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Incorporating the UK GRAD Programme and UKHERD

What do researchers do?

First destinations of doctoral graduates by subject

Analysis of first employment destinations of doctoral graduates 2003–2007 from UK universities by discipline and subject

- First-ever analysis of doctoral destinations by subject areas
- Summary of first destinations of doctoral graduates between 2003–2007
- Illustration of the range of occupations undertaken by doctoral graduates

Vitae is supported by Research Councils UK (RCUK), managed by CRAC: The Career Development Organisation and delivered in partnership with regional Hub host universities

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Contents

Glossary

AGCAS	Association of Graduate Careers Advisory Services
A&H	arts and humanities
BS	biological sciences
BMS	biomedical sciences
DBA	Doctor of Business Administration
DClinPsych	Doctorate in Clinical Psychology (professional)
DIUS	Department for Innovation, Universities and Science
DLHE	'Destinations of Leavers from Higher Education' survey by HESA
DMedEth	Doctor of Medical Ethics (professional)
DPA	Doctor of Public Administration
DPhil	Doctor of Philosophy
EdD	Doctor of Education
EngD	Doctor of Engineering (professional)
EU	European Union
EU-domiciled	normal residence is in the European Union
FE	further education
HE	higher education
HECSU	Higher Education Careers Services Unit
HEI	higher education institution
HESA	Higher Education Statistics Agency
JACS	Joint Academic Coding System
JSS	Joint Statement of the UK Research Councils' Training Requirements for Research Students (Joint Skills Statement)
NHS	National Health Service
PhD	Doctor of Philosophy
PS&E	physical sciences and engineering
QAA	Quality Assurance Agency for Higher Education
RC	research council(s)
RCUK	Research Councils UK
RDP	research degree programmes
SIC	Standard Industrial Classification
SOC	Standard Occupational Classification
SS	social sciences
UK-domiciled	normal residence is in the UK, including the Channel Islands and Isle of Man
WDPD? series	publications of the What Do PhDs Do? series, published by the UK GRAD Programme
WDPD?	What Do PhDs Do? (2004)
WDPDR	What Do PhDs Do? - A Regional Analysis (2006)
WDPDT	What Do PhDs Do? - Trends (2007)
WDRD? series	publications of the What do researchers do? series, published by Vitae
WDRDCS	What do researchers do? Career profiles of doctoral graduates (2009)
WDRDS	What do researchers do? First destinations of doctoral graduates by subject (2009, current publication)

Foreword

I am delighted to introduce Vitae's 'What do researchers do? First destinations of doctoral graduates by subject'. In addition to providing accessible, up-to-date information on employment destinations of all doctoral researchers, pioneered by the 'What Do PhDs do?' series (published by Vitae's predecessor, the UK GRAD Programme), this publication provides insights into first employment destinations by subject for the first time.

The 'What do researchers do?' series builds our knowledge and understanding of the landscape of researchers careers, the diversity of pathways and the contribution our most highly trained make to UK economy and society. Never has it been so important for the UK to have this supply of highly-skilled, talented individuals to contribute to our future economic prosperity.

Leading-edge research is essential in driving forward UK economic success and international competitiveness. But to continue to develop and attract global knowledge intensive businesses, we need more people with the skills to carry out basic research, for which the UK has acknowledged excellence. We also need innovative and creative doctoral graduates to develop innovative products, processes and services and increase our cultural and social capital.

It is critical that we support our doctoral graduates in making good career decisions. This publication is required reading for all careers professionals supporting researchers. I recommend it to anyone working with and developing researchers, to current and prospective doctoral researchers and to employers wanting to know more about recruiting these highly skilled individuals. It will be of real value to businesses, universities and research organisations.

Professor Ian Diamond
Chair, Research Councils UK Executive Group

What do researchers do?

First destination of doctoral graduates by subject

Background

'What do researchers do? First destination of doctoral graduates by subject' (WDRDS) provides an up-to-date and extended analysis of the first employment destinations of doctoral graduates from 2003-2007. For the first time it provides information on the size, demographics and destinations of doctoral graduates by subject. It explores employment rates, sectors and occupations.

It provides:

- First-ever analysis of doctoral destinations by subject areas
- Summary of first destinations of doctoral graduates between 2003-2007
- Illustration of the range of occupations undertaken by doctoral graduates

WDRDS is designed to help:

- doctoral researchers and prospective researchers make well-informed career choices
- careers advisors and supervisors be aware of the breadth of potential careers
- employers better appreciate what doctoral graduates can offer them.

Introduction

Doctoral graduates are typically high calibre individuals with specialist knowledge, well-developed transferable skills and an ability to work creatively and independently. 'What do researchers do? First destinations of doctoral graduates by subject' (WDRDS) demonstrates that doctoral graduates are highly employable right across the economy in a wide range of occupations. It shows that doctoral graduates are prized by the higher education sector where they go on to work in research, teaching and administration roles. However, it also demonstrates that a similar number of doctoral graduates go on to work outside of higher education in very diverse roles using either their specialist or high level generic skills, or both.

In WDRDS, for the first time, first destinations of doctoral graduates are presented by subject as well as by broad discipline. This more detailed analysis provides new insights into the employment destinations of researchers and will provide researchers with an analysis that is more relevant to them than ever before.

