13.8	2.8	8.3

Table 19a: Degree acceptances awarded to students from British Asian backgrounds, various subjects

	CMS	medicine	subjects allied to medicine	biological sciences	physical sciences	engineering	business studies	humanities	all subjects
2000	4.8	3.4	5.8	3.2	1.8	6.2	5.9	1.4	3.2
2001	5.1	4.3	5.6	3.3	2.0	6.2	5.8	1.5	3.1
2002	5.0	2.4	4.3	2.1	1.1	4.1	4.1	1.2	3.2
2003	5.2	8.0	9.0	4.2	2.7	8.7	9.1	1.5	3.7
2004	3.9	2.1	5.3	2.7	1.5	5.3	10.4	2.1	3.9
2005	6.0	2.8	6.0	3.4	1.6	6.1	6.9	1.3	4.4

Table 19b: Degree acceptances awarded to students from British Black backgrounds, various subjects

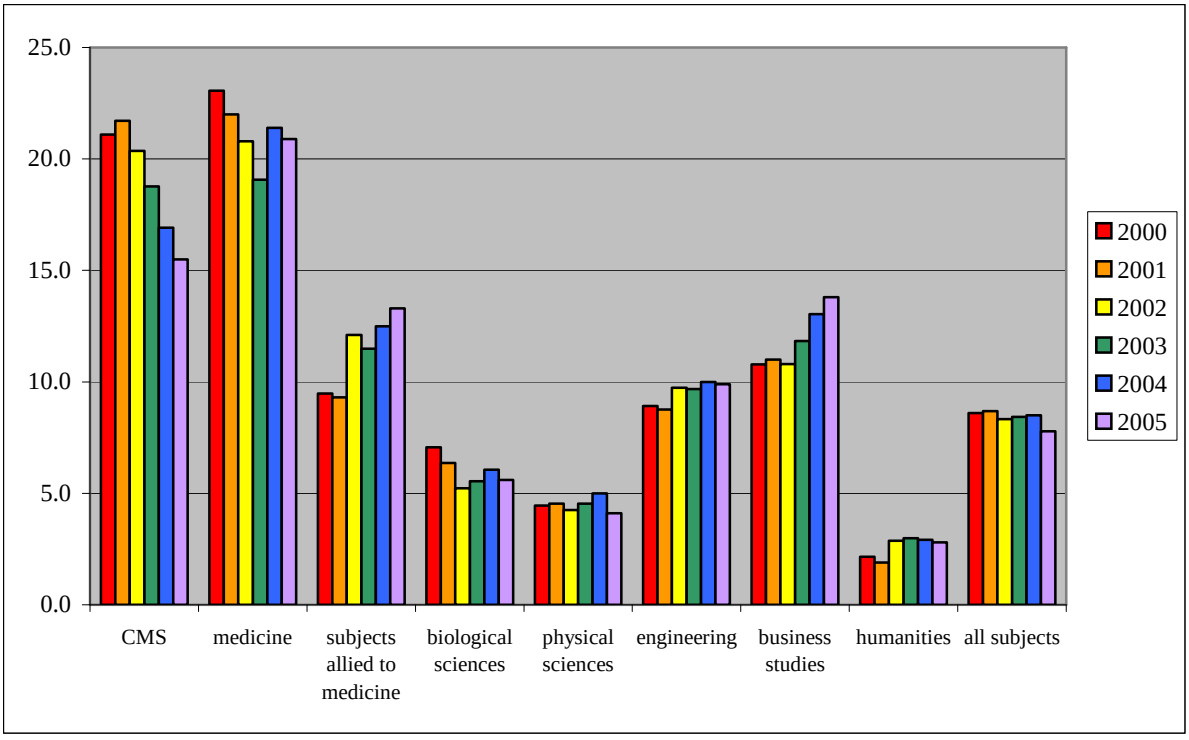

Chart 14a: Degree acceptances awarded to students from British Asian backgrounds, various subjects

