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What do researchers do?

Doctoral graduate **destinations and impact three years on**

2010

First ever analysis of employment destinations and impact of doctoral graduates three years after graduation

- Benefits of doctoral study to employability and career progression
- Dominant occupational clusters of doctoral graduates, salaries and career satisfaction
- Use of knowledge, skills, experience and the impact of doctoral graduates in the workplace and beyond

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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Foreword

Research Councils UK (RCUK) is committed to attracting and training excellent researchers who can make an impact through world-class research and bring major benefits to the economic and social wellbeing of the UK. 'What do researchers do? Doctoral graduate destinations and impact three years on' is one of a series of projects within the RCUK 'Doctoral Careers Pathway Study', as referred to in Chapter 1, that explores how highly-skilled doctoral graduates create innovation and growth and contribute to UK society, culture and economy.

This new publication provides, for the first time, comprehensive evidence of the value of doctoral study to researchers, their employers and society at large. It identifies six distinct 'occupational clusters' of doctoral graduates and illustrates how these highly talented individuals contribute to innovation and knowledge transfer through using their knowledge, skills and experience in research and non-research roles across all employment sectors.

It is clear from this study that doctoral study enhances the quality of researchers' lives, increases their capacity to contribute to innovation and to make a real difference in the workplace – whether in academia or beyond.

'What do researchers do?' is a valuable resource to help inform policy making, particularly in the current challenging funding environment. I also strongly recommend it to current and prospective doctoral researchers to aid well-informed career choices and to employers looking for employees who can make a real difference to their organisations.

Professor Rick Rylance
Chief Executive, AHRC
RCUK Champion for Research Careers

Data source: Destinations of Leavers from Higher Education Longitudinal Survey 2004/05, 2009 (IES analysis)

At a glance

This section presents key indicators for each of the six 'occupational clusters' of doctoral graduates employed in the UK. More detailed information on constitution of the occupational clusters and the profile and experiences of doctoral graduate respondents working in each of the clusters and can be found in Chapters 4-6.

Doctoral graduates employed in 'HE research roles'

- 19% of doctoral graduate respondents were working in HE research roles three and half years after graduation down from 26% at six months after graduation
- Majority were very satisfied (32%) or fairly satisfied (59%) with their career to date
- Current job fitted into career career plans (78%) and/or type of work they wanted (71%)
- Median annual full time salary was £30,500 with 90% earning between £24,000 and £40,000
- Doctoral qualification was a formal requirement for current job for 81% of respondents, important for 17%
- Skills and competencies were formally required for current job for 50% of respondents, important for 48%

Doctoral graduates employed in HE research roles have the opportunity in their current job to:	Most of the time	Some of the time	Occasionally	Not at all
Conduct research	88.4%	7.2%	2.5%	1.9%
Draw on the detailed knowledge of research degree	54.3%	31.6%	10.9%	3.3%
Use general disciplinary knowledge	74.9%	19.9%	3.9%	1.2%
Use the research skills developed as a doctoral researcher	77.8%	18.2%	2.5%	1.5%
Use the generic skills developed as a doctoral researcher	74.7%	21.3%	3.0%	1.1%
Work autonomously	65.8%	31.5%	1.8%	0.9%
Work as part of a team	30.1%	56.6%	10.8%	2.4%
Have responsibility for supervising the work of others	20.7%	42.6%	23.2%	13.5%

Doctoral study has enabled respondents working in HE research roles to:	A great extent	Some extent	Not at all	Don't know
Be innovative in the workplace	48.9%	46.8%	2.6%	1.7%
Make a difference in the workplace	38.7%	55.6%	4.2%	1.4%
Progress towards long term career aspirations	62.4%	34.1%	2.0%	1.5%
Enhance social and intellectual capabilities beyond employment	34.9%	50.0%	12.7%	2.4%
Enhance their quality of life generally	34.4%	53.7%	10.0%	1.8%

Doctoral graduates employed in 'non-HE research roles'

- 13% of doctoral graduate respondents were working in non-HE research roles three and half years after graduation slightly down from 15% six months after graduation
- Majority are very satisfied (35%) or fairly satisfied (57%) with their career to date
- Current job fitted into career career plans (68%) and/or type of work they wanted (65%)
- Median annual full time salary was £30,000, with 90% earning between £22,000 and £50,000
- Doctoral qualification was a formal requirement for current job for 51% of respondents, important for 35%
- Skills and competencies were formally required for current job for 46% of respondents, important for 49%

Doctoral graduates employed in research roles outside of HE have the opportunity in their current job to:	Most of the time	Some of the time	Occasionally	Not at all
Conduct research	53.5%	26.8%	11.4%	8.3%
Draw on the detailed knowledge of research degree	31.2%	38.5%	15.7%	14.5%
Use general disciplinary knowledge	67.0%	27.7%	5.0%	0.4%
Use the research skills developed as a doctoral researcher	60.8%	27.0%	8.4%	3.8%
Use the generic skills developed as a doctoral researcher	66.7%	27.8%	5.5%	0.0%
Work autonomously	48.8%	44.6%	5.1%	1.5%
Work as part of a team	44.4%	46.9%	7.7%	1.0%
Have responsibility for supervising the work of others	25.0%	42.0%	19.7%	13.3%

Doctoral study has enabled respondents working in research roles outside of HE to:	A great extent	Some extent	Not at all	Don't know
Be innovative in the workplace	50.9%	45.2%	3.2%	0.7%
Make a difference in the workplace	49.3%	47.0%	2.6%	1.1%
Progress towards long term career aspirations	47.4%	44.1%	4.8%	3.7%
Enhance social and intellectual capabilities beyond employment	29.8%	57.8%	9.8%	2.6%
Enhance their quality of life generally	29.8%	55.9%	11.6%	2.7%

Data source: Destinations of Leavers from Higher Education Longitudinal Survey 2004/05, 2009 (IES analysis)

At a glance

Doctoral graduates employed in 'HE teaching and lecturing roles'

- 22% of doctoral graduate respondents were working in HE teaching and lecturing roles three and half years after graduation up from 17% six months after graduation
- Majority are very satisfied (58%) or fairly satisfied (37%) with their career to date
- Current job fitted into career career plans (87%) and/or type of work they wanted (76%)
- Median annual full time salary was £38,000, with 90% earning between £30,000 and £60,000
- Doctoral qualification was a formal requirement for current job for 63% of respondents, important for 30%
- Skills and competencies were formally required for current job for 51% of respondents, important for 44%

Doctoral graduates employed in HE teaching and lecturing roles have the opportunity in their current job to:	Most of the time	Some of the time	Occasionally	Not at all
Conduct research	36.2%	44.4%	15.0%	4.4%
Draw on the detailed knowledge of research degree	46.6%	40.6%	9.3%	3.5%
Use general disciplinary knowledge	77.3%	20.0%	2.5%	0.2%
Use the research skills developed as a doctoral researcher	59.8%	35.2%	3.7%	1.3%
Use the generic skills developed as a doctoral researcher	66.5%	29.1%	3.8%	0.6%
Work autonomously	70.9%	28.5%	0.4%	0.2%
Work as part of a team	31.4%	55.4%	10.2%	3.0%
Have responsibility for supervising the work of others	36.5%	44.3%	12.0%	7.2%

Doctoral study has enabled respondents working in HE teaching and lecturing roles to:	A great extent	Some extent	Not at all	Don't know
Be innovative in the workplace	46.5%	47.1%	4.2%	2.1%
Make a difference in the workplace	40.4%	52.9%	4.5%	2.2%
Progress towards long term career aspirations	66.1%	28.5%	2.9%	2.6%
Enhance social and intellectual capabilities beyond employment	45.8%	45.4%	6.7%	2.1%
Enhance their quality of life generally	47.8%	43.3%	5.5%	3.4%

Doctoral graduates employed in 'teaching roles outside HE'

- 6% of doctoral graduate respondents were working in non-HE teaching roles three and half years after graduation unchanged from six months after graduation
- Majority are very satisfied (48%) or fairly satisfied (49%) with their career to date
- Current job fitted into career career plans (73%) and/or type of work they wanted (70%)
- Median annual full time salary was £30,000, with 90% earning between £20,000 and £57,000
- Doctoral qualification was a formal requirement for current job for 41% of respondents, important for 25%
- Skills and competencies were formally required for current job for 29% of respondents, important for 58%

Doctoral graduates employed in teaching roles outside HE have the opportunity in their current job to:	Most of the time	Some of the time	Occasionally	Not at all
Conduct research	19.0%	19.6%	21.5%	39.9%
Draw on the detailed knowledge of research degree	18.3%	30.9%	16.7%	34.1%
Use general disciplinary knowledge	59.0%	24.6%	8.5%	7.9%
Use the research skills developed as a doctoral researcher	29.0%	37.4%	19.5%	14.0%
Use the generic skills developed as a doctoral researcher	46.6%	42.8%	5.8%	4.7%
Work autonomously	60.5%	32.9%	4.0%	2.5%
Work as part of a team	47.6%	39.3%	2.9%	10.2%
Have responsibility for supervising the work of others	52.7%	20.9%	17.9%	8.5%

Doctoral study has enabled respondents working in teaching roles outside HE to:	A great extent	Some extent	Not at all	Don't know
Be innovative in the workplace	46.5%	42.1%	9.2%	2.2%
Make a difference in the workplace	35.2%	48.8%	11.7%	4.3%
Progress towards long term career aspirations	24.4%	48.8%	17.2%	9.5%
Enhance social and intellectual capabilities beyond employment	46.6%	40.9%	11.8%	0.7%
Enhance their quality of life generally	35.3%	54.7%	8.6%	1.4%

Data source: Destinations of Leavers from Higher Education Longitudinal Survey 2004/05, 2009 (IES analysis)

Doctoral graduates employed in 'other common doctoral occupations'

- 27% of doctoral graduate respondents were working in other common doctoral occupations three and half years after graduation up from 22% six months after graduation
- Majority are very satisfied (56%) or fairly satisfied (40%) with their career to date
- Current job fitted into career career plans (76%) and/or type of work they wanted (65%)
- Median annual full time salary was £38,000, with 90% earning between £24,000 and £90,000
- Doctoral qualification was a formal requirement for current job for 31% of respondents, important for 40%
- Skills and competencies were formally required for current job for 45% of respondents, important for 46%

Doctoral graduates employed in 'other common doctoral occupations' have the opportunity in their current job to:	Most of the time	Some of the time	Occasionally	Not at all
Conduct research	16.1%	27.8%	35.7%	20.4%
Draw on the detailed knowledge of research degree	20.5%	33.2%	22.0%	24.3%
Use general disciplinary knowledge	59.6%	28.1%	8.3%	4.0%
Use the research skills developed as a doctoral researcher	27.3%	43.8%	21.8%	7.0%
Use the generic skills developed as a doctoral researcher	49.0%	40.3%	9.1%	1.7%
Work autonomously	50.9%	42.0%	5.8%	1.3%
Work as part of a team	48.3%	45.3%	6.4%	0.0%
Have responsibility for supervising the work of others	38.7%	34.1%	17.9%	9.2%

Doctoral study has enabled respondents working in 'other common doctoral occupations' to:	A great extent	Some extent	Not at all	Don't know
Be innovative in the workplace	43.9%	49.4%	3.5%	3.2%
Make a difference in the workplace	40.1%	52.9%	4.5%	2.5%
Progress towards long term career aspirations	43.2%	45.1%	7.8%	3.8%
Enhance social and intellectual capabilities beyond employment	39.8%	45.5%	11.5%	3.2%
Enhance their quality of life generally	37.8%	49.4%	10.5%	2.4%

Doctoral graduates employed in 'other occupations'

- 14% of doctoral graduate respondents were working in other occupations three and half years after graduation a similar proportion to six months after graduation (15%)
- Majority are very satisfied (40%) or fairly satisfied (48%) with their career to date
- Current job fitted into career career plans (59%) and/or type of work they wanted (54%)
- Median annual full time salary was £32,000, with 90% earning between £18,200 and £66,600
- Doctoral qualification was a formal requirement for current job for 22% of respondents, important for 39%
- Skills and competencies were formally required for current job for 41% of respondents, important for 44%

Doctoral graduates employed in 'other occupations' have the opportunity in their current job to:	Most of the time	Some of the time	Occasionally	Not at all
Conduct research	17.2%	23.4%	25.3%	34.1%
Draw on the detailed knowledge of research degree	19.7%	20.1%	26.0%	34.2%
Use general disciplinary knowledge	47.6%	25.6%	14.1%	12.7%
Use the research skills developed as a doctoral researcher	25.2%	34.3%	23.7%	16.7%
Use the generic skills developed as a doctoral researcher	43.7%	36.5%	13.8%	6.0%
Work autonomously	54.8%	38.9%	4.0%	2.3%
Work as part of a team	40.5%	43.0%	9.2%	7.3%
Have responsibility for supervising the work of others	30.1%	28.6%	22.3%	19.0%

Doctoral study has enabled respondents working in 'other occupations' to:	A great extent	Some extent	Not at all	Don't know
Be innovative in the workplace	41.6%	40.3%	13.1%	5.0%
Make a difference in the workplace	31.7%	49.8%	14.1%	4.5%
Progress towards long term career aspirations	29.0%	46.6%	21.7%	2.6%
Enhance social and intellectual capabilities beyond employment	42.0%	41.5%	12.3%	4.2%
Enhance their quality of life generally	36.6%	48.5%	11.2%	3.7%

Data source: Destinations of Leavers from Higher Education Longitudinal Survey 2004/05, 2009 (IES analysis)

1 Introduction

1.1 Key statistics

- In 20004/5, 15,780 doctoral researchers graduated from UK HEIs. 61% were UK-domiciled, 13% from the rest of the EU, and 26% were international researchers.
- 2,073 doctoral graduates from 2005 responded to a longitudinal survey (L DLHE) survey approximately three and a half years after graduating (November 2008).
- The 45% response rate to the L DLHE provided a sample of the total cohort that was robust and representative in terms of gender, discipline, age, mode of study, ethnicity.