This publication is accompanied by 'What do researchers do? Career profiles of doctoral graduates' (WDRDCS). This companion publication supplements the first destinations described here with career stories that provide insights into the paths that doctoral graduates take beyond their first destination. Both publications provide information from a wide range of subjects and highlight the range of different occupations and employment sectors that researchers work in.

All stakeholders will benefit from having an enhanced understanding of the employment destinations of doctoral graduates. It should be inspiring and informative to doctoral researchers or recent doctoral graduates making career decisions and to those advising them. Understanding the employment destinations of doctoral graduates enables the higher education sector to ensure that the training provided is useful and appropriate. It is also informative for potential employers of doctoral graduates to see where such people have previously found employment. This analysis will be useful to government and other policy makers in understanding and evaluating the impact made by researchers to the economy.

Aims and scope of 'What do researchers do? First destinations of doctoral graduates by subject'

WDRDS is designed to help:

- doctoral researchers and prospective researchers make well-informed career choices
- careers advisors and supervisors to be aware of the breadth of potential careers
- employers to develop their understanding of the postgraduate labour market and what doctoral graduates can offer them.

WDRDS is based on the annual 'Destinations of Leavers from Higher Education' (DLHE) survey introduced in 2004[1]. It analyses the information that relates specifically to the employment destinations of UK-domiciled doctoral graduates. The publication builds on the 'What Do PhDs Do?' series[2] (2004–07) published by the UK GRAD Programme, now Vitae. In response to demand from the series' audiences, particularly researchers and careers advisers, WDRDS contains:

- analysis of the latest available first destination data of UK-domiciled doctorate-holders who graduated in 2007
- information on five-year trends 2003–2007, at the level of five broad discipline areas as well as 'all disciplines'
- new insights into first employment destinations of doctoral graduates in 36 different academic subjects and subject groups using the results of all five years of the DLHE survey[3].

What is a doctorate?

A doctorate is the highest qualification from UK universities. The degree is awarded for research, undertaken with a high level of independence, over three or four years (typically six to seven years if the doctorate is studied part-time). The research is required to make an original and significant contribution to knowledge, worthy of academic publication. The candidate also needs to demonstrate in-depth knowledge of the subject. Doctoral degree programmes now include structured transferable skills training as well as training in relevant research skills. Although most doctoral degrees are undertaken in well-structured programmes, doctoral study can take a variety of forms depending on the discipline and the mode of study, for example in a 'PhD by practice' creative work forms a significant part of the intellectual inquiry. The 'PhD by publication' allows for a candidate's thesis to consist entirely or largely of published work.

In WDRDS we use the generic term 'doctoral graduate' to cover those graduating with any of the following forms of doctorate:

- Doctor of Philosophy (PhD or DPhil), the most familiar doctoral research qualification
- Professional Doctorates (EdD, EngD, DClinPsych, DMedEth, DPA, DBA, etc), these differ from PhDs as the research project is normally related to the candidate's professional practice and includes a more formal taught component. The importance of professional doctorates is shown by the growth of doctoral graduates in clinical and pre-clinical medicine and psychology; now the first and third most common subject areas for UK-domiciled doctoral graduates.

Developments in research degree programmes

As the numbers of doctoral researchers has grown, this important cohort has received increasing attention. Changing expectations from government, funders, employers and researchers themselves has led to changes in the way doctoral education is delivered. This has been supported by the development of national quality assurance mechanisms and increased collaboration and practice-sharing between universities. An important development has been an increased focus on the development of researchers' personal and professional skills. Universities have developed their doctoral programmes to encourage and support researchers to develop both their research expertise and their transferable skills.

A key catalyst for change in doctoral education was 'SET for Success'[4] (2002). This review was commissioned by the Treasury to investigate the supply of people with science, technology, engineering and mathematics skills and recommended a number of developments in doctoral education. These included the introduction of formal skills training, principally in transferable skills, to supplement and enhance the research skills underpinning a successful doctorate. The higher education sector enthusiastically

1. www.hesa.ac.uk/index.php/component/option,com_collns/task,show_collns/targetYear,any/Itemid,231/targetStream,3/
2. 'What Do PhDs Do?' (2004) www.vitae.ac.uk/CMS/files/1.UKGRAD-WDPD-full-report-Sep-2004.pdf
'What Do PhDs Do? – A Regional Analysis' (2006) www.vitae.ac.uk/cms/files/UKGRAD-WDPD-regional-analysis-Sep-2006.pdf
'What Do PhDs Do? – Trends' (2007) www.vitae.ac.uk/cms/files/UKGRAD-WDPD-Trends-Sep-2007.pdf
3. The methodology chapter outlines the methodology used in WDRDS to facilitate comparison of institutional data against the national data.
4. 'SET for Success: the supply of people with science, technology, engineering and mathematics skills' (2002) Sir Gareth Roberts' Review, HM Treasury www.hm-treasury.gov.uk/ent_res_roberts.htm

embraced the recommendations of 'SET for Success' and has created a wide range of innovative practice designed to support researchers in the development of their skills[5].