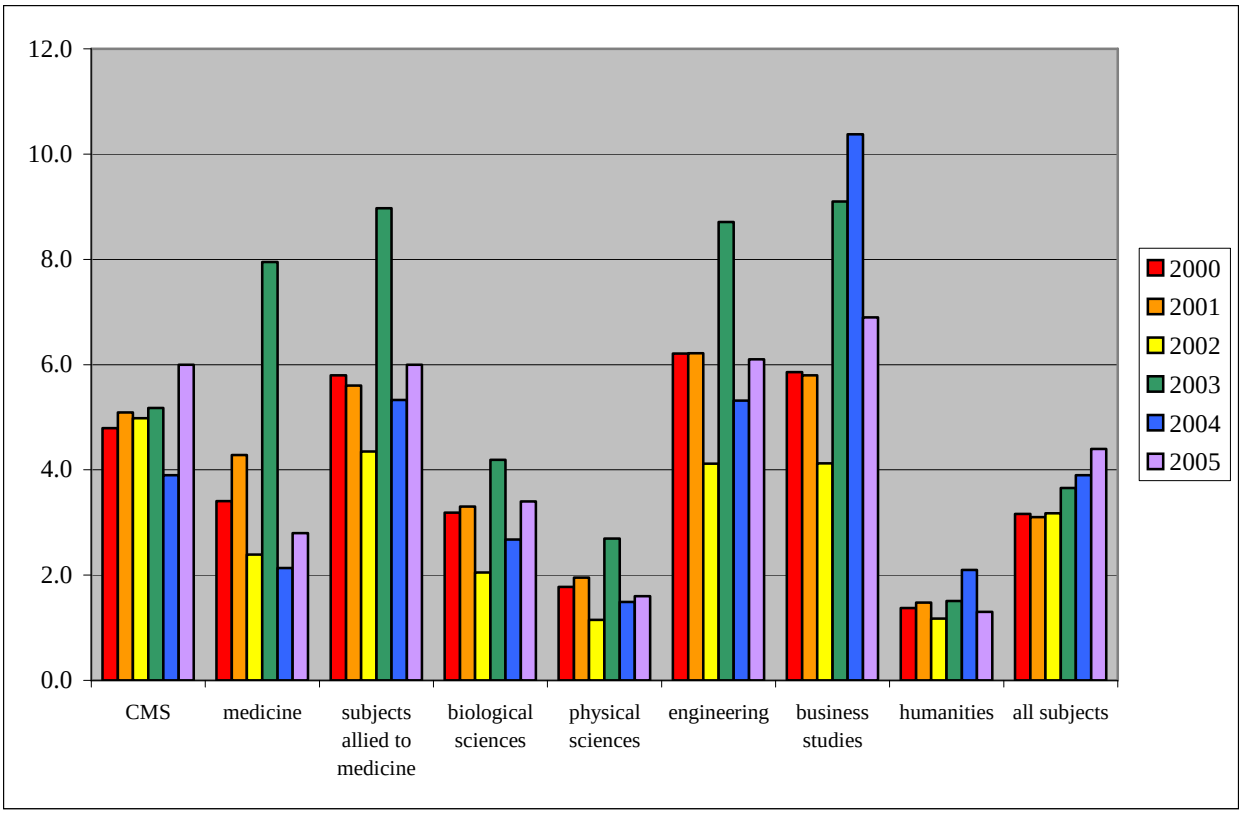

Chart 14b: Degree acceptances awarded to students from British Black backgrounds, various subjects

Historically, among these subjects it is only in Medicine have a higher proportion of the students admitted to degree course come from British Asian backgrounds than is the case in Computing and Mathematical Sciences. The Physical and Biological sciences in particular have a relatively small intake of students from Asian backgrounds, and this does not appear to be rising. However, in both Medicine and Computing and Mathematical Sciences, the trend appears to be for a fall in the proportion of students who come from British Asian backgrounds. This contrasts with a rise in other 'vocational' disciplines such as Business Studies, Subjects Allied to Medicine, and Engineering during the period surveyed.

The proportion of students who come from British Black backgrounds is in general smaller and rather less stable, although the trend in all subjects appears to be for a rise in the proportion of students in this category. This seems to be accompanied by a rise in the number of students from British Black backgrounds in Computing and Mathematical Sciences (the dip observed in 2004 appears to be atypical). A similar rise may be taking place in Business Studies, but elsewhere it is difficult to observe a pattern. The subjects where this group of students are most strongly represented are Business Studies, Engineering and the Subjects Allied to Medicine.

Table 20 shows the proportion of *all* applications from students from each ethnic background and of *all* acceptances awarded to students from each ethnic background which are received/ awarded in Computing and Mathematical Sciences. The figures presented here indicate that historically Computing and Mathematical Sciences has been the site for a high proportion of the representation of British non-white students in higher education in the UK. Between 2000 and 2002, around one fifth of applications from and degree acceptances to students from British Asian backgrounds were in this subject area, and although these proportions have now reduced, the figures are still high.

		applications	degree acceptances
	White	4.4	5.1
	Black - all	5.8	7.9
	Asian - all	9.4	10.9
	Chinese	11.1	13.1
	Mixed race	4.6	5.6
2005	Other/unknown	3.7	6.9
	White	4.7	5.3
	Black - all	6.9	8.2
	Asian - all	11.6	12.4
	Chinese	11.3	13.0
	Mixed race	4.9	5.4
2004	Other or unknown ethnicity	3.7	7.7
	White	5.4	5.8
	Black - all	8.8	9.9
	Asian - all	16.3	15.6
	Chinese	14.1	15.0
	Mixed race	5.4	5.8
2003	Other or unknown ethnicity	4.4	8.2
	White	5.9	6.0
	Black - all	12.2	12.0
	Asian - all	20.1	18.7
	Chinese	16.2	16.3
	Mixed race	6.6	6.9
2002	Other or unknown ethnicity	4.7	9.5
	White	7.0	6.9
	Black - all	13.8	14.5
	Asian - all	23.4	22.1
	Chinese	19.5	19.6
	Mixed race	8.0	7.8
2001	Other or unknown ethnicity	6.7	9.5
	White	6.5	6.7
	Black - all	11.9	12.8
	Asian - all	21.0	20.7
	Chinese	17.2	17.8
2000	Other or unknown ethnicity	6.8	9.5
	White	6.1	6.6
	Black - all	11.3	11.7
	Asian - all	18.4	18.9
	Chinese	16.2	17.7
1999	Other or unknown ethnicity	5.9	8.2
	White	5.4	6.0
	Black - all	9.4	11.2
	Asian - all	14.5	16.7
	Chinese	15.8	16.5
1998	Other or unknown	5.5	7.5

*Table 20: Percentage of **all** applications and degree acceptances for each ethnic group in any subject which were in Computing and Mathematical Sciences*

While the representation of women from all ethnic backgrounds is low in Computing and Mathematical Sciences, the representation of males from ethnic groups which overall have low participation rates appears to be somewhat higher.

