Doctorates in Computer Science

Doctorates as a percentage of all qualifications in the subject

As expected, this figure is low. In the past five years it changed very little, fluctuating between 1.6% (in 1998-9 and 2000-1) and 1.3% (2001-2). Between 1997 and 2001 Computing ranked 11th out of the subjects considered; it is 12th in 2001-2.

The table below shows the rankings for all subject groups in 2001-2. Over the past five years, figures for most subjects have remained remarkably stable. Among those which rank above Computing, the majority have seen an increase of around 1% in doctorates as a percentage of all qualifications during this period. The largest growth is in medicine and dentistry (from 10.7% to 13.4%) and the largest drop is in veterinary science (from 14.9% to 10.2%). The only other subject to experience a substantial fall was Agriculture and related subjects (6.3% to 5.4%, although there was another 'peak' of 6% in 1999-2000).

Subjects in the lower part of the table show little change over time. Social, economic and political studies has a rise of only 0.5% (from 2.3% to 2.9%), and elsewhere variations of no more than 0.3% are found.

		Doctorates as % of all subject qualifications
Medicine & dentistry		13.4
Physical sciences		11.3
Veterinary science		10.2
Biological sciences		8.8
Mathematical sciences		6.8
Humanities		5.5
Engineering & technology		5.4
Agriculture & related subjects		5.4
Languages		3.6
Social, economic & political studies		2.9
Subjects allied to medicine		1.4
Computer science		1.3
Architecture, building & planning		1.2
Education		1.1
Law		0.8
Business & administrative studies		0.7
Librarianship & information science		0.7
Creative arts & design		0.6
Combined		0.4

Doctorates as a percentage of all degrees in the subject

In 2001-2, Computing was ranked 14th out of the subjects listed. It was 12th in 1997-8 and 1998-9, and 13th in 1999-2000 and 2000-1. 2001-2 is the first year in which doctorates accounted for fewer than 2% of degrees in Computing (the highest figure was 2.2% in 1998-9 and 2000-1). In most subjects the percentage of degrees which are doctorates has risen during the five years examined. The largest rise, by some way, is in medicine and dentistry (3.7%); the next is in Humanities (1.7%), and Physical sciences, biological sciences, Education, Mathematics and Languages all have rises of over 1%. Interestingly, in four of the five the subjects where the difference between the highest and lowest percentage is between 0.5% and 0.9%, the highest percentage is actually found in 2000-1. These subjects are Engineering and technology, Law, Architecture, building and planning and Librarianship and information studies. Social, economic and political studies has an evenly-distributed increase of 0.8% between 1997-8 and 2001-2.

Computing is one of only three subjects which shows a decline, although this is not evenly distributed. The decline is much sharper in Agriculture and related subjects (1.3%) and Veterinary science (5.7%).

		Doctorates as % of all subject degrees
Medicine & dentistry		14.9
Physical sciences		12.2
Veterinary science		10.8
Biological sciences		9.6
Agriculture & related subjects		7.6
Mathematical sciences		7.5
Engineering & technology		6.6
Humanities		6.1
Languages		4.1
Social, economic & political studies		3.7
Education		3.4
Subjects allied to medicine		3.0
Architecture, building & planning		1.8
Computer science		1.8
Law		1.2
Business & administrative studies		1.0
Librarianship & information science		0.9
Creative arts & design		0.8
Combined		0.6

Doctorates as a percentage of all UK doctorates

Computer science has remained in roughly the same position among the subjects ranked during the five years studied. It accounted for 2.7% of all UK doctorates between 1998-9 and 2000-1, and for 2.4% in 1997-8.

Again, the ranking of subjects is extremely stable. Only three fields, Biological Sciences, Physical Sciences and Engineering and Technology, account for more than 10% of UK doctorates. There is little variation over the five years between the percentage contributed by each subject. Only three show a rise of more than 1% (Medicine and dentistry – 1.4%, Social, economic and political studies – 1.1% and Education – 1.1%). All other subjects show a very slight rise over the five years, with the exception of Mathematics (which rises to 3.3% 1998-9 but then drops again), Agriculture and related subjects (a drop of 0.8%) and Veterinary science (which drops by 0.4%).