Researchers graduating from doctorates typically have had the opportunity to develop their skills through skills training, experiential learning opportunities, targeted careers events and advice. The skills areas that are being developed are set out in the 'Joint Statement of the UK Research Councils' Training Requirements for Research Students' (2001)[6]. This details seven areas that researchers are expected to develop through a research degree: research skills and techniques, research environment, research management, personal effectiveness, communication skills, networking and teamworking, and career management. This holistic approach to developing the skills and competencies of doctoral researchers is embedded in Section 1 of the Quality Assurance Agency for Higher Education (QAA) 'Code of Practice for the assurance of academic quality and standards in higher education' (2004)[7].

The focus on developing researchers' skills has been recognised by government as critical to the future of the UK's competitiveness and sustaining a knowledge-based economy. Lord Leitch's 'Review of Skills'[8] recognises that *'One of the most powerful levers for improving productivity will be higher level skills. Postgraduate, or Level 5 skills, such as MBAs and PhDs...'.*

Key messages

Overall patterns of doctoral employment were consistent over the period 2003–2007. These patterns were set against a slight upward trend in the numbers of UK-domiciled doctoral graduates, which represented a slight decline in percentage of the total cohort. The employment rate[9] for UK-domiciled doctoral graduates working in the UK was stable at 80–81% and they continued to be employed in a wide range of occupations in all sectors of the UK economy. On average, 35% went into research roles across all sectors. Higher education is a main destination, where 23% of all respondents were employed as research staff and 14% as lecturers.

The proportion of doctoral graduates working or studying overseas declined slightly. However, unemployment among UK-domiciled doctoral graduates remained considerably lower than among first-degree graduates and masters graduates across all disciplines.

The 'At a glance' chapter compares by subject some of the key statistics on cohort size, employment status, employment in the education sector, employment in research-related roles and as research staff and in teaching and lecturing roles in higher education.

The discipline chapters look in more detail at discipline and subject level key findings over the period 2003–2007.

Arts and humanities

Doctoral graduates from the arts and humanities (A&H) made up between 13–14% of all UK-domiciled doctoral graduates. 76% were employed or employed and working in the UK, with the education sector being the largest employment area for A&H respondents. One fifth worked in research-related roles across all sectors (14% in higher education), while 27% were employed as lecturers in higher education. The proportion employed abroad was consistently below the rate across all disciplines.

Subject specific information is provided for history; English; modern languages; theology; linguistics and classical and ancient languages. Other subjects in arts and humanities are grouped together.

Biological sciences

Doctoral graduates from the biological sciences made up 14% of all UK-domiciled doctoral graduates. 80% were employed in the UK in 2007, half within the education sector with manufacturing being the second most popular sector. The proportion employed abroad was consistently above the average rate across all disciplines. The percentage working in research-related roles across all sectors was 64%, while the proportion of respondents working as research staff in higher education was 36%.

Subject specific information is provided for biology; biochemistry, molecular biology and biophysics; microbiology; and agriculture. Other subjects in biological sciences are grouped together.

Biomedical sciences

Doctoral graduates from the biomedical sciences made up 25-27% of all UK-domiciled doctoral graduates. 85% were employed in the UK, with the health and social work sector consistently being the largest employment area and the education sector second. 31% worked in research-related roles across all sectors, with 22% working as research staff in higher education. 10% were employed as lecturers in higher education.

Subject specific information is provided for clinical and pre-clinical medicine; psychology; pharmacology, toxicology and pharmacy; anatomy, physiology and pathology; and nursing. Other subjects in biomedical sciences are grouped together.

Physical sciences and engineering

Doctoral graduates in physical sciences and engineering (PS&E) made up the largest discipline, at 32% of the UK-domiciled cohort. 78% were employed in the UK, with the education sector being the largest employment area at 42%. Significant proportions of PS&E respondents were employed in manufacturing (25%) and business, finance and IT (20%). 43% were employed in research roles across all sectors, with 28% as research staff in higher education. Around 7% were employed as lecturers in higher education.

Subject specific information is provided for chemistry; physics; computer science; mathematics; physical and terrestrial geographical and environmental sciences; geology; electrical and electronic engineering; mechanical engineering; and civil engineering. Other PS&E subjects are grouped together in 'other physical sciences' or in 'other engineering'.

Social sciences

Doctoral graduates from the social sciences (SS) made up the smallest discipline at 10% of all UK-domiciled doctoral graduates. 84% were employed in the UK, with 71% of these employed in the education sector in 2007. 24% were employed in research roles across all sectors, with 18% working as research staff in higher education. A third of SS respondents were employed as lecturers in higher education, the highest proportion of any discipline.

Subject specific information is provided for business and management; sociology; politics; human and social geography; law; economics; and academic studies in education. Other SS subjects are grouped together.

A resources and publications page at the end of the publication provides links to other destination studies reports on researchers' careers and relevant policy reports.

5. An online database for sharing practice in researcher development can be found at www.vitae.ac.uk/dop
6. www.vitae.ac.uk/policy-practice/1690/Joint-Skills-Statement.html
7. Section 1 of the 'Code of Practice for the assurance of academic quality and standards in higher education' www.qaa.ac.uk/academicinfrastructure/codeOfPractice/section1/default.asp
8. www.vitae.ac.uk/policy-practice/375-2865/-Leitch-Review-of-Skills.html
9. The combined totals of respondents who 'entered work in the UK' and 'working and studying'.