Tables 21 – 24 and Charts 15 – 18 show the proportion of *all* degree acceptances awarded to males from certain ethnic groups which are awarded in different subject areas (these figures roughly parallel the proportion of all applications to university which are attracted from each group in each subject area).

	CMS	medicine	subjects allied to medicine	biological sciences	physical sciences	engineering	humanities	business studies
2005	17.0	4.9	10.1	3.0	2.4	8.8	1.3	19.5
2004	21.6	10.7	8.7	3.0	2.7	9.3	1.3	18.4
2003	25.9	4.0	6.9	2.4	2.2	8.8	1.2	14.1
2002	29.5	4.2	7.8	2.6	2.4	10.6	1.4	13.1
2001	35.1	4.3	6.8	1.8	2.3	8.6	0.6	11.1
2000	33.0	3.9	7.3	2.1	2.5	10.2	0.4	12.4

*Table 21: Percentage of **all** degree acceptances awarded to men from Asian Pakistani backgrounds in the UK which were awarded in various subjects*

	CMS	medicine	subjects allied to medicine	biological sciences	physical sciences	engineering	humanities	business studies
2000	30.1	2.3	5.2	2.8	3.7	11.0	1.5	10.8
2001	31.8	3.6	3.3	2.1	2.7	7.9	0.4	14.8
2002	28.2	1.9	3.7	3.6	2.5	9.8	2.4	13.3
2003	23.3	2.5	4.2	3.6	2.0	8.5	2.2	16.3
2004	20.7	3.4	5.8	4.0	2.5	7.1	1.6	18.3
2005	18.3	2.4	5.9	4.7	2.7	6.5	2.7	21.4

*Table 22: Percentage of **all** degree acceptances awarded to men from Asian Bangladeshi backgrounds in the UK which were awarded in various subjects*

	CMS	medicine	subjects allied to medicine	biological sciences	physical sciences	engineering	humanities	business studies
2000	22.7	1.9	6.5	2.5	1.6	15.1	0.7	13.7
2001	26.0	1.7	6.5	2.4	1.2	13.3	0.8	12.9
2002	21.5	2.0	5.4	3.0	1.8	14.6	1.7	14.7
2003	16.5	1.3	6.8	2.9	2.1	13.2	1.6	15.7
2004	14.4	1.4	7.7	3.5	1.8	14.2	1.5	18.6
2005	13.5	1.5	7.6	4.2	1.6	14.1	1.1	20.3

*Table 23: Percentage of **all** degree acceptances awarded to men from Black African backgrounds in the UK which were awarded in various subjects*

	CMS	medicine	subjects allied to medicine	biological sciences	physical sciences	engineering	humanities	business studies
2000	18.6	1.3	6.5	2.8	1.1	8.8	1.5	11.9
2001	18.5	0.7	5.9	2.5	2.5	6.3	1.6	12.6
2002	15.9	1.4	2.9	5.5	2.0	9.1	3.8	9.7
2003	15.0	0.7	3.0	7.2	1.6	5.8	3.8	12.8
2004	13.3	0.5	3.0	9.0	2.0	6.7	4.0	14.1
2005	13.4	0.7	3.2	9.5	1.6	6.1	3.5	13.7

*Table 24: Percentage of **all** degree acceptances awarded to men from Black Caribbean backgrounds in the UK which were awarded in various subjects*

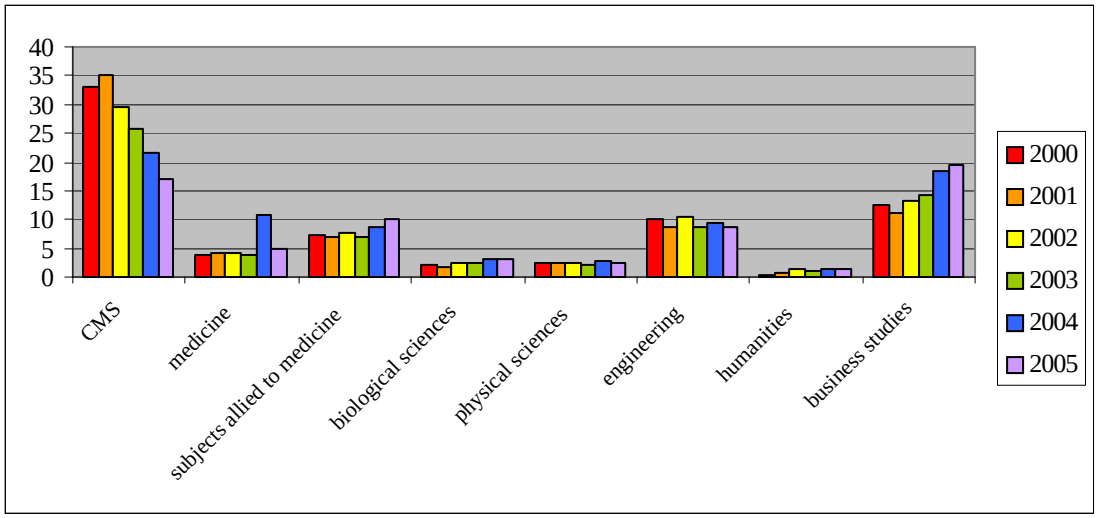

*Chart 15: Percentage of **all** degree acceptances awarded to men from Asian Pakistani backgrounds in the UK which were awarded in various subjects*