'What do researchers do? Doctoral graduates' destinations and impact three years on' reports on the findings of the career outcomes and perceived impact of doctoral graduates approximately three and a half years after graduation. It forms part of a wider investigation led by the Research Councils UK (RCUK) and supported by Vitae to explore and track the career pathways of doctoral graduates and to inform policy development directed at supporting and training future doctoral graduates.

1.2 Background and context

A supply of highly skilled researchers and a world class research base is critical to driving the economic prosperity and international competitiveness of the UK.

'Cutting-edge research conducted by postgraduates in our world-leading research centres contributes significantly to the health of the UK research base. The UK delivers 8% of the world research output, is second only to the US in a number of research disciplines and first amongst the G8 for research productivity. The talent developed in our postgraduate education system is critical to maintaining this success. The advanced knowledge and capability of postgraduates are highly prized by business and the public sector. The skills of postgraduates, especially researchers, are critical for tackling major business challenges and driving innovation and growth. The UK's ability to provide people skilled to this level is an important factor in attracting global businesses to locate high-value operations here'

One Step Beyond: Making the most of postgraduate education sector, BIS, 2010

Recently there has been increasing focus on identifying the value of developing postgraduate researchers and their contribution to wider economic, social and cultural impacts[1]. The application of knowledge and skills of highly skilled individuals can lead to better policy making, enhanced economic growth, and improvements in the health and welfare of the population. Some of these outcomes may be quantified, such as greater wealth and increased revenue, but others are more difficult to measure such as the effects on the environment, public health and the quality of life. Many of these benefits may take a decade or more before they become visible.

Much of the existing research into the value of doctoral graduates has been directed at the economic value or impact, in some cases this has been reduced to evidence of earnings premia. This is a particularly inappropriate methodology for doctoral graduates. With so many working in higher education, although salary is important, it is more associated with an acceptable quality of life than a strong career driver or indicator of value/impact[2].

Casey[3] takes an economic perspective to explore the impact of doctorates, in particular what is a doctorate worth and what is the justification for society to subsidise the production of doctorates. However, he also moves beyond individual returns to suggest wider societal and economic returns. He suggests that in training doctorates there is a high potential for spillover effects, knowledge is generated that can benefit society (research as a public good); and that doctoral graduates help boost the productivity of those with whom they work and beyond.

1.2.1 Changing environment

Institutions are responding to the need to sustain the supply of researchers, and prepare individuals for working within a global research environment and wider employment.

Greater focus has been placed on the professional development of doctoral researchers, their employability and career development, enabled by the funding flowing from the Roberts' Review[4]. Institutions have integrated professional and career development into the overall researcher experience.

'Doctoral programmes in the UK have traditionally included training in research skills, particularly those most relevant to research in individual disciplines or fields of study. But this new skills agenda seeks to go much further and embraces broader generic personal and professional skills that are transferable to a range of different career paths, within and beyond research'

(Redefining the doctorate, 2007[5])

1.2.2 Project background

The UK Research Councils are committed to enhancing the quality and output of the UK research base through training the next generation of world-class researchers. They aim to increase the attractiveness and sustainability of research careers in the UK and to improve the quantity, quality and impact of research for the benefit of UK society and the economy[6].

1 Warry, Increasing the economic impact of Research Councils, 2006

2 Ackers L, Gill B, Groves K, Oliver K (2006) Assessing the Impact of the Roberts' Review. Enhanced Stipends and Salaries on Postgraduate and Postdoctoral Positions, CSLPE

3 Bernard Casey, (2009), The economic contribution of PhDs, Journal of Higher Education Policy and Management, 31:3, 210-227

4 Gareth Roberts, SET for Success, 2002 http://webarchive.nationalarchives.gov.uk/+/http://www.hm-treasury.gov.uk/set_for_success.htm

5 Park C (2007) Redefining the Doctorate, Discussion Paper, Higher Education Academy

6 RCUK Research Careers and Diversity Strategy www.rcuk.ac.uk/rescareer/strategy.htm and the Concordat to Support the Career Development of Researchers www.researchconcordat.ac.uk

Data source: Destinations of Leavers from Higher Education Longitudinal Survey 2004/05, 2009 (IES analysis)

To understand the experience, value and impact of doctoral training the UK Research Councils have commissioned the 'Doctoral Career Pathways Study'[7]. This aims to establish the extent to which doctoral training and support helps to drive forward innovation and growth and to better understand the career paths of doctoral graduates.

The 'Doctoral Career Pathways Study' also aims to establish the extent to which doctoral graduates help to drive forward innovation and growth and thereby contribute to UK society, culture and economy; and provide evidence of the contribution made by these highly qualified recruits to the labour market.

The study is conceived as a suite of projects. The first, undertaken by the Institute for Employment Research (Options Analysis Project)[8], explored the options for collecting data on the early careers of doctoral graduates. This recommended that initial statistical information should be gathered through an enhancement to the Higher Education Statistics Agency (HESA) Longitudinal survey of the Destinations of Leavers of Higher Education (L DLHE).

This report presents the findings from the second stage of the Study: a statistical analysis of the enhanced 2008 L DLHE survey data, on the outcomes of doctoral graduates qualifying in 2004/05. It also begins to gather evidence of the potential impact of these individuals on the economy and wider aspects of society and culture in the UK. The survey data was supplemented by communication with key stakeholders and a small number of research postgraduates.

Further stages of the 'Doctoral Career Pathways Study' include developing methods to enrich and illustrate the statistical data through case studies and narrative career profiles, gathering employer views, and exploring ways to track a sample of doctoral graduates over a period of 5-10 years to build a dataset of longer term career paths. The findings from this report will inform the medium to long term development of future stages.

1.2.3 Mapping researcher careers

Until this report, the most comprehensive indication of doctoral graduates' destinations has come from analysis of first destinations surveys (DLHE) of UK-domiciled[9] and rest of EU doctoral graduates[10]. In addition there have been a number of studies commissioned by individual Research Councils[11] that have tracked discipline specific cohorts to provide insights into different career choices and outcomes over time. Other research (summarised in Raddon and Sung, 2009) has found that the majority of doctoral graduates are generally satisfied with their careers, and wish to stay in their respective fields.

This report provides new insights into the careers of doctoral graduates. For the first time the views, experiences and careers of doctoral graduates are explored approximately three and a half years following graduation.

'What do researchers do? Doctoral graduates destinations and impact three years on' presents:

- analysis of the 2008 L DLHE data for UK-domiciled and rest of the EU doctoral graduates who qualified in 2004/05, including cross-cutting analysis by five disciplinary groups
- the experiences of doctoral study, including the motivations to undertake doctoral study, the types of activities undertaken during study, and reflections on choices for study and value for money
- the landscape of doctoral employment, including employment rates, occupations and employment sectors, salaries and types of contract and career satisfaction
- the introduction of 'occupational clusters'; exploring the main employment characteristics of doctoral graduates working in six common occupational groupings both within and outside academia
- how far doctoral graduates engage in research activity, use their knowledge and skills, and work with others within their current employment
- the extent to which doctoral study has enabled doctoral graduates to make an impact in their employment, career aspirations and quality of life
- key conclusions and next steps.

1.3 Survey and methodology

This report uses data from both the Destinations of Leavers from Higher Education (DLHE) survey and the follow-up L DLHE survey to better understand the early career pathways of doctoral graduates. The DLHE survey is a census-based graduate survey that explores destinations approximately six months[12] after graduation of UK and EU domiciled graduates at all UK higher education institutions. The L DLHE survey is a sample based follow-up survey of DLHE respondents that provides details of individual career progression over time and asks graduates about their careers and choices approximately three and a half years[13] after graduating. The most recent L DLHE in November 2008, targeting those graduating in 2004/05, was enhanced to allow more focused analysis of doctoral graduates. This involved: surveying all eligible doctoral graduates, work to improve institutions' contact details and therefore response rates, and a new section of the questionnaire aimed specifically at doctoral graduates. This new section explores reasons for undertaking a research degree, skills and activities in undertaking research study, impact of the research degree and perceptions of achievement.

In total, 5,587 2004/05 postgraduate researchers who responded to DLHE were contacted and invited to take part in the L DLHE survey. Of these, 2,501 responded providing a response rate of 45%. The final survey dataset available for analysis included 2,073 doctoral graduates and 428 research masters qualifiers[14].

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7 Building Evidence of Researchers' Impact www.rcuk.ac.uk/rescareer/rcdu/impact.htm

8 Purcell K, Elias P, Tzanakou C (2008) Doctoral Career Pathways, Skills and Training: Options Analysis for the Collection of Information About the Early Careers of UK Doctoral Graduates, IER/RCUK

9 Vitae, What do researchers do? series and UK GRAD Programme, What Do PhDs Do? series www.vitae.ac.uk/wdrd

10 Currently the DLHE surveys do not cover international researchers. BIS have commissioned a study to assess the feasibility of including international graduates in future DLHE surveys. www.i-graduate.org/services/international_student_tracking_study.html

11 Vitae, What do researchers do? First destinations of doctoral graduates by subject, 2010, Resources and publications, p53

12 Higher Education Statistics Agency (HESA) www.hesa.ac.uk

13 The L DLHE survey captures activity at 24 November 2008, and in line with HESA terminology is deemed to represent a time period of approximately three and a half years after completion but in reality may be up to four and a half years after completion.

14 Due to the small sample size of research masters graduates, there has been no further detailed analysis of the experiences and outcomes of this group. However, outcomes of all masters graduate, and 1st and 2.1 first degree graduate respondents are provided where appropriate as a comparison to doctoral graduate respondent outcomes.

Data source: Destinations of Leavers from Higher Education Longitudinal Survey 2004/05, 2009 (IES analysis)

1.3.1 Analysis

To aid in the analysis of doctoral outcomes, data collected from the initial DLHE survey and from the Student Record was linked to the L DLHE data at an individual level. This allowed for detailed analysis of doctoral graduates from different backgrounds and study experiences – particularly taking account of home domicile and discipline. In addition, further work was undertaken to re-code the doctoral dataset using the verbatim responses given in the survey to clarify the occupations and industry sectors of the doctoral cohort[15]. The final overall dataset was weighted by the survey contractor to correct for selection and response bias to bring it into line with the initial DLHE respondent profile. All proportions quoted in this report are quoted as weighted data, following HESA guidelines. All totals are given as un-weighted bases[16].