Data source: Graduate Prospects using DLHE surveys 2004, 2005, 2006, 2007, 2008 (© HESA)

At a glance

This section enables easy comparisons of a number of key indicators by subject. All data is amalgamated over the years 2003–2007. Only subjects with 250 doctoral graduates or over are given separately: smaller subjects are consolidated into subject groupings. More detailed information can be found in the 'all disciplines' and discipline chapters.

UK-domiciled doctoral graduate population by subject 2003–2007

The numbers of UK-domiciled doctoral graduates by subject varies from single figures up to an average of 737 per year in medicine.

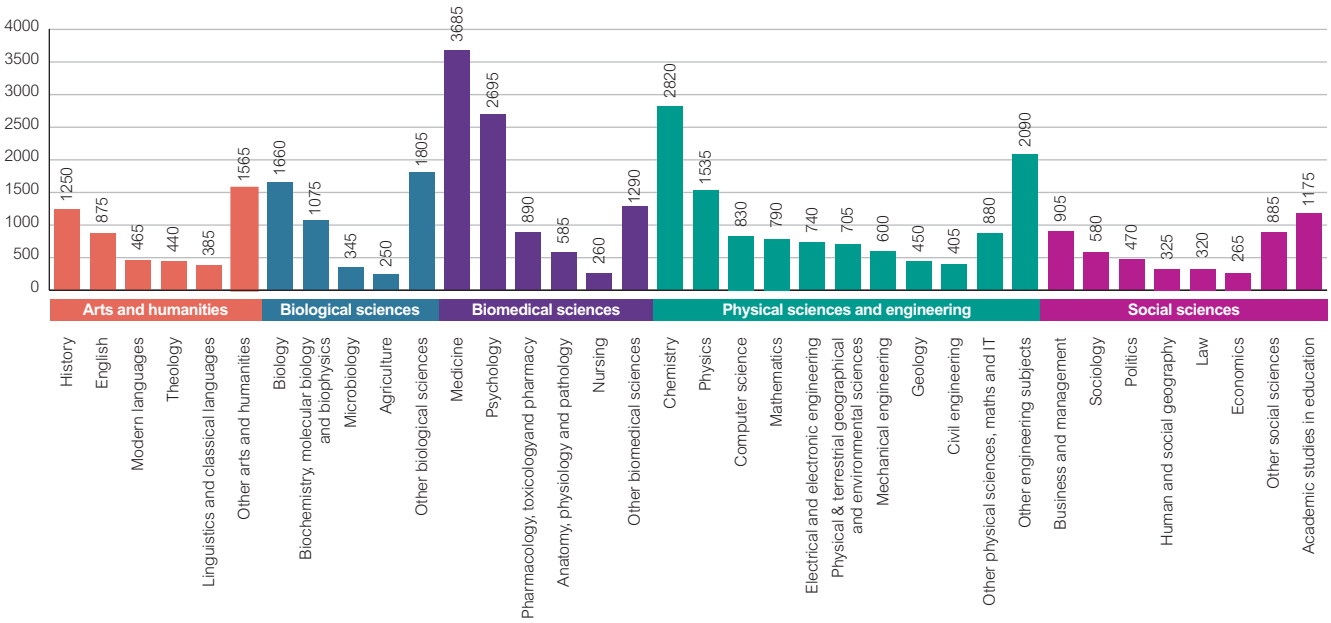

Figure 1: UK-domiciled doctoral graduate population 2003–2007

Employment status of UK-domiciled doctoral graduate respondents by subject 2003–2007

The percentage of respondents to the DLHE survey that enter work or combine work and study in the UK varies by subject, from 70% in modern languages to 90% in nursing. It has to be borne in mind that categories such as working overseas will vary by subject too and are not reported on here. More details and analysis are given in each of the discipline chapters.