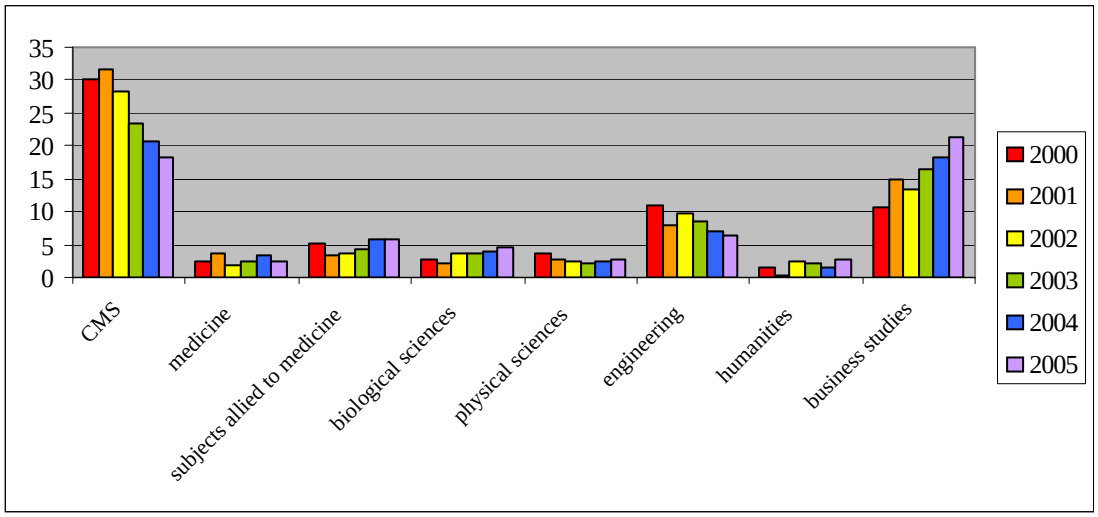

*Chart 16: Percentage of **all** degree acceptances awarded to men from Asian Bangladeshi backgrounds in the UK which were awarded in various subjects*

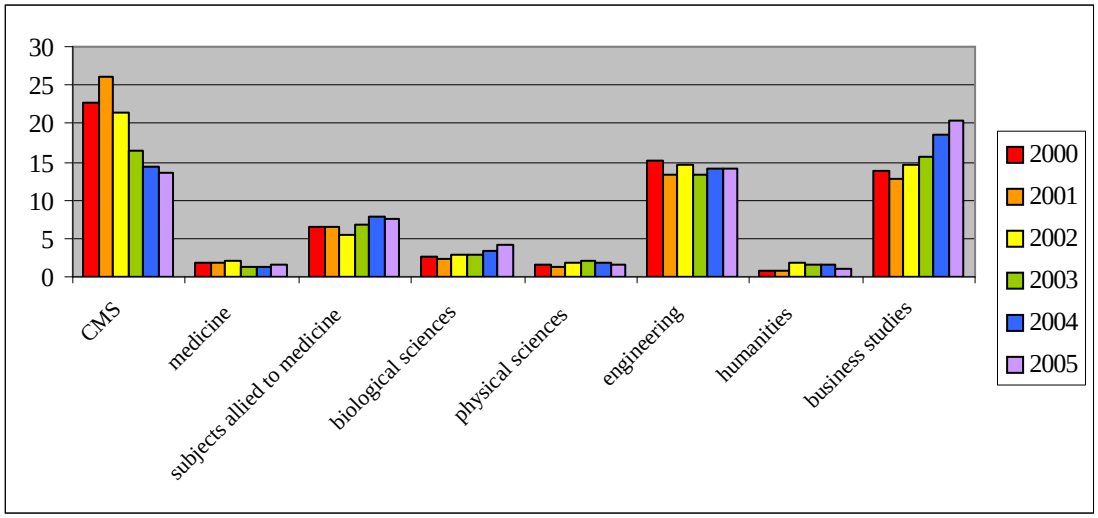

*Chart 17: Percentage of **all** degree acceptances awarded to men from Black African backgrounds in the UK which were awarded in various subjects*

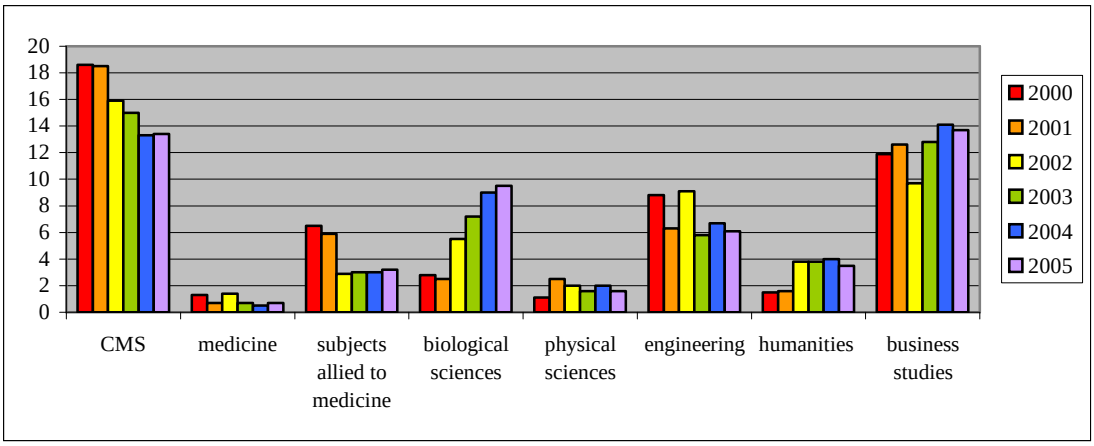

*Chart 18: Percentage of **all** degree acceptances awarded to men from Black Caribbean backgrounds in the UK which were awarded in various subjects*