In addition a new categorisation of 'occupational cluster' has been developed using the Labour Force Survey[17] to explore the extent to which doctoral graduates within the general population are working in 'doctoral rich' occupations and sectors. The cluster categories are: HE research occupations; HE teaching and lecturing professionals; non-HE research occupations; other teaching occupations; and other common doctoral occupations (occupations with a relatively high density and/or volume of doctoral graduates). The remainder of doctoral respondents roles were combined under a cluster called 'other occupations'.

1.3.2 Gathering qualitative feedback

To support the quantitative analysis of destinations data (DLHE and L DLHE), a small number of interviews (21) with those involved in the training and funding of postgraduate researchers ('stakeholders')[18] and focus groups (5) with doctoral graduates[19] were undertaken (see Methodology).

Discussions with stakeholders explored: expectations of doctoral students and graduates and the challenges they face in the labour market; views on the dominant career paths of doctoral graduates and what is regarded as a positive outcome; factors influencing outcomes and pathways;views on the added value of a doctorate in academia and in other sectors, and the impact of doctoral graduates on the economy, society and culture.

Discussions with doctoral graduates were intended to ascertain how effectively the L DLHE survey was able to capture doctoral career pathways and experiences, to provide feedback on how the survey could be improved, and to gain doctoral graduates' perspectives on the impact of their research experiences. However the discussions also provided rich detail on actual career experiences.

Together the stakeholder interviews and doctoral graduate focus groups provide useful insights and perspectives into the careers of doctoral graduates and the impact they have. These insights are presented, where relevant, alongside the quantitative survey data.

1.4 The sample: demographics and representativeness

In 2005 there were almost 90,000[20] registered doctoral researchers studying in the UK, and 15,780[21] doctoral qualifications were awarded that year (Table 1.1). Of these 'graduations' only UK-domiciled (9,640) and rest of EU domiciled doctoral graduates (2,065) were eligible for the initial DLHE survey. The 5,409 doctoral graduates who responded to the initial DHLE survey constituted the population for the L DLHE survey.

Table 1.1: Registered doctoral researchers (all years) and graduations from UK HEIs

	2000/01	2001/02	2002/03	2003/04	2004/05	2005/06	% change 2000/01 to 2005/06
UK domiciled	53196	52606	52283	53150	52945	53675	0.9%
Rest of EU	9276	9369	9534	9896	11071	11705	26.2%
Non-EU	20307	21142	22642	24443	25376	26438	30.2%
(N)	*82779*	*83117*	*84459*	*87489*	*89392*	*91818*	*10.9%*
Graduations	14120	14205	14870	15255	15780	16515	17.0%

Additional source: Table 1.11a Higher Degrees: Postgraduate Study in the UK 2000/01 to 2005/06, p18; Table 2.1 Doctoral Career Pathways, Skills and Training: Options Analysis for the Collection of Information About the Early Careers of UK Doctoral Graduates, p2

[15] The re-coding improved the proportion and accuracy of coded responses for SICs and SOCs. It should be noted that findings reported here for occupation and sector will differ from any reported by HESA. For more information see Purcell K, Elias P, Lyonette C, Tzanakou C (2010) Research degree holders in the Longitudinal Survey of the Destinations of 2004/05 Leavers from Higher Education: Survey data validation L-DLHE non-respondent survey and qualitative follow-up pilot interviews: Report to RCUK)

[16] For data protection, all base numbers, have been rounded to the nearest five. Number and percentages may therefore not total due to rounding

[17] Labour Force Survey, Office for National Statistics www.statistics.gov.uk/statbase/Source.asp?vlnk=358&More=Y. For a full description of how clusters have been derived using aggregate quarterly Labour Force Survey data from July 2005 to July 2008 and What do researchers do? definitions of research staff see the Methodology www.vitae.ac.uk/wdrdmethodology

[18] These individuals represented a number of key organisations including individual Research Councils; university and HE interest groups; Government Departments; HE careers advisors; and the professions traditionally entered into by doctoral graduates

[19] Five focus groups were held during August 2009 in London (2), Scotland, the West Midlands and the North West. 25 doctoral graduates took part from different disciplines, ages, gender, and with different previous experiences and subsequent career paths across all sectors. These were not designed to be representative but instead to begin to gather qualitative data from a range of doctoral graduates who had completed the L DLHE survey and to understand possible interpretations and appropriateness of the L DLHE survey questions

[20] Artess J, Ball C, Mok P (2008) Higher Degrees: Postgraduate Study in the UK 2000/01 to 2005/06

[21] Purcell K, Elias P, Tzanakou C (2008) Doctoral Career Pathways, Skills and Training: Options Analysis for the Collection of Information About the Early Careers of UK Doctoral Graduates, IER/RCUK

Data source: Destinations of Leavers from Higher Education Longitudinal Survey 2004/05, 2009 (IES analysis)

After weighting, the doctoral graduate respondents to the L DLHE compare well with known parameters of the overall doctoral population, both those responding to the initial DLHE survey and all 2004/05 doctoral graduates, in terms of gender, domicile, age, mode of study, ethnicity and discipline (Table 1.2). There is however, a slight over-representation in biomedical sciences (Table 1.3). Overall, this provides a high level of confidence that the responses from doctoral graduates gathered through the L DLHE survey and presented in this report are both robust and representative.

Table 1.2: Characteristics of doctoral graduates from UK HEIs

	L DLHE respondents (2008)	DLHE respondents (2005)	Graduations (all domiciles) (2004/05)
UK-domiciled	87.8%	86.3%	61.1%
Rest of EU domiciled	12.2%	13.7%	13.1%
Non-European domiciled	na	na	25.8%
Gender			
Male	51.2%	53.1%	56.7%
Female	48.8%	46.9%	43.3%
Age[1]			
Under 30 years	17.1%	15.4%	nk
30-34 years	42.4%	43.2%	nk
35-39 years	14.8%	15.8%	nk
40-49 years	12.9%	14.2%	nk
50-59 years	8.7%	7.5%	nk
60+ years	4%	4%	nk
Disability status			
Disabled	5.2%	4.8%	nk
No known disability	94.8%	95.2%	nk
(N)	*1990*	*5215*	
Ethnicity			
White	92.6%	92.4%	nk
Black and minority ethnic	7.4%	7.6%	nk
(N)	*1750*	*4150*	
Mode of study			
Full-time	72.5%	74.3%	76.3%
Part-time	27.5%	25.7%	23.7%
(N)	*2075*	*5410*	*15775*

[1] Age at date of L DLHE survey (November 2008) calculated from date of birth

Additional source: Students in Higher Education Institutions 2004/05, 2006 (Table 13a & 14)

Table 1.3: Disciplinary profile of all doctoral graduate respondents

Discipline	L DLHE (2008)	WDRD (2005)	Graduations (2004/05) (all domiciles)
Arts and humanities	11.1%	12.8%	13.8%
Biological sciences	13.4%	14.0%	12.7%
Biomedical sciences	26.3%	27.3%	20.9%
Physical sciences and engineering	33.0%	31.9%	35.2%
Social sciences	11.9%	9.8%	13.2%
Other[1]	4.2%	4.2%	4.1%
Total	*2075*	*4880*	*15780*

[1] 'Other' disciplines tend to be education. Due to the small size of this group it has not been separated out in any disciplinary analysis

Additional source: WDRD Trends, 2007, UK-domiciled respondents to DLHE by discipline (2005)

2 Experiences of doctoral study

2.1 Key statistics

- Reasons for doctoral study are dominated by interest in the subject (89%) and interest in research (85%), across all disciplines. A desire to broaden career prospects generally (59%) was also important.
- During their doctoral research study respondents work alone to a great extent (90%); but 82% collaborate to some extent within their broad discipline, 53% collaborate across other disciplines, and 69% communicate with others beyond the research community at least to some extent.
- 86% of respondents felt their doctoral study involved the development of cross-disciplinary skills and knowledge at least to some extent.
- Respondents were generally satisfied with their doctoral study. Less than 5% would do things differently; the majority (78%) felt their course had been 'good value for money'.
- Generally satisfaction levels with their degree were higher amongst doctoral graduates than masters and first degree graduates.

2.2 Reflection on higher education choices

Doctoral graduate respondents were generally satisfied with their choices and experiences of doctoral study (Table 2.1). The vast majority felt they would make the same choices and very few felt that if they were to make their choices again they would do things differently. Doctoral graduate respondents were more certain of their choices than first degree and masters respondents.

13% of doctoral graduate respondents felt it was very likely (3%) or likely (10%) that they would choose to study at a different institution, compared with 18% of first degree graduate respondents or 17% of masters respondents.

12% of doctoral graduate respondents felt it was very likely (5%) or likely (7%) that they would choose to study a different subject, compared with 26% of first degree graduate respondents or 19% of masters respondents.

7% of doctoral graduate respondents felt it was very likely (2%) or likely (5%) that they would choose to work towards a different type of qualification, compared with 14% of first degree graduate respondents or 15% of masters respondents. 13% of doctoral graduate respondents felt it was very likely (4%) or likely (9%) that they would do something other than a doctoral degree.

There was little difference in responses across the disciplines (Table 2.2). However there was an indication that arts and humanities and social sciences doctoral graduates were marginally more decided about their choices than those from biological or from physical sciences and engineering disciplines.

Table 2.1: Likelihood of all doctoral graduate respondents of making different choices about higher education by level of qualification

	Very likely	Likely	Not very likely	Not likely at all	Don't know	(N)
Different subject						
Doctoral graduates	4.5%	7.4%	25.5%	60.9%	1.8%	*2040*
Masters graduates	7.6%	11.2%	25.8%	53.8%	1.6%	*4695*
First degree graduates (1st/2:1)	10.0%	15.6%	27.4%	44.9%	2.1%	*15835*
Different institution						
Doctoral graduates	3.2%	10.2%	33.2%	49.9%	3.5%	*2025*
Masters graduates	4.3%	12.3%	33.0%	45.9%	4.4%	*4690*
First degree graduates (1st/2:1)	4.6%	13.1%	31.9%	47.0%	3.3%	*15810*
Different type of qualification						
Doctoral graduates	2.1%	4.4%	19.9%	72.0%	1.7%	*2030*
Masters graduates	5.2%	9.9%	29.2%	53.2%	2.4%	*4685*
First degree graduates (1st/2:1)	4.4%	9.6%	28.1%	55.1%	2.9%	*15800*
Do something else						
Doctoral graduates	3.4%	9.1%	24.4%	59.6%	3.5%	*2030*
Masters graduates	2.8%	7.6%	27.9%	57.6%	4.2%	*4680*
First degree graduates (1st/2:1)	2.1%	6.4%	26.7%	60.8%	4.0%	*15785*

Data source: Destinations of Leavers from Higher Education Longitudinal Survey 2004/05, 2009 (IES analysis)

2.2.1 Value for money

Approximately three-quarters (78%) of doctoral graduate respondents who expressed an opinion felt that their course had been value for money (44% in strong agreement; 34% in agreement). There appeared to be relatively little difference in respondents' views by discipline (Table 2.4). Doctoral graduate respondents from biological sciences disciplines appeared to be marginally less likely to strongly agree that their course represented good value for money.

Doctoral graduate respondents were considerably more likely to strongly agree (42%) that their course represented good value for money than first degree (24%) and master (31%) respondents (Table 2.3).

Focus group discussions indicated the factors doctoral graduates take into account when assessing value for money. These included source of funding, quality of supervisor, relationship with supervisor, university facilities and also opportunity costs and proximity to career goals.

Overall, the high levels of satisfaction correspond with the results of the Postgraduate Research Experience Survey (PRES)[22], which is run during the doctoral study. PRES shows four out of five postgraduate research respondents rating their doctoral experience as having met or exceeded their expectations.