		Subject doctorates as % of UK doctorates
Biological sciences		16.0
Physical sciences		14.5
Engineering & technology		13.1
Medicine & dentistry		9.7
Social, economic & political studies		8.5
Humanities		6.0
Languages		5.6
Subjects allied to medicine		5.5
Education		4.2
Business & administrative studies		3.6
Mathematical sciences		2.7
Computer science		2.6
Agriculture & related subjects		1.8
Combined		1.5
Creative arts & design		1.4
Law		1.2
Architecture, building & planning		1.1
Veterinary science		0.6
Librarianship & information science		0.5

Some context – all figures are for 2001-2002

Subject qualifications as a percentage of all UK qualifications

		All subject qualifications as % of all UK qualifications
Business & administrative studies		13.7
Combined		11.1
Subjects allied to medicine		11.0
Education		10.1
Social, economic & political studies		7.9
Engineering & technology		6.6
Creative arts & design		6.2
Computer science		5.5
Biological sciences		4.9
Languages		4.2
Law		4.0
Physical sciences		3.5
Humanities		3.0
Architecture, building & planning		2.3
Medicine & dentistry		2.0
Librarianship & information science		1.8
Mathematical sciences		1.1
Agriculture & related subjects		0.9
Veterinary science		0.2

Subject degrees as a percentage of all UK degrees

		All subject degrees as % of all UK degrees
Business & administrative studies		14.4
Combined		10.3
Social, economic & political studies		9.0
Engineering & technology		7.7
Creative arts & design		7.4
Subjects allied to medicine		7.1
Biological sciences		6.5
Computer science		5.6
Languages		5.4
Education		4.8
Physical sciences		4.6
Law		3.8
Humanities		3.8
Medicine & dentistry		2.6
Architecture, building & planning		2.3
Librarianship & information science		2.1
Mathematical sciences		1.4
Agriculture & related subjects		0.9
Veterinary science		0.2

Subject first degrees as percentage of all UK first degrees

		All subject first degrees as % of all UK first degrees
Combined		12.3
Business & administrative studies		12.2
Creative arts & design		8.5
Social, economic & political studies		8.2
Subjects allied to medicine		8.1
Engineering & technology		7.4
Biological sciences		6.7
Languages		5.7
Computer science		5.2
Education		4.6
Physical sciences		4.5
Law		3.7
Humanities		3.6
Architecture, building & planning		2.3
Medicine & dentistry		2.2
Librarianship & information science		2.0
Mathematical sciences		1.5
Agriculture & related subjects		0.9
Veterinary science		0.2

Subject higher degrees as a percentage of all UK higher degrees

		All subject Higher degrees as % of all UK higher degrees
Business & administrative studies		21.0
Social, economic & political studies		11.4
Engineering & technology		8.8
Computer science		6.7
Biological sciences		5.7
Education		5.2
Physical sciences		5.0
Humanities		4.5
Languages		4.4
Combined		4.4
Law		4.3
Creative arts & design		4.2
Subjects allied to medicine		4.1
Medicine & dentistry		3.5
Librarianship & information science		2.4
Architecture, building & planning		2.0
Mathematical sciences		1.2
Agriculture & related subjects		1.1
Veterinary science		0.2

All 'other' subject postgraduate subject qualifications as a percentage of all UK 'other' postgraduate qualifications

		"Other" postgraduate subject qualifications as % of all UK "other" p/g qualifications
Education		44.1
Business & administrative studies		13.1
Law		9.5
Combined		8.2
Subjects allied to medicine		5.3
Social, economic & political studies		3.9
Architecture, building & planning		2.9
Computer science		2.7
Creative arts & design		2.0
Librarianship & information science		1.7
Engineering & technology		1.7
Medicine & dentistry		1.5
Biological sciences		1.1
Languages		0.7
Physical sciences		0.6
Humanities		0.5
Mathematical sciences		0.3
Agriculture & related subjects		0.1
Veterinary science		0.0

All subject non-degree undergraduate qualifications as a percentage of all UK non-degree undergraduate qualifications

		Subject non-degree u/g qualifications as % of all UK non-degree u/g qualifications
Subjects allied to medicine		30.6
Combined		16.1
Business & administrative studies		11.3
Education		7.0
Computer science		6.9
Social, economic & political studies		6.4
Engineering & technology		5.7
Creative arts & design		4.0
Languages		2.2
Architecture, building & planning		2.2
Biological sciences		1.5
Humanities		1.4
Agriculture & related subjects		1.4
Law		1.0
Physical sciences		1.0
Librarianship & information science		0.8
Mathematical sciences		0.4
Medicine & dentistry		0.1
Veterinary science		0.0