Dwyer et al (2006, 2) note that, while participation rates among Pakistani and Bangladeshi men are higher than those for white males, they are less likely to enter higher education or to possess degrees than other British males from South Asian backgrounds (also Connor et al 2004, 18). Jones and Elias (2004) also note that people from Bangladeshi backgrounds are relatively under-represented in SET education and employment. Several writers, from Dearing (1997) on, note that men from Caribbean backgrounds are under-represented in HE, and Jones and Elias also note that this group are under-represented in SET. They also state that the overall rise in the number of HE students from Black African backgrounds noted by UUK (2004) may not be accompanied by a rise in the proportion of students from these backgrounds in SET subjects (although they are generally well-represented in IT).

Table 25 and Chart 19 show the number of men from each of these ethnic backgrounds accepted to degrees between 1998 and 2005. Table 26 and Chart 20 show the proportion of all students accepted to degrees who were men from these ethnic backgrounds

.

	1998	1999	2000	2001	2002	2003	2004	2005
Black Caribbean	878	897	891	1,062	1,049	1,136	1,207	1,477
Black African	1986	2,093	2,212	2,630	2,896	3,750	3,834	4,737
Asian Pakistani	3158	3,213	3,469	3,895	3,753	4,467	4,098	4,323
Asian Bangladeshi	889	946	1,088	1,139	1,148	1,208	1,403	1,355

Table 25: Number of men from selected Black and Asian ethnic backgrounds admitted to degree courses

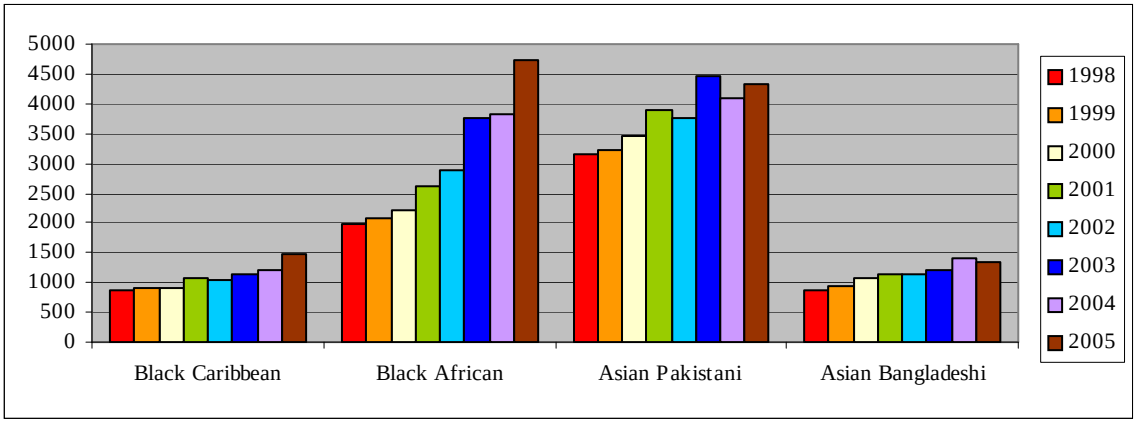

Chart 20: Number of men from selected Black and Asian ethnic backgrounds admitted to degree courses

	1998	1999	2000	2001	2002	2003	2004	2005
Black Caribbean	0.3	0.3	0.3	0.4	0.3	0.4	0.4	0.4
Black African	0.7	0.8	0.8	0.9	0.9	1.2	1.2	1.3
Asian Pakistani	1.2	1.2	1.2	1.3	1.2	1.4	1.3	1.2

Table 26: Proportion of all students admitted to degree courses who were men from selected Black and Asian ethnic backgrounds

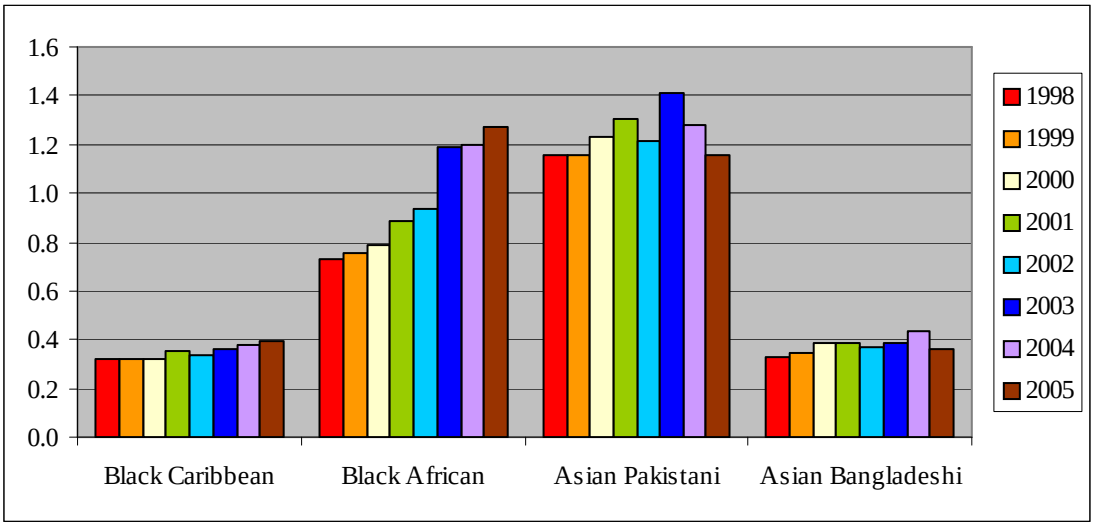

Chart 21: Proportion of all students admitted to degree courses who were men from selected Black and Asian ethnic backgrounds