Table 2.2: Likelihood of all doctoral graduate respondents making different choices about higher education by discipline (excludes 'don't knows')

	Very likely	Likely	Not very likely	Not likely at all	(N)
Different subject (All)	4.6%	7.5%	26.0%	62.0%	*2005*
Arts and humanities	4.0%	7.7%	16.8%	71.5%	*245*
Biological sciences	7.9%	6.7%	29.4%	55.9%	*270*
Biomedical sciences	3.1%	7.1%	26.8%	63.0%	*460*
Physical sciences and engineering	4.1%	9.0%	27.3%	59.6%	*670*
Social sciences	5.3%	5.0%	25.3%	64.4%	*250*
Different institution (All)	3.3%	10.6%	34.4%	51.7%	*1950*
Arts and humanities	3.0%	10.1%	30.0%	56.9%	*240*
Biological sciences	3.8%	11.0%	39.4%	45.9%	*260*
Biomedical sciences	2.5%	11.8%	33.9%	51.8%	*455*
Physical sciences and engineering	3.4%	9.4%	36.8%	50.3%	*655*
Social sciences	3.7%	12.0%	30.5%	53.9%	*235*
Different type of qualification (All)	2.1%	4.5%	20.2%	73.2%	*2000*
Arts and humanities	2.1%	4.9%	17.5%	75.5%	*245*
Biological sciences	5.2%	6.7%	22.5%	65.6%	*270*
Biomedical sciences	2.0%	4.1%	21.1%	72.8%	*460*
Physical sciences and engineering	1.5%	4.2%	21.5%	72.7%	*670*
Social sciences	0.7%	2.6%	16.5%	80.3%	*245*
Do something else (All)	3.6%	9.5%	25.2%	61.7%	*1955*
Arts and humanities	2.5%	7.2%	23.9%	66.3%	*235*
Biological sciences	4.2%	8.6%	28.6%	58.6%	*265*
Biomedical sciences	3.8%	9.9%	25.4%	60.8%	*455*
Physical sciences and engineering	3.7%	11.5%	26.4%	58.4%	*660*
Social sciences	3.4%	7.6%	20.4%	68.6%	*240*

Table 2.3: Comparison of level of agreement of graduate respondents that 'my course was good value for money' by level of qualification

Agreement/disagreement	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree	Don't know	(N)
Doctoral graduates	41.8%	33.0%	16.0%	4.2%	1.2%	3.9%	*2055*
Masters graduates	31.4%	43.8%	15.4%	6.9%	1.6%	0.9%	*4475*
First degree graduates (1st/2:1)	23.7%	45.1%	19.0%	8.4%	2.4%	1.4%	*15895*

Table 2.4: Level of agreement of all doctoral graduate respondents that 'my course was good value for money' by discipline (excludes 'don't knows')

Agreement/disagreement	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree	(N)
All	43.5%	34.3%	16.6%	4.4%	1.2%	*1980*
Arts and humanities	45.9%	30.9%	13.5%	7.3%	2.4%	*250*
Biological sciences	34.9%	38.4%	20.9%	5.2%	0.6%	*270*
Biomedical sciences	41.3%	33.4%	18.5%	5.4%	1.4%	*455*
Physical sciences and engineering	46.1%	36.3%	15.5%	1.4%	0.7%	*655*
Social sciences	46.0%	31.6%	14.8%	5.5%	2.1%	*245*

[22] The Research Student Experience: Lessons from PRES, 2009, Higher Education Academy

Data source: Destinations of Leavers from Higher Education Longitudinal Survey 2004/05, 2009 (IES analysis)

2.3 Motivations to study

Motivations to undertake doctoral study, along with other individual and institutional factors, can influence expectations, outcomes and subsequent career pathways. As motivations to study were explored in the L DLHE only with doctoral graduate respondents, it is not possible to compare motivations of doctoral graduates with those of other levels of study.

Feedback from focus groups indicates that the question assumes individuals had solid and strategic reasons for undertaking their study, which may not have been the case. Additionally, some of the multiple-choice options were considered to be somewhat value-laden (e.g. 'I wanted to go on being a student') so individuals may have felt disinclined to select these. Some comments suggested that softer and wider motivations for study were not covered by the available categories. These included: challenge to work at a deeper level, to give something back to society by contributing to the development of a research area, to prove oneself and to make up for perceived earlier poor performance, and to set oneself apart from other graduates.

The question also assumes motivations remain unchanged, yet feedback from the stakeholders consulted indicates that this may not have been the case, and an individual's aspirations and expectations may have altered as they progressed through their studies, and perhaps through their careers. Respondents were asked to report on their motivations to study several years after graduation. The answers may have been influenced by post-rationalisation as respondents retrofit their motivations with their actual experiences[23].

With these caveats in mind, the most commonly given reason by respondents for deciding to undertake their doctorate was an interest in the subject (89%) followed by an interest in research (85%) (Table 2.5). Overall, interest is the foremost driving factor, influencing almost nine in ten respondents. It appears to be particularly important to those choosing to study arts and humanities, and less so to those from biomedical sciences.

Also common were career drivers: 59% of doctoral graduates chose doctoral study to broaden their career prospects generally; 44% did so because they wanted an academic career; and 34% had a specific area of employment they were aiming for and felt that doctoral research study was essential for entry to this.

The desire to improve career prospects broadly and also to pursue a specific career were relatively more common among those from biological and biomedical sciences than respondents from other disciplines, whereas the desire for an academic career was more likely to be cited as a reason for choosing doctoral study by those from social sciences and arts and humanities disciplines.

In terms of wider support and encouragement, half (51%) had decided on doctoral study because they received a funded scholarship and a sizeable group (42%) reported that they had been encouraged to do so by previous tutors or lecturers. A small group of respondents (16%) were already in employment and were encouraged to undertake doctoral level study by their employer.

Few respondents had undertaken doctoral study to postpone labour market entry (22% to go on being a student, and 9% to postpone job hunting), but this was more common among physical sciences and engineering doctoral graduates than those of other disciplines. This group was also more likely than others to study because they had been awarded a funded scholarship, or because their supervisors had encouraged them.

Table 2.5: Motivations of all doctoral graduate respondents for doctoral study by discipline

Motivations[1]	All	Arts and humanities	Biological sciences	Biomedical sciences	Physical sciences and engineering	Social sciences
I was interested in the subject	89.2%	94.5%	90.4%	84.1%	90.8%	90.1%
I was interested in research	84.7%	89.3%	86.1%	82.7%	84.6%	84.0%
I wanted to go on being a student	22.4%	27.6%	13.8%	12.5%	33.5%	20.2%
I wanted to postpone job hunting	8.6%	7.3%	5.7%	4.5%	14.3%	8.4%
I was awarded a funded scholarship	51.1%	43.6%	54.8%	45.1%	60.9%	48.1%
I was encouraged or required to do so by my employer at the time	15.5%	7.0%	14.8%	24.2%	11.3%	15.3%
I was encouraged to do so by previous tutors/lecturers	41.8%	52.4%	35.4%	38.1%	45.8%	42.8%
I wanted an academic career	43.7%	59.8%	42.4%	44.1%	35.8%	51.9%
I thought it would broaden my career prospects more broadly	58.9%	39.4%	65.9%	67.0%	61.0%	50.6%
It was essential to get into the area of employment I want(ed) to work in	34.0%	34.6%	38.4%	44.5%	27.2%	33.1%
(N)	*2025*	*255*	*280*	*475*	*695*	*255*

[1] Multi-response question so sum will be greater than 100%

[23] III O'Reilly, C. A., & Caldwell, D. F. (1981). The commitment and job tenure of new employees: Some evidence of postdecisional justification. Administrative Science Quarterly, 26(4), 597–616. d) London, M. (1983)

Data source: Destinations of Leavers from Higher Education Longitudinal Survey 2004/05, 2009 (IES analysis)

2.4 Research activities

The experience of doctoral study appears to be largely about working alone. 90% of respondents were required to work on their own to a great extent during their studies (Table 2.6). Arts and humanities respondents were more likely than others to work on their own to a great extent, whereas those from biomedical sciences were the least likely to regularly work on their own during their studies. Doctoral study also appears to be about increasing specialisation, with 60% of respondents reporting their research topic required increasing specialisation to a great extent.

There are indications of collaboration, but this was generally within the broad discipline area (25% to a great extent and 57% to some extent). Wider communication and collaboration outside the broad discipline was less common. For 47% of respondents their doctoral study required no collaboration with others in different disciplines and for 31% of respondents their research study required no communication with others outside the research community. In general, extensive collaboration within and across subject areas was more common for biomedical respondents than for those of other disciplines (particularly arts and humanities and social sciences). Extensive communication beyond the research community was more common during the studies of biomedical and social science respondents.

There are also indications of developing cross-disciplinary knowledge and skills beyond one's subject area, (28% to a great extent and 58% to some extent). This was fairly consistent across the disciplines.

Table 2.6: Extent to which all doctoral graduate respondents' research topics required the following practice by discipline

	Great extent	Some extent	Not at all	(N)
Working alone (All)	90.0%	9.8%	0.3%	*2005*
Arts and humanities	98.0%	1.6%	0.3%	*250*
Biological sciences	92.1%	7.9%	0.0%	*275*
Biomedical sciences	83.4%	16.4%	0.2%	*445*
Physical sciences and engineering	88.3%	11.1%	0.5%	*680*
Social sciences	96.1%	3.9%	0.0%	*255*
Collaborating with others in same broad discipline /subject area (All)	24.9%	57.0%	18.1%	*1975*
Arts and humanities	7.8%	46.4%	45.9%	*240*
Biological sciences	31.6%	61.3%	7.1%	*275*
Biomedical sciences	34.8%	56.7%	8.5%	*440*
Physical sciences and engineering	28.7%	60.8%	10.4%	*675*
Social sciences	6.1%	51.2%	42.7%	*245*
Collaborating with others in different disciplines (All)	7.0%	45.9%	47.1%	*1955*
Arts and humanities	4.1%	32.6%	63.3%	*240*
Biological sciences	6.1%	48.8%	45.2%	*270*
Biomedical sciences	11.1%	53.0%	35.9%	*435*
Physical sciences and engineering	6.7%	49.2%	44.1%	*665*
Social sciences	4.1%	32.7%	63.2%	*245*
Development of cross disciplinary/subject area knowledge and skills (All)	27.7%	57.9%	14.4%	*1980*
Arts and humanities	23.3%	61.4%	15.3%	*240*
Biological sciences	24.5%	60.3%	15.2%	*270*
Biomedical sciences	28.2%	60.6%	11.2%	*440*
Physical sciences and engineering	27.6%	56.9%	15.5%	*675*
Social sciences	32.6%	50.3%	17.1%	*250*
Communicating with others outside the research community (All)	24.4%	44.3%	31.3%	*1975*
Arts and humanities	15.7%	46.1%	38.2%	*240*
Biological sciences	19.5%	40.0%	40.5%	*270*
Biomedical sciences	31.3%	43.8%	24.9%	*440*
Physical sciences and engineering	19.1%	45.3%	35.6%	*670*
Social sciences	33.3%	44.2%	22.5%	*250*
Increasing specialisation (All)	60.0%	34.6%	5.4%	*1965*
Arts and humanities	57.9%	35.0%	7.1%	*240*
Biological sciences	64.8%	33.1%	2.0%	*270*
Biomedical sciences	58.2%	33.8%	8.0%	*435*
Physical sciences and engineering	64.2%	32.6%	3.2%	*675*
Social sciences	51.0%	41.1%	7.9%	*245*

Data source: Destinations of Leavers from Higher Education Longitudinal Survey 2004/05, 2009 (IES analysis)

3 The doctoral landscape

3.1 Key statistics

- Majority of doctoral graduate respondents (92%) were in employment, in full-time paid work (77%), in the UK (80%). Unemployment had halved for UK doctoral graduates from 4% over three years.
- 44% were in the same job since graduation; a fifth (22%) had held three jobs or more.

Working in the UK

- Across the entire cohort, employment in the education sector remained relatively stable since graduating at 50% of respondents: however, the proportions differed by discipline.
- The proportions employed in other professional, associate professional and technical occupations (including HE research staff) fell from 26% to 17%.
- The proportions in teaching and lecturing roles increased from 22% to 26%; those in commercial, industrial and public sector management roles increased from 7% to 11%.
- 70% were employed on open-ended contracts and 80% were working in organisations with at least 250 staff.
- 90% of respondents working full time earned between £23,000 and £71,000. The median salary was £34,000: £10,000 higher than first degree graduates at the same point in their careers.
- Predominately, respondents were very satisfied (46%) or fairly satisfied (47%) with their career to date.

3.2 Employment circumstances

Three and a half years after graduating, the vast majority (80%) of doctoral graduate respondents were working or studying in the UK, while 12% were working or working and studying overseas (Table 3.1). Very few respondents were unemployed (2%), or taking time out of the labour market for other reasons, retirement/maternity etc. (3%).

In terms of international mobility[24], 54% of doctoral graduates originally from the rest of the EU had left the UK to take up employment or study overseas, while 37% were working or studying in the UK. By contrast, only 7% of UK-domiciled respondents were working or studying overseas.