Non-doctoral higher degrees as percentage of subject degrees

		Subject non-doctoral higher degrees as % of all subject degrees
Business & administrative studies		35.2
Computer science		28.0
Social, economic & political studies		27.7
Librarianship & information science		27.6
Law		26.4
Education		23.5
Humanities		22.9
Agriculture & related subjects		22.2
Engineering & technology		21.6
Architecture, building & planning		20.6
Medicine & dentistry		19.2
Languages		16.0
Physical sciences		14.4
Creative arts & design		13.3
Mathematical sciences		12.7
Biological sciences		12.2
Veterinary science		11.4
Subjects allied to medicine		11.2
Combined		9.9

Subject non-doctoral higher degrees as a percentage of all subject qualifications

		Subject non-doctoral higher degrees as % of all subject qualifications
Business & administrative studies		25.9
Librarianship & information science		22.2
Social, economic & political studies		22.1
Humanities		20.6
Computer science		20.0
Engineering & technology		17.7
Law		17.5
Medicine & dentistry		17.3
Agriculture & related subjects		15.8
Languages		14.2
Architecture, building & planning		14.0
Physical sciences		13.4
Mathematical sciences		11.5
Biological sciences		11.2
Creative arts & design		11.2
Veterinary science		10.8
Education		7.8
Combined		6.5
Subjects allied to medicine		5.1

Subject non-doctoral higher degrees as percentage of all subject postgraduate qualifications

		Subject non-doctoral higher degrees as % of subject postgraduate qualifications
Humanities		73.5
Computer science		72.5
Languages		71.6
Social, economic & political studies		70.8
Creative arts & design		70.4
Agriculture & related subjects		69.3
Engineering & technology		67.5
Business & administrative studies		67.3
Librarianship & information science		64.3
Mathematical sciences		52.0
Physical sciences		50.0
Biological sciences		49.0
Veterinary science		46.2
Architecture, building & planning		45.2
Medicine & dentistry		43.3
Subjects allied to medicine		40.9
Combined		40.3
Law		36.8
Education		12.2

Subject non-doctoral higher degrees as percentage of all UK non-doctoral higher degrees

		Non doctoral subject higher degrees as % of all UK non-doctoral higher degrees
Business & administrative studies		24.3
Social, economic & political studies		11.9
Engineering & technology		8.0
Computer science		7.5
Education		5.4
Combined		4.9
Law		4.9
Creative arts & design		4.7
Humanities		4.2
Languages		4.1
Subjects allied to medicine		3.8
Biological sciences		3.8
Physical sciences		3.2
Librarianship & information science		2.7
Medicine & dentistry		2.4
Architecture, building & planning		2.2
Agriculture & related subjects		1.0
Mathematical sciences		0.9
Veterinary science		0.1

Discussion

Nationally, 5.5% of all university qualifications are awarded in Computing, and the subject accounts for 5.6% of all degrees. The number of doctorates awarded in Computing is comparatively low (2.6%) but the number of higher degrees is comparatively high, at 6.7% of all UK higher degrees. Only five subject areas award a percentage of higher degrees which is greater by more than 1% than their percentage of all UK first degrees (the others are Business and administrative studies – 6.6% more, Social, economic and political studies – 2.4% more, Biological sciences – 1.2% more, and Engineering and technology – 1.1% more).

This is presumably because a high number of Masters' degrees are awarded in Computing. Although HESA does not provide a separate figure for Masters' degrees, it is likely that the majority of non-doctoral higher degrees are in fact Masters' degrees. The percentage of all Computing degrees which are non-doctoral higher degrees (i.e. probably Masters) is very high, at 28%, the second highest for any subject area. Computing also contributes a high percentage of all UK non-doctoral higher degrees.

Note also that the RAE figures for Doctoral awards in computing (see accompanying document relating to the UKCRC research) appear to be at variance with those collected by HESA. This may arise because the HESA figures are centrally generated by universities while the RAE ones are submitted directly by academic departments. It would be interesting to see the breakdown of figures from each source by part-time/full-time study and by mode of funding. One possible cause of a discrepancy is a high number of part-time doctoral students who are working in industry while studying and who may be funded by scholarships, employers or other sources; is it possible that these might not be logged 'conventionally' by the central university departments, and hence inadvertently excluded from the HESA figures? I have no evidence for this position, but it is a possible explanation.