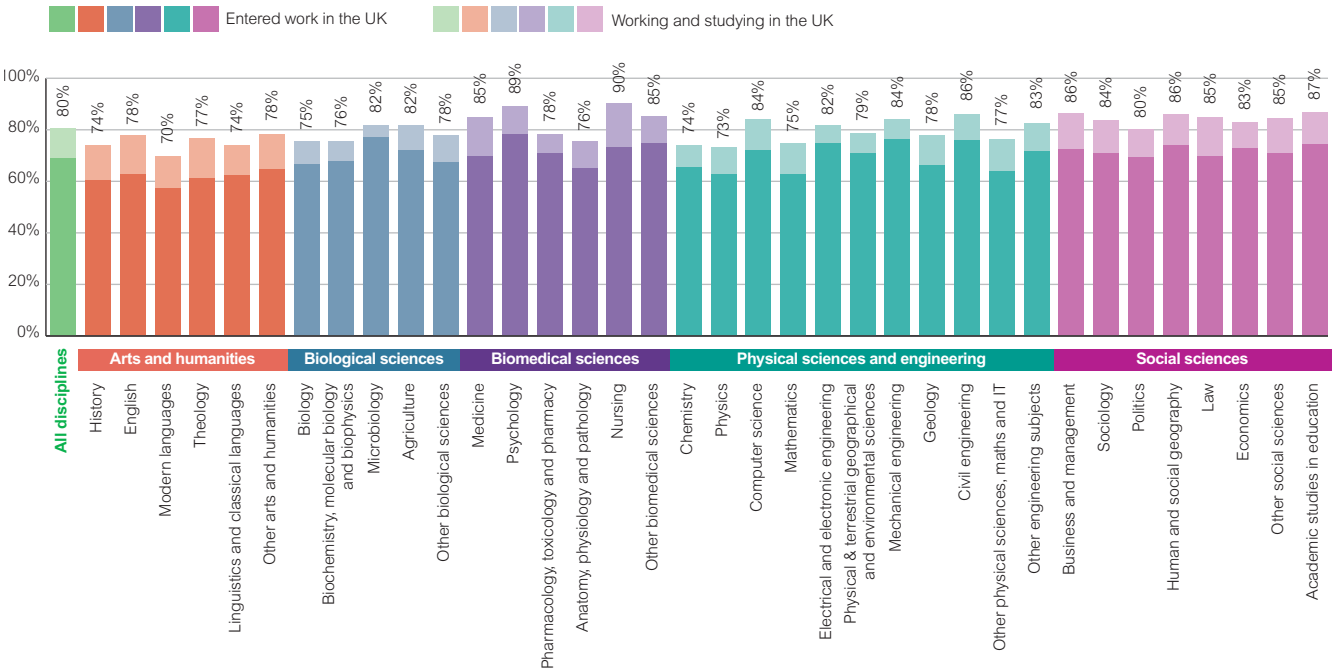

Figure 2: Percentage of UK-domiciled doctoral graduate respondents either working or working and studying in the UK 2003–2007

Data source: Graduate Prospects using DLHE surveys 2004, 2005, 2006, 2007, 2008 (© HESA)

Proportion of UK-domiciled doctoral graduate respondents employed in the UK in research occupations by subject 2003–2007

The percentage of doctoral graduate respondents in each subject employed in research occupations across all employment sectors varies from 7% for theology to 71% for microbiology and biochemistry, molecular biology and biophysics.

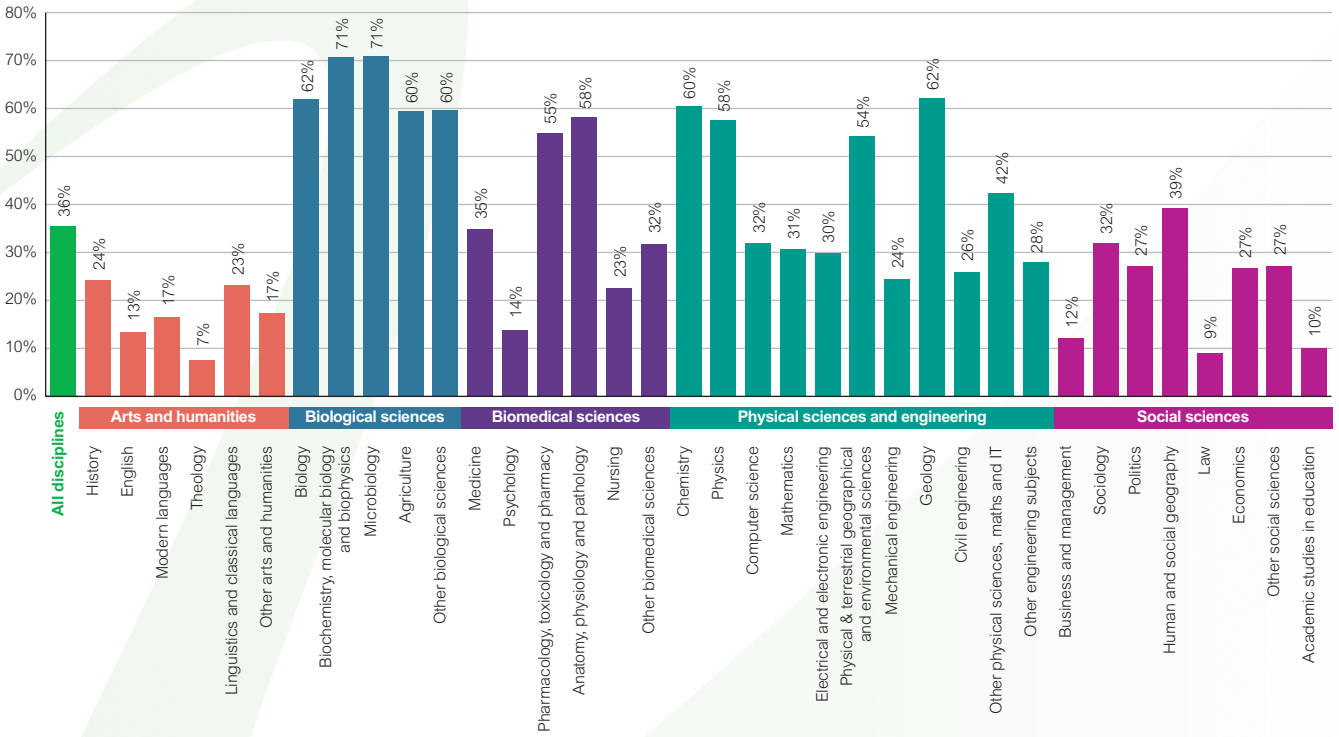

Figure 3: Percentage of UK-domiciled doctoral graduate respondents employed in the UK in research occupations 2003–2007

Proportion of UK-domiciled doctoral graduate respondents employed in the UK in the education sector by subject 2003–2007

The education sector absorbs nearly half of respondents over all subjects employed in the UK. However, this varies by subject from 28% for psychology doctoral graduates to 79% of those in modern languages.