Focusing on UK-domiciled respondents, the proportion in work in the UK had increased from 69% after six months to 79% three and a half years after graduation, whilst the proportion studying in the UK had reduced by approximately one half (14% to 6%) (Table 3.2). The proportion of UK-domiciled respondents working or studying overseas had remained constant at 7%. Unemployment rates had more than halved from 3.6% to 1.6%. Three-quarters of UK-domiciled respondents were working full-time (77%) and 8% were working part-time, either in the UK or overseas (Table 3.2). This position had changed slightly since the first DLHE survey.

Table 3.1: Employment circumstances for doctoral graduate respondents from UK HEIs by original domicile (November 2008)

Employment circumstances	All	UK	Rest of EU
Working in the UK	74.1%	79.3%	36.4%
Working and studying in the UK	5.5%	6.1%	1.0%
Working overseas	11.5%	6.2%	50.0%
Working and studying overseas	0.7%	0.3%	4.0%
Not available for work or study	3.3%	3.4%	2.8%
Assumed unemployed	1.7%	1.6%	2.2%
Work/study location unknown or other	3.1%	3.1%	3.5%
(N)	*2075*	*1815*	*255*

Table 3.2: Comparison of employment circumstances of UK-domiciled doctoral graduate respondents over time

Employment circumstances	At 3.5 years (L DLHE)	At 6 months (WDRD)
Working in the UK	79.3%	69.1%
Working and/or studying in the UK	6.1%	14.3%
Working and/or studying overseas	6.5%	7.0%
Not available for work or study	3.4%	3.4%
Assumed unemployed	1.6%	3.6%
Work/study location unknown or other	3.1%	2.6%
Full-time paid work (inc self employed)	76.9%	70.2%
Part-time paid work	8.2%	6.2%
(N)	*1815*	*4880*

Additional source: What Do Researchers Do? First Destinations of Doctoral Graduates by Subject, 2009, Table 4.

[24] These results should be treated with some caution as response rates for doctoral graduate overseas may be lower than those in the UK at the time of the L DLHE (November 2008)

Data source: Destinations of Leavers from Higher Education Longitudinal Survey 2004/05, 2009 (IES analysis)

Approximately three and a half years after graduating UK-domiciled doctoral graduate respondents were marginally more likely to be in paid employment than masters or high achieving first degree respondents (85% compared with 81% for masters and 80% for first degree) and less likely to be unemployed (1.6% compared with 2.2% and 2.6% respectively (Table 3.3).

Table 3.3: Comparison of main activity of UK-domiciled graduate respondents (November 2008)

Main activity	Doctoral graduates	Masters graduates	First degree 1st/2:1
A: Full time paid work	76.9%	75.4%	75.1%
B: Part time paid work	8.2%	5.6%	4.5%
D: Work and further study	6.5%	8.1%	7.5%
E: Further study only	1.7%	4.9%	8.1%
F: Assumed to be unemployed	1.6%	2.2%	2.6%
O/C/G/H - Other	5.2%	3.9%	2.2%
(N)	*1815*	*3960*	*15320*

3.3 Details of employment

The remainder of the report generally focuses on those doctoral graduates who were employed in the UK, irrespective of their original domicile[25] (80% of all doctoral graduate respondents). For this group, we now move on to describe the employment sectors they work in, their occupation, type of employment contract, size of employer, salary, degree of career satisfaction and number of jobs they have had since graduating.

3.3.1 Employment sectors

Half the doctoral graduate respondents working in the UK were employed in education, with the majority of these in higher education (HE) (44%) and the balance (6%) in the wider education[26] sector (Table 3.4). Health and social work accounted for 13%, finance, business and IT 11%, research and development 9% and manufacturing 9%. Public administration accounted for 5% of respondents and other sectors a further 4%.

Overall, the proportion working in the education sector three and a half years after graduating was very similar for UK doctoral graduates and those from the rest of the EU. However, doctoral graduates from the rest of the EU were more concentrated in the HE sector at 50%. Those from the rest of the EU were twice as likely to be working in the business, finance and IT sector than those from UK; but were considerably less likely to be working in the health and social work sector, reflecting a lower proportion of biomedical sciences doctoral graduates from the rest of the EU.

The employment pattern had changed little over time in the labour market for UK doctoral graduate respondents. The proportion working in HE remaining relatively stable, falling from 47% at six months to 44% three and a half years after graduating (Table 3.5).

Table 3.4: Employment sectors for all doctoral graduate respondents in UK employment by original domicile (November 2008)

Employment sector	All	UK	Rest of EU
HE	44.2%	43.8%	49.7%
Education (other)	5.8%	6.1%	0.8%
Finance, business and IT	10.9%	10.4%	19.5%
Health and social work	13.0%	13.7%	2.0%
Manufacturing	8.5%	8.5%	10.1%
Research and development	9.0%	8.8%	11.9%
Public administration	4.9%	4.9%	4.7%
Other sectors	3.7%	3.9%	1.2%
(N)	*1615*	*1525*	*95*

Table 3.5: Comparison of employment sectors of UK-domiciled doctoral graduate respondents in UK employment over time

Employment sector	3.5 years (L DLHE)	6 months (DLHE[1])
HE	43.8%	46.6%
Education (other)	6.1%	5.1%
Finance, business and IT	10.4%	9.4%
Health and social work	13.7%	14.9%
Manufacturing	8.5%	8.1%
Research and development	8.8%	6.0%
Public administration	4.9%	5.2%
Other sectors	3.9%	4.7%
(N)	*1525*	*1505*

[1] DLHE data for corresponding L DLHE respondents only

[25] 'Working in the UK' includes those working full-time, part-time and combining work and study in the UK

[26] 'Wider education sector' is used to describe education organisations outside HE (e.g. schools, colleges, training providers)

Data source: Destinations of Leavers from Higher Education Longitudinal Survey 2004/05, 2009 (IES analysis)

Table 3.6: Employment sector of all doctorate graduate respondents in UK employment by discipline (November 2008)

Employment sector	All	Arts and humanities	Biological sciences	Biomedical sciences	Physical sciences and engineering	Social sciences
HE	44.2%	67.0%	37.2%	40.0%	35.8%	62.1%
Education (other)	5.8%	11.8%	7.8%	2.7%	4.6%	4.2%
Finance, business and IT	10.9%	3.2%	5.0%	2.9%	24.0%	9.6%
Health and social work	13.0%	0.0%	12.4%	35.8%	1.7%	4.1%
Manufacturing	8.5%	1.3%	12.2%	5.6%	15.3%	0.6%
Research & development	9.0%	3.0%	14.8%	7.5%	10.8%	8.2%
Public administration	4.9%	3.4%	5.5%	5.2%	3.5%	6.8%
Other sectors	3.7%	10.3%	5.0%	0.4%	4.2%	4.3%
(N)	*1615*	*180*	*220*	*405*	*550*	*180*
HE at 6 months, for comparison	46.6%	62.6%	42.5%	40.6%	41.3%	65.2%

Employment by sector approximately three and a half years after graduating varied significantly by discipline (Table 3.6). Education remains the most common sector for all disciplines, however those from arts and humanities (67%) and from social science (62%) disciplines were the most likely to be working in HE. The percentage of arts and humanities respondents employed in HE had increased from first destination

Arts and humanities doctoral graduates along with biological sciences doctoral graduates were more likely than other disciplines to be working in the wider education sector (i.e. not in HE). Physical sciences and engineering doctoral graduates were relatively more likely than others to be working in the finance, business and IT sector (24%); and those from biomedical sciences were relatively more likely than others to be working in health and social care (36%). Those working in manufacturing and/or research and development organisations were more likely to be physical sciences and engineering doctoral graduates and biological science doctoral graduates than from other disciplines.

3.3.2 Occupations

Doctoral graduates had a wide range of occupations across different employment sectors. The most common occupation for doctoral graduate respondents was teaching and lecturing professions, accounting for approximately one quarter of respondents (27%). This was followed by scientific research, analysis and development professions (19%) and other professional, associate professional and technical occupations (17%)[27]. The next most common occupations were commercial, industrial and public sector managers (10%) and health professional and associate professionals (9%).

Approximately, three and a half years into their careers, respondents from the rest of the EU were more likely to be in teaching and lecturing professions and marginally more likely to be in scientific research, analysis and development roles than were UK-domiciled doctoral graduates.

No doctoral graduate respondents from the rest of the EU were found to be in the health professions or associate professions.

The occupational patterns for UK-domiciled doctoral graduates had changed very little over the three and a half years since

Table 3.7: Occupations of all doctoral graduate respondents in UK employment by original domicile (November 2008)

Occupation	All	UK	Rest of EU
Marketing, sales, media and advertising occupations	3.1%	3.1%	2.3%
Commercial, industrial and public sector managers	10.4%	10.6%	6.8%
Scientific, research, analysis and development occupations	18.6%	18.4%	21.5%
Engineering professionals	4.1%	4.0%	6.7%
Health professionals and associate professionals	9.3%	9.8%	0.0%
Teaching professionals (including lecturers)	26.8%	26.4%	32.1%
Business and finance professionals	5.3%	5.2%	7.7%
Information technology professionals	2.9%	2.9%	2.3%
Other professional, associate professional and technical occupations	17.0%	16.9%	18.4%
Numerical clerks and cashiers, clerical, retail and bar staff	1.1%	1.1%	1.4%
Armed forces and public protection service occupations	0.3%	0.3%	0.8%
Other occupations	0.6%	0.6%	0.0%
Unknown occupations	0.6%	0.7%	0.0%
(N)	*1630*	*1535*	*95*

[27] Respondents employed as research staff in higher education are classified in these two occupational categories (see WDRD 2009 methodology). This cohort is explored later in the report as an 'occupational cluster'

Data source: Destinations of Leavers from Higher Education Longitudinal Survey 2004/05, 2009 (IES analysis)

graduation (Table 3.8). There had been some increases in the proportion of respondents in some occupational groupings (teaching and lecturing roles; managers; and business and finance roles). However, the proportion categorised as other professional, associate professional and technical occupations had fallen from 26% to 17%.

Reflecting the patterns for employment sectors, the occupational distribution of doctoral graduates varies considerably by discipline (Table 3.9). The most common occupation for biological science doctoral graduates and for physical sciences and engineering doctoral graduates was scientific research, analysis and development (35% and 25% respectively). The most common occupation for biomedical science doctoral graduates was a health profession/associate profession (31%), while the most common role for social scientists and those from arts and humanities was teaching and lecturing (50% and 59% respectively). In addition, almost all respondents working as engineering professionals or as information technology professionals were from physical sciences and engineering disciplines.