While all of these ethnic groups saw an overall rise in the number of males admitted to degree courses during the period considered, there was a fall in the proportion of these degree acceptances which were to courses in Computing and Mathematical Sciences. However, the proportion of degree acceptances which were in Computing and Mathematical Sciences remains relatively high in all cases. For all of these ethnic groups, a rise was seen in the number of degree acceptances which were to courses in Business Studies. For all groups apart from students from Caribbean backgrounds, there was also a small rise in the proportion of acceptances which were to courses in Subjects Allied to Medicine.

Among men from Asian Pakistani backgrounds, there was little shift in the proportion of degree acceptances which were in the Physical and Biological Sciences, Engineering or the Humanities. The proportion of degree acceptances granted to men from Asian Bangladeshi backgrounds which were in Engineering fell, although this group saw a small rise in the proportion of acceptances to degrees which were in the Biological Sciences. Interestingly, the other group whose numbers and whose 'share' of higher education places remains small, men from Caribbean backgrounds, also saw a sharp rise in the proportion of admissions to degrees which were in the Biological Sciences. The substantial rise in the number and proportion of male students who came from Black African backgrounds was accompanied by a small rise in the proportion of admissions which were in Biological Sciences, although their numbers in Engineering remained stable.

Overall, it appears that Computing and Mathematical Sciences continues to account for a large part of participation in higher education by students from minority ethnic backgrounds, in particular male students. However, as overall numbers of students from these backgrounds rises, their distribution between different subjects appears to be becoming slightly more even.

1:6 Entry qualifications

Inevitably, overall figures for entry qualifications will mask a huge range of variation between different courses and institutions. However, entry qualifications for Computing and Mathematical Sciences were examined in order to test the anecdotal assertion that students in this subject are often accepted with 'poorer' qualifications than average, or than those required for comparable disciplines. The proportion of students whose UCAS tariff point score falls into each of the bands indicated is shown in Table 27. Figure are shown from 2002, because of changes in the way entry qualifications are recorded by UCAS in that year.

In fact, it appears that while Computing and Mathematical Sciences attracts and also accepts a higher proportion of students from the lowest tariff bands, it also attracts around twice as many from the *highest* bands, and accepts a higher than average proportion of students in this group. The most marked contrast applies to applicants with between 240 and 479 points, who appear to apply in smaller numbers to Computing and Mathematical Sciences courses, and to be admitted in commensurately smaller numbers. By contrast, more students with between 80 and 239 points apply and are admitted. The discrepancy between the proportion of applications and the proportion of admissions for students with 0 – 80 points which is seen for all applications is not present for Computing and Mathematical Sciences. This may relate to the relatively high entry from older students, who are more likely to hold non-standard qualifications than are traditional 'young' entrants.

		Computing and Mathematical Sciences		**All subjects**	
		applications	**degree acceptances**	**applications**	**degree acceptances**
2005	480 and over	8.3	8.9	5.6	6.6
	360 – 479	11.3	12.6	14.1	16
	240 – 359	17.5	18.5	20.4	21.9
	120 – 239	38.1	36.3	37.1	37
	80 – 119	4.6	3.3	2.5	1.9
	0 – 80	20.3	20.5	20.3	16.6
2004	480 and over	9.8	10.7	7.4	8.9
	360 – 479	13.0	14.5	18.0	20.8
	240 – 359	20.6	22.4	26.1	28.2
	120 – 239	24.9	22.3	18.9	17.8
	80 – 119	5.6	3.6	3.5	2.6
	0 – 80	26.1	26.5	26.2	21.7
2003	480 and over	7.5	9.0	6.3	7.6
	360 – 479	11.1	13.3	16.8	19.7
	240 – 359	20.2	23.2	25.8	28.6
	120 – 239	27.1	23.7	20.2	19.1
	80 – 119	5.9	3.5	3.9	2.8
	0 – 80	28.2	27.3	27.0	22.2
2002	480 and over	6.9	8.5	5.7	7
	360 – 479	10.5	12.9	15.2	18
	240 – 359	19.8	22.9	25.2	28.7
	120 – 239	26.0	23.8	21.2	20.7
	80 – 119	6.4	3.8	4.6	3.3
	0 – 80	30.5	28.2	28.1	22.3

Table 27: Percentage of all applications and degree acceptances, for students with various UCAS point scores: Computing and Mathematical Sciences compared with all subjects

Tables 28a – d compare the entry qualifications of applicants and accepted students in Computing and Mathematical Sciences with those of students in other disciplines.