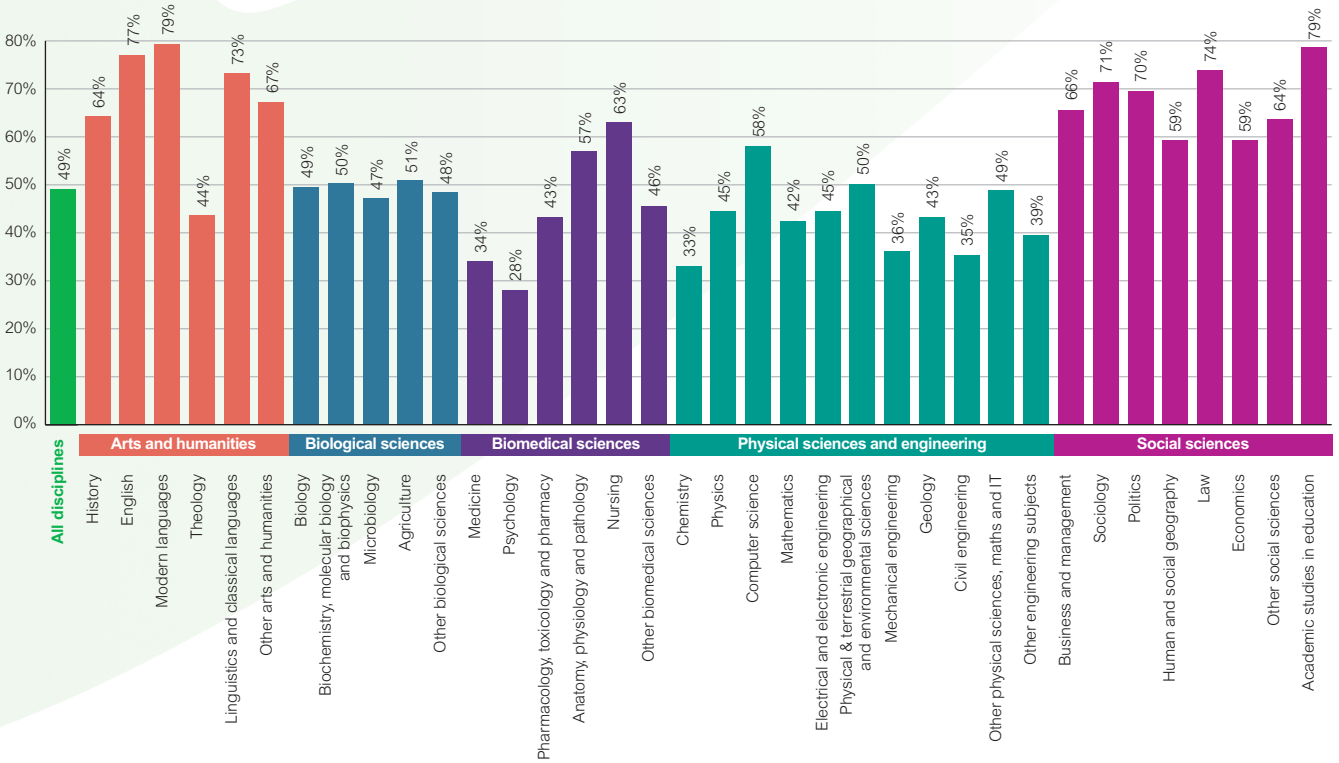

Figure 4: Percentage of UK-domiciled doctoral graduate respondents employed in the education sector 2003–2007

Data source: Graduate Prospects using DLHE surveys 2004, 2005, 2006, 2007, 2008 (© HESA)

Proportion of UK-domiciled doctoral graduate respondents employed as research staff in higher education by subject 2003–2007

The percentage of doctoral graduate respondents employed as research staff in HE institutions varies from 6% for theology to 43% for biochemistry, molecular biology and biophysics.