Table 3.8: Comparison of occupations of UK-domiciled doctoral graduate respondents in UK employment over time

Occupation	At 3.5 years (L DLHE)	At 6 months[1] (DLHE)
Marketing, sales, media and advertising occupations	3.1%	2.4%
Commercial, industrial and public sector managers	10.6%	6.6%
Scientific, research, analysis and development occupations	18.4%	19.2%
Engineering professionals	4.0%	4.6%
Health professionals and associate professionals	9.8%	10.7%
Teaching professionals (including lecturers)	26.4%	21.5%
Business and finance professionals	5.2%	3.8%
Information technology professionals	2.9%	2.4%
Other professional, associate professional and technical occupations	16.9%	26.4%
Numerical clerks and cashiers, clerical, retail and bar staff	1.1%	1.8%
Armed forces and public protection service occupations	0.3%	0.3%
Other occupations	0.6%	0.5%
Unknown occupations	0.7%	-
(N)	*1535*	*1440*

[1] DLHE data for corresponding L DLHE respondents only

Table 3.9: Occupation of all doctoral graduate respondents in UK employment by discipline (November 2008)

Occupation	All	Arts and humanities	Biological sciences	Biomedical sciences	Physical sciences and engineering	Social sciences
Marketing, sales, media and advertising occupations	3.1%	6.1%	4.9%	2.2%	2.6%	1.4%
Commercial, industrial and public sector managers	10.4%	9.4%	13.9%	8.3%	10.6%	11.9%
Scientific, research, analysis and development occupations	18.6%	0.0%	35.0%	18.9%	24.6%	3.1%
Engineering professionals	4.1%	0.5%	1.0%	0.4%	11.6%	0.0%
Health professionals and associate professionals	9.3%	0.0%	3.0%	30.8%	0.2%	0.0%
Teaching professionals (including lecturers)	26.8%	58.8%	14.5%	16.9%	18.2%	50.0%
Business and finance professionals	5.3%	1.3%	5.7%	4.0%	6.9%	8.1%
Information technology professionals	2.9%	0.0%	1.2%	0.6%	7.7%	0.0%
Other professional, associate professional and technical occupations	17.0%	16.4%	19.1%	17.3%	14.6%	20.9%
Numerical clerks and cashiers, clerical, retail and bar staff	1.1%	3.6%	1.3%	0.0%	1.2%	1.6%
Armed forces and public protection service occupations	0.3%	1.1%	0.0%	0.0%	0.5%	0.4%
Other occupations	0.6%	2.4%	0.0%	0.4%	0.4%	0.8%
Unknown occupations	0.6%	0.5%	0.5%	0.2%	0.8%	1.8%
(N)	*1630*	*180*	*220*	*405*	*555*	*180*

Data source: Destinations of Leavers from Higher Education Longitudinal Survey 2004/05, 2009 (IES analysis)

Table 3.10: Number of jobs held by all doctoral graduate respondents since graduation (2004/05)

No. of jobs[1]	
0	2.6%
1	43.8%
2	31.8%
3	14.5%
4	5.6%
5 or more	1.7%
(N)	*2075*

[1] Number of work activities declared by respondents to L DLHE

Number of jobs

All respondents were asked to provide details of the key activities including periods of employment they had had since graduating (Table 3.10). Approximately two in five (44%) doctoral graduate respondents reported just one job[28] since graduating, a further one-third (32%) reported two jobs, 15% reported three jobs, and a small group (7%) had changed jobs at least four times. A small proportion (3%) of respondents reported no employment activity at all during the three and a half years since graduating. Overall, more than half of doctoral graduates had moved on from the first job they had after graduating.

3.3.3 Employment status

The majority (70%) of doctoral graduate respondents in employment in the UK approximately three and a half years after graduating were on a permanent or open-ended contract (Table 3.12). A further 22% were on fixed-term contracts lasting at least one year, and relatively few doctoral graduates were on short fixed-term contracts or were working in a self-employed/freelance capacity (3% and 4% respectively).

There are indications that the proportion of doctoral graduates working under open-ended contracts increases over time in the labour market. Additional analysis of the L DLHE (Table 3.11) shows that six months after graduating 52% per cent of respondents who were in work in UK at that time were employed on open-ended contracts (compared with 70% approximately three and a half years after graduating). A further 32% were on fixed-term contracts lasting 12 months or longer and 9% were on short fixed-term contracts six months after graduation. This is consistent with What Do PhDs Do? Trends (2007), which reported that 48% of respondents who graduated in 2004/05 were on open-ended contracts six months after graduating[29].

Open-ended contracts were also more common for physical sciences and engineering and social science doctoral graduates (74% and 78% respectively), and relatively less prevalent among those from biological science disciplines (Table 3.12). Approximately one third of biological science doctoral graduates (36%) were on fixed-term contracts, a higher proportion than found for any other discipline. Those most likely to be self-employed or working freelance were arts and humanities doctoral graduates (9%).

The L DLHE survey shows that approximately three and a half years on, doctoral graduate respondents working in full-time roles were more likely to be on open-ended contracts (74%) than those working part-time (62%) (Table 3.13).

Table 3.11: Comparison of employment contract (where known) of UK domiciled doctoral graduate respondents in UK employment over time

Type of employment contract	3.5 years (L DLHE)	6 months (DLHE)
On a permanent or open-ended contract	69.5%	51.6%
On a fixed-term contract lasting 12 months or longer	22.5%	31.9%
On a fixed-term contract lasting less than 12 months	2.7%	8.8%
Self-employed/Freelance	3.8%	3.9%
Other	1.5%	3.7%
(N)	*1530*	*1365*

[1] DLHE data for corresponding L DLHE respondents only

Table 3.13: Type of employment contract (where known) of all doctoral graduate respondents in UK employment by mode of employment (November 2008)

Type of employment contract	All	Full-time work	Part-time work
On a permanent or open-ended contract	69.8%	73.6%	62.4%
On a fixed-term contract lasting 12 months or longer	22.2%	23.1%	22.4%
On a fixed-term contract lasting less than 12 months	2.8%	2.2%	8.1%
Self-employed/Freelance/Other	3.7%	1.2%	7.0%
(N)	*1615*	*1380*	*165*

3.3.4 Size of organisation

The majority of respondents (80%) were working in larger organisations with at least 250 employees, reflecting the dominance of employment in education and health sectors

Table 3.12: Type of employment contract (where known) of all doctoral graduate respondents in UK employment by discipline (November 2008)

Type of employment contract	Arts and humanities	Biological sciences	Biomedical sciences	Physical sciences and engineering	Social sciences
On a permanent or open-ended contract	66.2%	58.0%	67.8%	74.1%	77.9%
On a fixed-term contract lasting 12 months or longer	17.8%	31.9%	27.9%	18.8%	13.2%
On a fixed-term contract lasting less than 12 months	4.4%	3.6%	2.1%	2.4%	3.1%
Self-employed/Freelance	9.4%	3.8%	1.1%	3.3%	4.6%
Other	2.2%	2.8%	1.2%	1.4%	1.3%
(N)	*175*	*220*	*405*	*550*	*180*

[28] A job is defined here as a period of either full-time or part-time employment, self-employment or freelance work as a main activity at some point since graduating. Respondents can change jobs by moving to another employer or by changing roles/being promoted within an organisation

[29] In the initial DLHE survey, 12% chose not to declare their contractual status. Less than 2% chose not to declare their status in the L DLHE survey

Data source: Destinations of Leavers from Higher Education Longitudinal Survey 2004/05, 2009 (IES analysis)

Table 3.14: Size of employing organisation for all doctoral graduate respondents in UK employment by discipline (November 2008)

Size of organisation	All	Arts and humanities	Biological sciences	Biomedical sciences	Physical sciences and engineering	Social sciences
1 to 49	10.7%	11.1%	14.0%	5.1%	13.2%	13.6%
50 to 249	9.2%	12.4%	10.8%	5.5%	10.7%	5.7%
250 or more	80.1%	76.5%	75.2%	89.4%	76.0%	80.7%
(N)	*1575*	*170*	*210*	*390*	*540*	*175*

(Table 3.14). Approximately one in ten were working in medium-sized organisations (with between 50 and 249 employees), and a further one in ten were working in small organisations with fewer than 50 employees.

The pattern of organisational size across the different disciplines tends to reflect the different employment sectors these doctoral graduate respondents worked in rather than any influence of their discipline (see 3.3.1 Table 3.6).

3.3.5 Salary

Respondents were asked to give an estimate of their annual gross pay before tax excluding any bonuses or benefits. Across all doctoral graduate respondents working in UK the median salary was £33,000[30]. However, this figure is likely to be affected by hours of work[31]. In the main, doctoral graduates were working full-time (85%), 10% worked part-time and 4% were self employed (with unknown hours).

Those in full-time employment in the UK

Focusing on doctoral graduate respondents in full-time work in the UK, the median salary was £34,000; i.e. at least half of this group was earning £34,000 three and a half years into their careers[32] (Table 3.15). There was a considerable range of salaries, with 90% of doctoral graduate respondents in full time employment in the UK earning between £23,000 and £71,000 per annum[33]. The majority (64%) earned between £25,000 and £40,000; 25% earned more than £40,000 a year, with 11% of respondents earning £25,000 or less.

Doctoral graduate respondents from the rest of the EU had a relatively lower proportion on high incomes (7% earned over £50,000 compared with 13% for UK-domiciled doctoral graduates).

Those who had undertaken their doctoral study part-time tended to have higher salaries than those who had studied full-time (Table 3.16). The median salary of respondents who had studied full-time was £32,000, and 16% earned at least £40,000, whereas the median salary of respondents who had studied part-time was £42,000 and 55% earned at least £40,000. This differential is partly due to the fact that part-time students are generally already in employment which gives them a head start in the labour market, for example a high number of clinicians and psychologists undertake part-time doctorates, while in existing employment[34].

UK-domiciled doctoral graduate respondents in full-time employment in the UK on average earned more three and a half years into their careers than those leaving HE with other qualifications (Table 3.17).

Table 3.15: Gross annual income of all doctoral graduate respondents in UK full-time employment by original domicile (November 2008)

Annual salary (banded)	All	UK	Rest of EU
£25,000 or less	10.6%	10.5%	12.7%
£25,001 to £30,000	22.9%	22.7%	26.1%
£30,001 to £40,000	41.2%	41.3%	39.7%
£40,001 to £50,000	12.3%	12.2%	14.6%
£50,001 or more	12.9%	13.3%	6.9%
(N)	*1205*	*1135*	*70*
Median (£)	*34000*	*34000*	*34000*
5th percentile (£)	*23000*	*23000*	*24000*
95th percentile (£)	*71000*	*72000*	*60000*

Table 3.16: Gross annual income of doctoral graduate respondents in UK full-time employment by mode of study (November 2008)

Annual salary (banded)	Full-time study	Part-time study
£25,000 or less	11.6%	7.2%
£25,001 to £30,000	27.6%	8.2%
£30,001 to £40,000	44.9%	29.5%
£40,001 to £50,000	9.1%	22.5%
£50,001 or more	6.8%	32.5%
(N)	*890*	*315*
Median (£)	*32000*	*42000*
5th percentile (£)	*23000*	*24000*
95th percentile (£)	*60000*	*90000*

Table 3.17: Comparison of gross annual income by qualification of graduate respondents in UK full-time employment (November 2008)

Annual salary (banded)	Doctoral graduates	Masters graduates	First degree 1st/2:1
less than £25,000	7.6%	21.6%	49.1%
£25,000 to £29,999	16.1%	16.0%	24.8%
£30,000 to £39,999	46.8%	27.5%	18.6%
£40,000 to £49,999	14.5%	15.9%	5.1%
£50,000 or more	15.0%	19.0%	2.4%
(N)	*1135*	*2270*	*9700*
Median (£)	*34000*	*33500*	*25000*

[30] 13% of those in work in the UK declined to answer the question on salary

[31] The categories of full-time, part-time, self employed and unpaid work in the L DLHE were not defined in any way and respondents were not required to qualify their answers

[32] 12% of those in full-time work in the UK declined to answer the question on salary

[33] The influence of extreme outliers was removed by taking away the top and bottom 5% of cases, and reporting the range for the remaining 90% of cases

[34] Vitae, What do researchers do? First destinations of doctoral graduates by subject, 2009, p29

Data source: Destinations of Leavers from Higher Education Longitudinal Survey 2004/05, 2009 (IES analysis)

Table 3.18: Gross annual income of all doctoral graduate respondents in UK full-time employment by discipline (November 2008)

Annual salary (banded)	All	Arts and humanities	Biological sciences	Biomedical sciences	Physical sciences and engineering	Social sciences
£25,000 or less	10.6%	13.9%	13.7%	8.5%	12.6%	6.5%
£25,001 to £30,000	22.9%	14.3%	36.3%	19.3%	27.6%	11.9%
£30,001 to £40,000	41.2%	52.0%	38.5%	38.5%	43.1%	39.0%
£40,001 to £50,000	12.3%	14.0%	5.7%	11.9%	9.9%	26.5%
£50,001 or more	12.9%	5.8%	5.8%	21.8%	6.8%	16.1%
(N)	*1205*	*105*	*180*	*315*	*435*	*125*
Median (£)	*34000*	*35000*	*30500*	*35000*	*32000*	*39000*
5th percentile (£)	*23000*	*20000*	*23403*	*23000*	*22000*	*25000*
95th percentile (£)	*71000*	*52000*	*57000*	*86000*	*55000*	*72000*

The difference is particularly stark when compared with first degree graduates. The median salary for first degree respondents (gaining a 1st or 2:1) was £25,000, compared with £34,000 for doctoral graduate respondents. Only 8% of first degree respondents earned more than £40,000, compared with 30% of doctoral graduate respondents. 49% of first degree respondents earned less than £25,000, compared with 8% of doctoral graduate respondents.