		Computing and Mathematical Sciences		medicine		subjects allied to medicine	
		applications	degree acceptances	applications	degree acceptances	applications	degree acceptances
2005	480 and over	8.3	8.9	22.2	39.8	2.4	4.3
	360 - 479	11.3	12.6	30.2	36.5	10.6	16.1
	240 - 359	17.5	18.5	16.9	9.2	19.4	21.4
	120 - 239	38.1	36.3	22.1	11.1	34.7	32.6
	80 - 119	4.6	3.3	0.8	0.3	2.7	1.8
	0 - 80	20.3	20.5	7.8	3.3	30.2	23.9
2004	480 and over	9.8	10.7	27.3	43.7	2.9	4.9
	360 - 479	13.0	14.5	35.4	40.2	12.9	18.8
	240 - 359	20.6	22.4	20.8	10.5	24.6	27.0
	120 - 239	24.9	22.3	6.6	1.9	19.0	14.9
	80 - 119	5.6	3.6	1.1	0.2	3.7	2.5
	0 - 80	26.1	26.5	8.8	3.4	36.9	31.9

Table 28a: Percentage of all applications and degree acceptances, for students with various UCAS point scores: Computing & Mathematical Sciences compared with medical disciplines

		Computing and Mathematical Sciences		biological sciences		engineering	
		applications	degree acceptances	applications	degree acceptances	applications	degree acceptances
2005	480 and over	8.3	8.9	5.0	5.2	10.6	10.2
	360 - 479	11.3	12.6	16.4	17.8	17.4	17.3
	240 - 359	17.5	18.5	24.1	24.3	18.9	19.0
	120 - 239	38.1	36.3	38.5	36.3	32.5	32.1
	80 - 119	4.6	3.3	2.1	1.6	2.5	2.2
	0 - 80	20.3	20.5	13.9	14.8	18.1	19.1
2004	480 and over	9.8	10.7	7.1	7.3	12.8	12.7
	360 - 479	13.0	14.5	21.6	23.2	21.6	21.6
	240 - 359	20.6	22.4	31.6	31.9	24.3	23.9
	120 - 239	24.9	22.3	19.3	16.5	16.8	15.6
	80 - 119	5.6	3.6	3.0	2.0	3.0	2.4
	0 - 80	26.1	26.5	17.4	19.2	21.6	23.8

Table 28b: Percentage of all applications and degree acceptances, for students with various UCAS point scores: Computing & Mathematical Sciences compared with biological sciences/engineering

		Computing and Mathematical Sciences		physics		chemistry	
		applications	degree acceptances	applications	degree acceptances	applications	degree acceptances
	480 and over	8.3	8.9	28.5	27.6	7.2	6.5
	360 - 479	11.3	12.6	25.8	27.6	20.8	20.5
	240 - 359	17.5	18.5	17.4	17.2	27.5	27.9
	120 - 239	38.1	36.3	23.6	22.0	40.3	38.3
	80 - 119	4.6	3.3	0.7	0.5	0.8	0.8
2005	0 - 80	20.3	20.5	3.9	5.1	3.5	5.9
	480 and over	9.8	10.7	9.2	8.1	35.6	32.2
	360 - 479	13.0	14.5	27.9	28.7	32.4	34.3
	240 - 359	20.6	22.4	40.3	39.2	19.9	20.6
	120 - 239	24.9	22.3	17.0	15.4	6.9	6.4
	80 - 119	5.6	3.6	1.5	1.1	0.9	0.5
2004	0 - 80	26.1	26.5	4.1	7.5	4.2	6.0

Table 28c: Percentage of all applications and degree acceptances, for students with various UCAS point scores: Computing & Mathematical Sciences compared with physical sciences

		CMS		business studies		humanities	
		applications	degree acceptances	applications	degree acceptances	applications	degree acceptances
	480 and over	8.3	8.9	2.31	2.66	22.2	22.3
	360 - 479	11.3	12.6	10.79	11.73	15.4	15.1
	240 - 359	17.5	18.5	23.08	23.74	23.6	23.1
	120 - 239	38.1	36.3	44.78	42.83	32.5	31.5
	80 - 119	4.6	3.3	3.89	2.38	0.9	0.8
2005	0 - 80	20.3	20.5	15.16	16.67	5.5	7.3
	480 and over	9.8	10.7	2.44	2.9	6.2	6.7
	360 - 479	13.0	14.5	10.32	11.4	17.9	19.1
	240 - 359	20.6	22.4	22.75	23.3	23.3	23.1
	120 - 239	24.9	22.3	45.37	43.3	46.7	46.3
	80 - 119	5.6	3.6	4.38	2.7	3.0	2.4
2004	0 - 80	26.1	26.5	14.75	16.4	3.0	2.4

Table 28d: Percentage of all applications and degree acceptances, for students with various UCAS point scores: Computing & Mathematical Sciences compared with business studies and humanities

Overall, the highest qualification levels are found in Medicine, Physics and the Humanities. The subjects with the most similar profile to Computing and Mathematical Sciences are the Subjects Allied to Medicine, Business Studies, and Engineering. However, the first two of these do *not* have as high a proportion of applicants and entrants with very high points scores of the sort seen in Computing and Mathematical Sciences and Engineering. It is possible that this reflects the diversity of course types on offer in the latter two subjects, and the fact that these subjects are offered in the majority of both 'elite' and other universities.

1:7 A-level numbers

Table 29 and Chart 22 show the number of candidates entered for A-level and AS examinations in Computer Studies and ICT between 2002 and 2004 (disaggregated figures are not readily available for earlier years). These indicate a steep fall in the popularity of both subjects among school pupils, in line with their decreasing popularity among applicants to higher education.