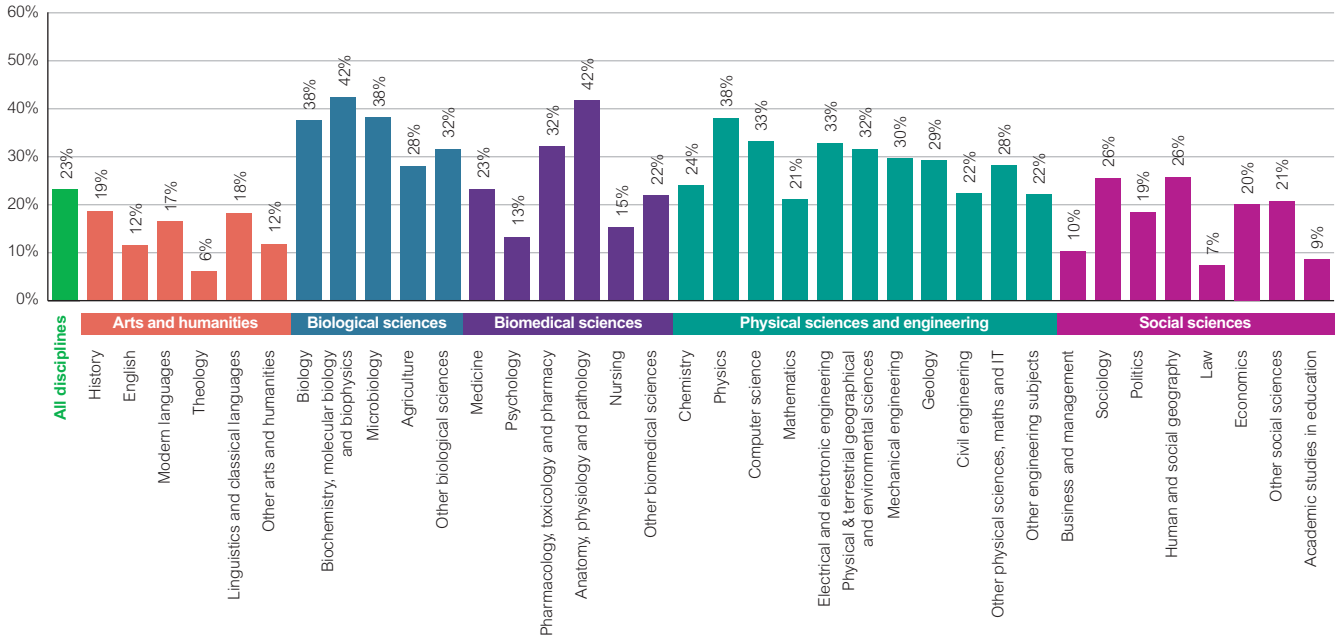

Figure 5: Percentage of UK-domiciled doctoral graduate respondents employed as research staff in HE 2003–2007

Proportion of UK-domiciled doctoral graduate respondents employed in teaching and lecturing in higher education by subject 2003–2007

The proportion of doctoral graduate respondents employed in teaching and lecturing in HE as a first destination varies from less than 1% in physics, chemistry and microbiology to 56% in law.

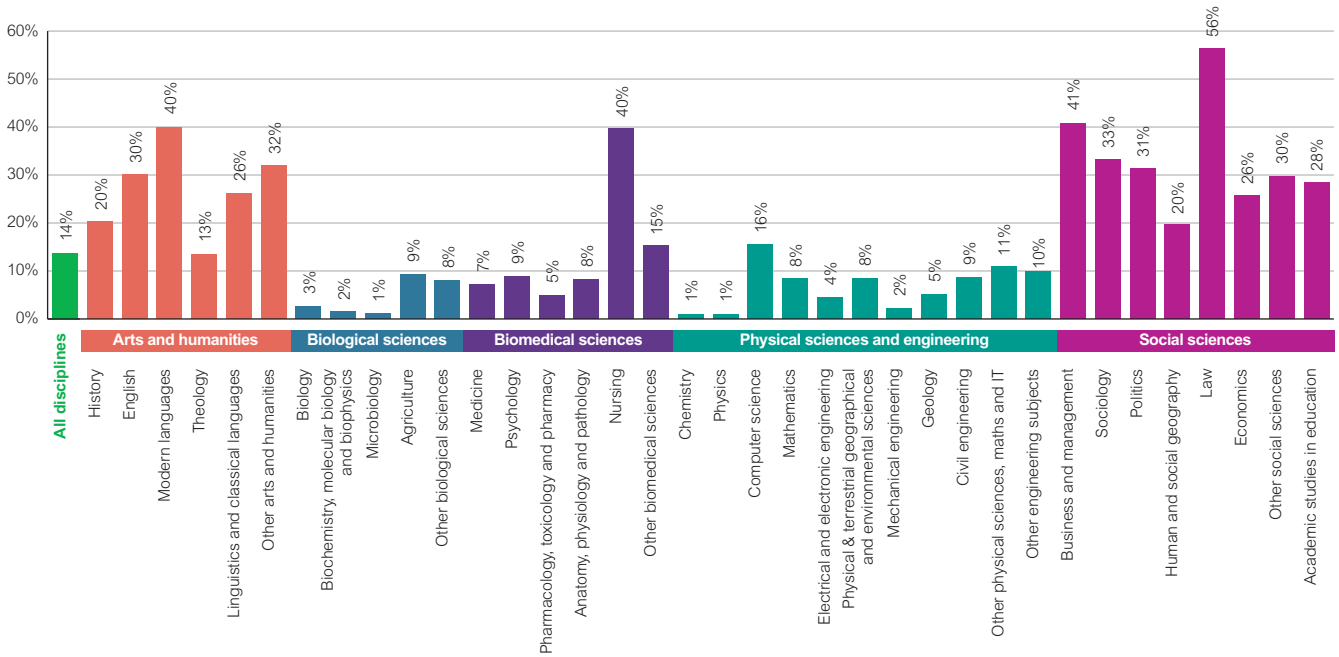

Figure 6: Percentage of UK-domiciled respondents employed in teaching and lecturing in HE 2003-2007