The picture is less clear when comparing salaries of doctoral graduates to those of masters graduates, as the latter has a wider distribution of income. Masters graduate respondents had a marginally lower median salary at £33,500, but a relatively higher proportion were higher earners (35%) and lower earners (22%) compared with doctoral graduate respondents (30% and 8%, respectively).

Doctoral graduate respondents earnings varied considerably by discipline (Table 3.18). Those most likely to be earning over £50,000 were from social science disciplines (16%) and from biomedical science disciplines (22%). 90% of these respondents earned between £25,000 and £72,000, and between £23,000 and £86,000, respectively. Those from biological science disciplines had the lowest median salary at £30,500. This may reflect a combination of factors, all of which are associated with lower salaries. Doctoral graduates of biological sciences are more likely to be employed as research staff in higher education and more likely to be female, younger and to have studied full-time than doctoral graduates in general.

Table 3.19: Comparison of satisfaction with career to date by qualification for all graduate respondents

Satisfaction	Doctoral graduates	Masters graduates	First degree 1st/2:1
Very satisfied	44.3%	39.5%	38.8%
Fairly satisfied	46.3%	50.1%	48.7%
Not very satisfied	7.0%	7.8%	9.2%
Not at all satisfied	1.8%	2.3%	3.0%
Don't know	0.6%	0.3%	0.4%
(N)	*2005*	*4655*	*15735*

3.3.6 Career satisfaction

Across all respondents, whether in work or not, doctoral graduates were the most satisfied with their careers to date (three and a half years after graduating) with 44% reporting that they were very satisfied (Table 3.19). This compares to 40% of those with masters qualifications, and 39% of those with first degrees (qualifying with a 1st/2:1).

Most doctoral graduate respondents who were in work in the UK were either very satisfied (46%) or fairly satisfied (47%) with their careers to date (Table 3.20). 7% felt either not very or not at all satisfied. Still focusing on those in employment in the UK, career satisfaction was highest among UK-domiciled doctoral graduates (47% very satisfied), those from biomedical sciences (50% very satisfied) and social sciences disciplines (52% very satisfied) (Table 3.20). These were also the disciplines with higher median earnings. Those working under open contracts were also more likely to report high levels of career satisfaction (51% were very satisfied) compared with those on fixed-term contracts (31%).

Feedback from the focus groups suggests that aspects considered when assessing satisfaction include:

- career progression compared with expectations and goals, and the progress of peers
- the potential to develop and to have control over their progress
- whether the current job was intellectually stimulating, challenging and considered worthwhile
- whether they enjoy the day-to-day experience, work-life balance, relationships at the office (and internal politics)
- salary (whether it was considered commensurate with what the individual feels they contribute to the organisation).

Table 3.20: Satisfaction with career to date of all doctoral graduate respondents in UK employment by discipline (excludes 'don't knows')

Satisfaction	All	Arts and humanities	Biological sciences	Biomedical sciences	Physical sciences and engineering	Social sciences
Very satisfied	46.1%	47.0%	38.9%	50.1%	42.3%	52.0%
Fairly satisfied	46.7%	44.4%	50.8%	44.7%	51.1%	37.8%
Not very satisfied	6.1%	7.7%	8.8%	4.6%	5.6%	8.8%
Not at all satisfied	1.1%	0.9%	1.5%	0.6%	1.0%	1.5%
(N)	*1590*	*175*	*215*	*395*	*535*	*180*

Data source: Destinations of Leavers from Higher Education Longitudinal Survey 2004/05, 2009 (IES analysis)

4 Occupational clusters

4.1 Key statistics

- 86% of doctoral graduates are employed in five 'occupational clusters', compared with 37% of first degree and 44% of masters graduates.
- 41% of respondents had moved between clusters over three years; 50% had moved from HE research occupations, few respondents in HE teaching and lecturing roles had moved cluster (21%).
- Respondents employed in HE research roles fell from 26% at six months to 19% after three and a half years. Respondents in HE teaching and lecturing roles increased from 17% to 22%.
- Only 19% of respondents in HE research roles were employed on open contracts; more than three quarters of respondents in other clusters were on open contracts.
- Respondents in HE teaching and lecturing roles (58%) and 'other common doctoral occupations' outside HE (56%) were most likely to be very satisfied with their career to date. These two clusters had the highest median salary.
- Respondents working in research roles in HE and beyond HE were least likely to be very satisfied with their career to date (32% and 35% respectively). These two clusters had the lowest median salary.

4.2 Typology of doctoral employment

The relationship between occupation and employment sector was explored further using the Labour Force Survey[35] to create a categorisation of labour market outcomes 'occupational clusters' that have greater resonance with the researcher community. The clusters consist of groupings of similar doctoral graduate occupations and provide a useful typology to explore the extent to which doctoral graduates are working in research in and beyond higher education, in teaching and lecturing roles and other common doctoral occupations outside higher education.

There are six occupational clusters:

- 'HE research occupations', i.e. research staff employed in higher education
- 'HE teaching and lecturing roles'
- 'Research (not in the HE sector)', i.e. employed in research roles outside HE (sometimes referred to as wider research roles)
- 'Other teaching occupations', outside higher education (sometimes referred to as wider teaching roles)
- 'Other common doctoral occupations'[36] outside HE, which are not classified as research or teaching roles
- 'Other occupations'[37], containing the balance of occupations across all sectors.

The categorisation of these occupational clusters is exclusive to doctoral graduates (Table 4.1). Comparison with the occupations of other level graduate respondents, finds less than 1% of first degree graduates and 2% of masters graduates were in HE research occupations, or in teaching/lecturing in HE (less than 1%, and 2%). Similarly, few of these respondents were found in research roles outside HE (3% and 5%), or in teaching jobs outside HE (14% and 11%). Generally, the majority of first degree and masters graduate respondents were in the 'Other occupations' cluster (63% and 56%, respectively), i.e. not in common doctoral occupations.

For details on how the clusters were derived please see the Methodology at www.vitae.ac.uk/wdrdmethodology. These occupational clusters are used throughout the rest of this report.

Table 4.1: Comparison of occupational clusters by qualification for graduate respondents in UK employment (November 2008)

Clusters[1]	Doctoral graduates	Masters graduates	First degree 1st/2:1
HE research occupations	19.2%	1.7%	0.3%
Research (not in HE sector)	13.1%	5.0%	2.7%
Teaching and lecturing in HE	21.6%	1.7%	0.2%
Other teaching occupations	5.7%	10.7%	13.7%
Other common doctoral occupations	26.5%	25.3%	20.0%
Other occupations	13.9%	55.6%	63.1%
(N)	*1625*	*3320*	*12575*

[1] Clusters combine occupations and employment sectors to define labour market outcomes based on Labour Force Survey data.

[35] Labour Force Survey, Office for National Statistics www.statistics.gov.uk/statbase/Source.asp?vlnk=358&More=Y. For a full description of how clusters have been derived using aggregate quarterly Labour Force Survey data from July 2005 to July 2008 and What do researchers do? definitions of research staff see the Methodology www.vitae.ac.uk/wdrdmethodology

[36] Occupations with a relatively high density and a relatively high volume of doctoral graduates compared to the general workforce according to the UK Labour Force Survey

[37] Other occupations include all occupations were there is a relatively low destiny or volume of doctoral graduates working in specific occupations, according to SOC codes

Data source: Destinations of Leavers from Higher Education Longitudinal Survey 2004/05, 2009 (IES analysis)

4.2.1 Describing the clusters

Approximately, three and a half years after graduating, of those respondents in work in the UK:

- approximately one in five (19%) were in HE research occupations. Although employed primarily to undertake research, their role may also involve some teaching responsibilities. For many these research roles are seen as a step towards an academic career in teaching and lecturing[38]
- a similar proportion (22%) were working as HE teaching and lecturing professionals. Individuals working in these roles may also spend significant time on research activities
- 13% were in non-HE research roles, predominately working in the private sector (80%), examples include analytical chemist, clinical scientist, consultant pathologist, geologist, senior development scientist
- 6% were in other teaching occupations outside the HE sector, for example in further education or schools
- approximately one quarter (27%) were in 'other common doctoral occupations'. This cluster includes: health professionals (accounting for 18% of the cluster), functional and production managers and senior officials (25%); engineering professionals (14%), ICT professionals (10%), and those in business, finance and statistical professional and associate professional roles (15%)
- the remaining 14% were spread across a wide range of other occupations including: science and engineering technicians (accounting for 9% of the cluster), artistic and literary occupations (9%), public service and other associate professionals (10%), managers and proprietors in service industries (12%), and sales and related associate professionals (8%).

Table 4.2: Occupational clusters for doctoral graduate respondents in UK employment by original domicile (November 2008)

Clusters[1]	All	UK	Rest of EU
HE research occupations	19.2%	19.4%	17.0%
Research (not in HE sector)	13.1%	12.6%	20.9%
Teaching and lecturing in HE	21.6%	21.0%	31.2%
Other teaching occupations	5.7%	6.0%	0.8%
Other common doctoral occupations	26.5%	26.8%	20.7%
Other occupations	13.9%	14.2%	9.4%
(N)	*1625*	*1535*	*95*

[1] Clusters combine occupations and employment sectors to define labour market outcomes based on Labour Force Survey data

Doctoral graduates from the rest of EU were relatively more likely than UK doctoral graduate respondents to be in wider research roles (22% compared with 13%) and to be teaching and lecturing in HE (31% compared with 21%) (Table 4.2). Conversely they were less likely to be in other teaching roles, other common doctoral occupations or other occupations.

Those most likely to be in HE research roles were biological science and biomedical science doctoral graduates (27% and 23% respectively) (Table 4.3). Relatively few doctoral graduates from arts and humanities disciplines were in the HE research cluster (8%) or in other research roles (3%). Those from biological science disciplines, along with those from physical sciences and engineering, were more likely than those from other disciplines to be working in research roles outside HE; but for both these groups of respondents HE research was more common.

Teaching and lecturing in HE was particularly common among social science and arts and humanities doctoral graduate respondents (47% and 50% respectively). Respondents from arts and humanities disciplines were also relatively more likely than other doctoral graduates to be in wider teaching roles. Other common doctoral occupations were likely among biomedical science doctoral graduates and physical sciences and engineering doctoral graduates (40% and 31%), reflecting the health, engineering, ICT and business and finance professions within this cluster.

Table 4.3 Occupational clusters for doctoral graduate respondents in UK employment by discipline (November 2008)

Clusters[1]	All	Arts and humanities	Biological sciences	Biomedical sciences	Physical sciences and engineering	Social sciences
HE research occupations	19.2%	7.5%	27.3%	23.2%	18.8%	13.7%
Research (not in HE sector)	13.1%	3.4%	23.1%	10.1%	17.6%	8.1%
Teaching and lecturing in HE	21.6%	50.0%	7.0%	14.8%	14.0%	46.5%
Other teaching occupations	5.7%	11.2%	7.5%	2.7%	4.5%	3.7%
Other common doctoral occupations	26.5%	5.8%	17.5%	40.3%	31.4%	12.6%
Other occupations	13.9%	22.2%	17.6%	8.9%	13.7%	15.4%
(N)	*1625*	*180*	*220*	*405*	*555*	*180*

[1] Clusters combine occupations and employment sectors to define labour market outcomes based on Labour Force Survey data

[38] CROS 2009 found 51% of HE research staff had aspirations for a career that combines research and teaching. Careers in Research On-line Survey (CROS) 2009: Analysis of Aggregated UK Results, Vitae www.vitae.ac.uk/cros

Data source: Destinations of Leavers from Higher Education Longitudinal Survey 2004/05, 2009 (IES analysis)

Comparing the L DLHE responses with the original DLHE results six months after graduation, there has been some movement between the clusters[39] (Table 4.4). The proportion in HE research had fallen from 26% to 19%, reflecting a movement of respondents from research staff positions into other occupational clusters. Two occupational clusters recorded increases: teaching and lecturing in HE increased from 17% to 22%, while other common doctoral occupations increased from 22% to 27%.