	Computing		ICT	
	A-level	AS	A-level	AS
2002/3	8,464	11,957	16,664	26,647
2003/4	6,860	9,430	14,466	22,363
2004/5	5,810	8,354	12,852	19,826

Table 29: Number of candidates, A-level and AS Computer Studies and ICT

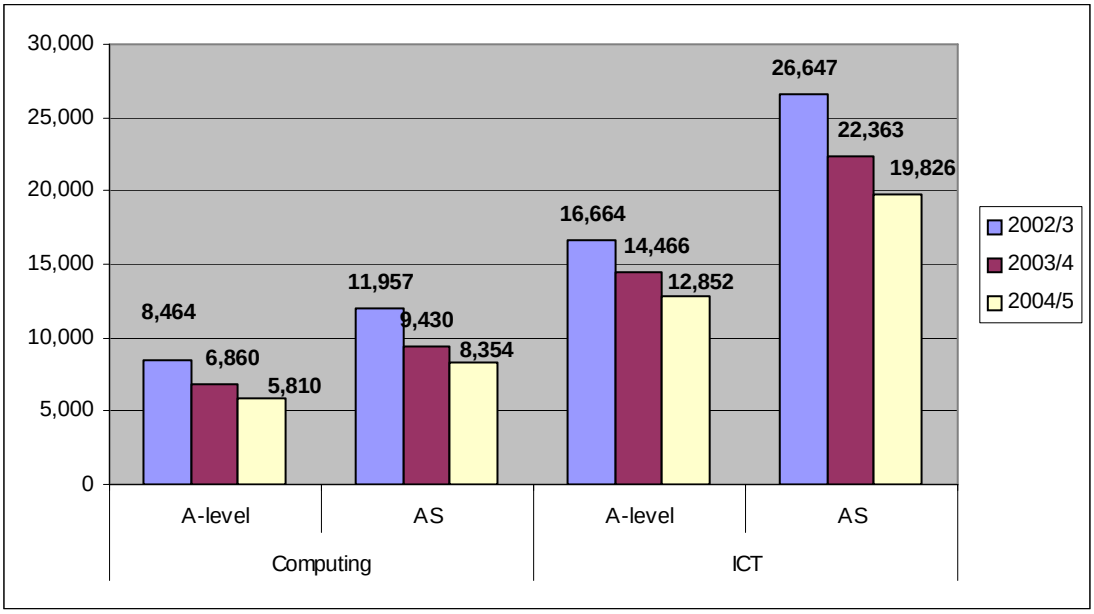

Chart 22: Number of candidates, A-level and AS Computer Studies and ICT

Tables 30a – d show student attainment in A-level and AS Computer Studies and ICT. These indicate that the more 'technical' Computer Studies enjoys a considerably higher rate of attainment than ICT at both levels.

	A	B	C	D	E	A-E
2004/5	14.6	18.6	22.3	22.1	16.2	93.8
2003/4	14.0	18.8	21.7	22.0	16.4	92.9
2002/3	12.4	17.4	22.0	22.1	17.4	91.3

Table 30a: Attainment, A-level Computer Studies

	A	B	C	D	E	A-E
2004/5	7.3	16	24.2	27.1	18.9	93.4
2003/4	6.8	16.3	25.6	27.1	17.8	93.6
2002/3	5.9	14.8	23.8	26.6	20.3	91.5

Table 30b: Attainment, A-level ICT

	A	B	C	D	E	A-E
2004/5	10	13.8	17.6	18.5	16.7	76.6
2003/4	10.5	14.1	17.8	18.3	16.7	77.5
2002/3	11.0	12.7	16.3	18.3	17.3	75.7

Table 30c: Attainment, AS Computing

	A	B	C	D	E	A-E
2004/5	4.5	10.6	17.6	23	22.2	77.9
2003/4	4.0	10.4	18.0	23.0	22.4	77.9
2002/3	4.0	9.1	17.3	22.4	22.0	74.9

Table 30d: Attainment, AS ICT

Table 30e shows the number of students taking ICT at GCSE, and the percentage of these who gain the highest grades, A*, A and B. Some anecdotal evidence presented at the HEFCE-funded events organised by CPHC and the BCS suggested that certain schools might use ICT as a subject in which it is easy to get a 'high pass rate' at GCSE. The A-level and AS figures indicate that, while overall pass rates at these levels are indeed high, the highest grades are achieved by a relatively low proportion of entrants. Table 30e compares GCSE ICT with other subject taken by similar numbers of candidates, the closest being various disciplines within Design and Technology and Drama (slightly higher numbers), and Business Studies and Single Award Science (lower numbers). These subjects in fact show similar or slightly lower numbers of passes in the very high range. However, by comparison with some of the 'traditional academic' subjects in the table, including the physical and biological sciences, GCSE ICT does indeed have a low rate of achievement at the highest levels.

	Number of students (thousands)	**Percentage of students gaining A* or A**	**Percentage of students gaining A*, A or B**
Art and Design	192.0	21.3	41.5
Geography	189.4	23.5	40.6
Physical Education	145.3	18.0	37.6
Religious Studies	132.0	28.7	49.7
German	99.7	20.7	38.5
D & T: Resistant Materials	98.7	13.1	26.8
Drama	94.1	20.8	46.1
D & T: Food Technology	94.0	16.7	31.5
D & T: Graphic Products	86.7	15.5	32.3
Information Technology	85.2	17.4	35.9
Business Studies	78.7	14.7	30.0
Single Award Science	66.5	2.3	6.3
Music	53.0	28.1	50.4
Spanish	52.5	26.9	43.0
Biological Sciences	49.1	46.2	71.3
D & T: Textiles Technology	48.2	24.5	42.7
Chemistry	46.5	47.5	71.6
Physics	46.0	48.5	73.0
Media/Film/Television Studies	41.2	15.0	34.5

Table 30e: GCSE ICT, number of students and passes at A - B*