Data source: Graduate Prospects using DLHE surveys 2004, 2005, 2006, 2007, 2008 (© HESA)

Destinations of UK-domiciled doctoral graduates in all disciplines

Overall patterns of doctoral employment showed much consistency over the period 2003–2007. These patterns were set against an upward trend in the numbers of UK-domiciled doctoral graduates, which increased by 12% to 7875[1] in 2007 from a low of 7035 in 2004. UK-domiciled doctoral graduates as a percentage of the total cohort declined slightly, from 58% in 2003 to a low of 53% in 2006. The employment rate[2] for UK-domiciled doctoral graduates working in the UK was stable at 80–81%. The proportion working or studying overseas declined slightly. Unemployment among UK-domiciled doctoral graduates remained considerably lower than among first-degree graduates, and also consistently lower than that of masters graduates. Doctoral graduates continued to be employed in a wide range of occupations in all sectors of the UK economy: the concentrations of doctoral graduates in different occupations remained largely similar between 2003 and 2007. However, minor fluctuations at the 'all disciplines' level can mask larger variations at discipline group and subject level, as shown in later chapters.

Key statistics: the doctoral population

- Over 600 more UK-domiciled doctoral researchers graduated in 2007 (7875) than in 2003 (7270)
- UK-domiciled graduates formed 54% of 2007 doctoral graduates from UK universities compared with 58% in 2003
- The percentage of UK-domiciled female doctoral graduates increased steadily from 46% in 2003 to 48% in 2007
- Those graduating from part-time doctoral study ranged between 26% and 28% over the period 2003–2007

Key statistics: DLHE survey respondents

- Response rates rose from 65% (4695 respondents graduating in 2003) to 70% (5495 respondents graduating in 2007)
- 81% of 2007 UK-domiciled doctoral graduates entered employment or work with study in the UK
- 6% of 2007 UK-domiciled doctoral graduates chose to further their careers abroad, compared with 8% in 2003
- Unemployment rates at 3.1% for 2007 UK-domiciled doctoral graduates consistently remain lower compared with first-degree graduates (5.5%, 2007) and masters graduates (3.7%, 2007)

Looking in more detail at the UK-domiciled doctoral graduates 2003–2007 working in the UK[3]

- Half were employed[4] in the education sector: the balance in manufacturing, finance, business and IT, health, public administration and a wide range of other sectors
- Over one-third worked in research roles across all employment sectors
- 23% worked as research staff in higher education institutions (HEIs)
- 22% worked as education and teaching professionals across all sectors
- 14% were employed as lecturers in higher education

Doctoral graduate population from UK HEIs 2003–2007

Doctoral graduates from UK HEIs	2003	2004	2005	2006	2007	Total
Total doctoral graduates	12520	12170	12645	13195	14505	65440
UK-domiciled doctoral graduates	7270	7035	7080	7430	7875	36695
% UK-domiciled doctoral graduates	58%	58%	56%	53%	54%	56%
% Other EU-domiciled doctoral graduates	11%	11%	12%	12%	12%	12%
% Non EU-domiciled doctoral graduates	30%	31%	32%	35%	34%	32%

Table 1: Breakdown by domicile of all doctoral graduates from UK universities 2003–2007

Despite an increase in numbers there was a slight fall in the percentage of UK-domiciled doctoral graduates from 58% in 2003 to 54% in 2007. This was mainly due to the increase in numbers of non-EU domiciled doctoral graduates from 30% in 2003 to 34% in 2007. The proportion of other EU-domiciled doctoral graduates saw a small increase from 11 to 12% over the five-year period.

Characteristics of UK-domiciled doctoral graduates from UK HEIs

UK-domiciled doctoral graduates	2003	2004	2005	2006	2007	Total
Female	45%	46%	47%	49%	48%	46%
Male	55%	54%	53%	52%	52%	54 %
Full-time	73%	73%	72%	74%	74%	73%
Part-time	27%	27%	28%	26%	26%	27%

Table 2: Breakdown of all UK-domiciled doctoral graduates from UK universities 2003–2007 by gender and mode of study

Overall there has been an upward trend in the percentage of female doctoral graduates from 45% in 2003 to 48% in 2007. The percentage gaining their doctorate through part-time study has remained pretty stable at between 26–28%.

Response rate to the surveys

Table 3 presents the response rates and gender balance of UK-domiciled doctoral graduates graduating from UK universities in 2003–2007. It is encouraging to note the rising response rate between the first (65%) and last (70%) surveys. Response rates were representative in terms of mode of study, discipline and gender[5]. More information on response rates by discipline and subject is given in the discipline chapters.

1. For data protection, all figures have been rounded to the nearest five. Number and percentages may not total due to rounding.
2. The combined totals of respondents who 'entered work in the UK' and 'working and studying' (see Figure 1).
3. UK-domiciled respondents in the 'entered work in the UK' and 'working and studying' categories.
4. This includes both 'entered work in the UK' and 'working and studying in the UK'.
5. There was a 3% or less difference in response rates by type of study (full-time/part-time) and by gender. Response rates by discipline group varied between 62% and 66% (2003), increasing to between 68% and 70% (2007).

Data source: Graduate Prospects using DLHE surveys 2004, 2005, 2006, 2007, 2008 (© HESA)