Table 4.4 Comparison of occupational clusters over time for doctoral graduate respondents in UK employment (November 2008)

Clusters[1]	3.5 years (L DLHE)	6 months (DLHE[2])
HE research occupations	19.2%	26.2%
Research (not in HE sector)	13.1%	14.5%
Teaching and lecturing in HE	21.6%	16.8%
Other teaching occupations	5.7%	5.5%
Other common doctoral occupations	26.5%	22.4%
Other occupations	13.9%	14.7%
(N)	*1625*	*1610*

[1] Clusters combine occupations and employment sectors to define labour market outcomes based on Labour Force Survey data

[2] DLHE data for corresponding L DLHE respondents only

Table 4.5: Comparison of occupational clusters for doctoral graduate respondents in UK employment over time (November 2008)

	at 6 months					
Clusters[1]	HE research	Other research	HE teaching and lecturing	Other teaching	Other common occupations	Other occupations
At 3.5 years						
HE research occupations	50.0%	18.3%	6.0%	0.0%	3.4%	7.1%
Research (not in HE sector)	13.0%	46.7%	3.0%	5.0%	6.9%	10.7%
Teaching and lecturing in HE	17.0%	3.3%	79.1%	35.0%	2.3%	8.9%
Other teaching occupations	3.0%	0.0%	4.5%	50.0%	1.1%	5.4%
Other common doctoral occupations	10.0%	20.0%	1.5%	0.0%	75.9%	23.2%
Other occupations	7.0%	11.7%	6.0%	10.0%	10.3%	44.6%
(N)	*435*	*280*	*320*	*105*	*380*	*260*

[1] Clusters combine occupations and employment sectors to define labour market outcomes based on Labour Force Survey data

Tracking individual responses, a total of 41% of respondents had moved clusters between the two snap shot points: 6 months and three and a half years. Half of all responding doctoral graduates who were working in HE research roles six months after graduation were working in a different cluster after three and a half years (Table 4.5). 17% had moved into teaching and lecturing roles in HE. A small number (6%) of those initially in teaching and lecturing roles had moved into HE research roles.

There was some evidence of two-way intersectoral mobility between HE research and non-HE research clusters. 13% of those initially in HE research had moved out of the sector to take up research posts in other sectors after three and a half years. Additionally, a similar number of those initially in research roles outside HE had moved into HE research posts three and a half years later (18% of the cluster). Also of note (though the numbers here are small) is that 35% of those initially teaching in the wider education sector had taken up teaching and lecturing posts in HE after three and a half years.

Respondents working in HE teaching and lecturing and other common doctoral occupations at six months after graduation were most likely to be working in the same cluster three and a half years after graduation at 79% and 76%, respectively.

[39] Activity at 6 months has been taken from the original coded DLHE response, rather than the L DLHE activity history data. The data indicates movement between clusters, but not within clusters. This comparative data should be treated with caution as some of the variance may be influenced by differences in coding methodologies used in the DLHE survey (coded by HEIs) and the L DLHE survey (recoded by IER)

Data source: Destinations of Leavers from Higher Education Longitudinal Survey 2004/05, 2009 (IES analysis)

4.3 Work characteristics of the clusters

Employment status

Contractual status varied by cluster. Reflecting the nature of research staff employment in higher education, HE research is the only cluster where doctoral graduate respondents were predominately working on fixed-term contracts (74% on contracts of 12 months or longer, and 5% on shorter contracts of less than one year)[40] (Table 4.6).

Fixed-term contracts have become a common feature of research staff employment within higher education and have constituted a key step in many research careers. However, in response to recent legislation, there has been a reduction in the use of fixed-term contracts to employ research staff in higher education[41].

In all other clusters, including teaching and lecturing in HE, the dominant employment status was the open-ended contract. However, that is not to say that only research staff in HE are employed on fixed-term contracts, for example, 15% of respondents in wider research roles outside higher education were on fixed-term contracts.

Few doctoral graduates were working in a self employed or freelance capacity, but this was relatively more common for those in teaching roles outside HE, and for those in other/wider occupations.

Size of organisation

Size of employer varied by occupational cluster, although for all clusters the most common size of employing organisation was large (at least 250 employees). Unsurprisingly, virtually all those respondents working in academic research roles and teaching and lecturing in HE were working in large organisations (97% and 95%) (Table 4.7). Those respondents in 'other occupations' were the most likely to be in small companies (28%).

Table 4.6: Employment contract by occupational clusters for doctoral graduate respondents in UK employment (November 2008)

	Employment contract					
Clusters[1]	Open-ended contract	Fixed term (12mon+)	Fixed term (<12mon)	Self-employed	Other (incl temp agency)	(N)
HE research occupations	19.2%	74.3%	5.1%	0.0%	1.4%	*295*
Research (not in HE sector)	78.8%	11.7%	3.0%	4.5%	2.0%	*210*
Teaching and lecturing in HE	84.0%	10.3%	3.5%	1.4%	0.8%	*370*
Other teaching occupations	77.7%	9.3%	2.7%	6.5%	3.8%	*105*
Other common doctoral occupations	84.7%	10.0%	0.9%	3.6%	0.8%	*400*
Other occupations	77.7%	7.4%	1.8%	10.1%	2.9%	*245*
All	69.7%	22.3%	2.8%	3.6%	1.5%	*1620*

[1] Clusters combine occupations and employment sectors to define labour market outcomes based on Labour Force Survey data

Table 4.7: Size of employing organisation for doctoral graduates respondents in UK employment by occupational clusters (November 2008)

	Employer size			
Clusters[1]	1 to 49	50 to 249	250 or more	(N)
HE research occupations	0.5%	2.4%	97.0%	*280*
Research (not in HE sector)	16.1%	12.7%	71.2%	*205*
Teaching and lecturing in HE	0.7%	4.0%	95.3%	*365*
Other teaching occupations	11.8%	43.6%	44.6%	*100*
Other common doctoral occupations	14.3%	8.8%	77.0%	*390*
Other occupations	28.1%	10.0%	61.8%	*235*

[1] Clusters combine occupations and employment sectors to define labour market outcomes based on Labour Force Survey data

[40] This is consistent with CROS findings that 82% of HE research staff were employed on fixed-term contracts and 18% were on open-ended contracts. Careers in Research On-line Survey (CROS) 2009: Analysis of Aggregated UK Results, Vitae www.vitae.ac.uk/cros

[41] Researchers, fixed-term contracts and universities: understanding law in context, Vitae, 2010 www.vitae.ac.uk/CMS/files/upload/Fixed-term%20contract_July_2010.pdf

Data source: Destinations of Leavers from Higher Education Longitudinal Survey 2004/05, 2009 (IES analysis)

Salary

Looking at salary by occupational cluster for those in full-time work in the UK, with the exception of those in other teaching roles, the most common salary band was £30,001 to £40,000; accounting for between one third and one half of all doctoral graduate respondents working in these clusters (Table 4.8). However, there was some variety in earnings across the clusters. The highest median salaries were found for those respondents working as teachers and lecturers in HE (£38,000) and those working in other common doctoral occupations (£38,000).

Focusing on respondents working in higher education, 46% of those in HE research roles earned between £30,001 and £40,000, compared with 53% of those teaching and lecturing roles. 49% of respondents in HE research earned £30,000 or less, compared with only 11% of those working in teaching and lecturing roles in HE. The median earnings were £30,500 and £38,000 respectively.

As noted in the report by Ackers et al (2006)[42] pay is one of the single most important factors shaping attitudes towards HE careers, alongside contractual security. However, individuals making career decisions may consider whether the pay and security they (will) receive is adequate to achieve an acceptable quality of life, rather than making comparisons to pay in other sectors.

Across all the clusters, those most likely to be earning over £50,000 in full-time work were in 'other common doctoral occupations' (29%), which includes health professionals, engineers and managers. Doctoral graduate respondents in teaching occupations outside HE and in other occupations were relatively more likely than others to be earning lower salaries (20% and 23%, respectively earning £25,000 or less).

Satisfaction

As noted earlier, generally doctoral graduate respondents were satisfied with their career to date. Higher levels of career satisfaction were found among those in HE teaching and lecturing roles (58% very satisfied) and other common doctoral occupations (56% very satisfied) (Table 4.9). Within other common doctoral occupations, those in the health professions were particularly very satisfied (67%).

Relatively fewer, approximately one third, doctoral graduate respondents in research roles reported feeling very satisfied with their careers to date, either in HE research occupations (32% very satisfied) or in wider research roles (35%).

The CROS results found that HE research staff generally tended to feel valued, were satisfied with their work-life balance and believe their organisations were committed to equality and diversity. However, it also found that some groups of researchers, such as those who have had multiple fixed-term contracts, had less positive feelings about their employer, their job and their career.

Table 4.8: Gross annual income of doctoral graduate respondents in UK full-time employment by occupational cluster (November 2008)

	Annual salary (banded)					
Clusters[1]	£25000 or less	£25001 to £30000	£30001 to £40000	£40001 to £50000	£50001 and over	(N)
HE research occupations	7.9%	41.5%	45.8%	3.3%	1.4%	*235*
Research (not in HE sector)	16.3%	34.0%	38.4%	6.5%	4.7%	*170*
Teaching and lecturing in HE	1.8%	8.8%	53.4%	25.7%	10.4%	*265*
Other teaching occupations	20.0%	31.3%	22.4%	11.4%	15.0%	*70*
Other common doctoral occupations	9.1%	13.5%	36.6%	12.1%	28.6%	*300*
Other occupations	22.5%	19.7%	34.4%	12.4%	11.1%	*170*
All	10.6%	22.9%	41.2%	12.3%	12.9%	*1205*

[1] Clusters combine occupations and employment sectors to define labour market outcomes based on Labour Force Survey data

Table 4.9: Career satisfaction of doctoral graduate respondents in UK employment by occupational clusters (November 2008)

	Satisfaction				
Clusters[1]	Very	Fairly	Not very	Not at all	(N)
HE research occupations	32.0%	58.9%	8.1%	1.0%	*290*
Research (not in HE sector)	34.5%	57.2%	7.8%	0.5%	*205*
Teaching and lecturing in HE	57.9%	37.2%	4.5%	0.4%	*365*
Other teaching occupations	47.6%	48.6%	3.0%	0.7%	*100*
Other common doctoral occupations	55.7%	39.7%	4.0%	0.6%	*395*
Other occupations	39.5%	47.8%	9.0%	3.7%	*235*
All	46.2%	46.8%	6.0%	1.1%	*1585*

[1] Clusters combine occupations and employment sectors to define labour market outcomes based on Labour Force Survey data

[42] Ackers L, Gill B, Groves K, Oliver K (2006) Assessing the Impact of the Roberts' Review. Enhanced Stipends and Salaries on Postgraduate and Postdoctoral Positions, CSLPE

Data source: Destinations of Leavers from Higher Education Longitudinal Survey 2004/05, 2009 (IES analysis)

5 Finding and securing employment

5.1 Key statistics

- Professional networks were key to finding current employment for a third of respondents (33%); a quarter (24%) had previously worked for the organisation.
- The majority had taken their current job as it fitted with their career plans (75%) and/or the type of work they had wanted (67%). For half of respondents it was to broaden their experience and develop general skills (47%).
- For more than 80% the doctorate was a formal requirement (50%) or important (32%) for their current job. Skills and competencies were also very important in the recruitment of doctorates (46% as a formal requirement, 47% important).

Respondents to the L DLHE were asked how they secured their current employment[43]. These included sources of job information, how individuals found out about their jobs, examining motivations for taking up jobs, and understanding the extent to which the qualification itself was a formal requirement for entry to the position.

5.2 Job search methods

Networks were key to finding employment. One-third (33%) of doctoral graduate respondents had found out about their current job through professional, work or educational contacts or networks, and 16% through personal contacts (family, friends etc.) (Table 5.1). Professional networks were more likely to be cited as a source of vacancy information by those from biomedical science disciplines, and also arts and humanities disciplines. They also appeared to be more common sources of information for doctoral graduate respondents than for masters graduates (24%) or first degree graduates with a 1st or 2:1, (18%).

Approximately one quarter (24%) of doctoral graduate respondents found out about their job because they already worked for the organisation or had previously done so, perhaps returning to or progressing within an organisation. This was relatively more common among respondents from the biomedical sciences (Table 5.2). A slightly smaller proportion of doctoral graduate respondents had seen their position advertised in a newspaper/magazine (22%) or an employer's website (20%). Newspaper and magazine adverts appeared to be a particularly common method of job search among social scientists. The findings for masters graduates for all these sources of job information were very similar, but first degree graduates were relatively more likely than all postgraduates (doctoral graduates or masters graduates) to use employers' websites to find work (26%).

Less frequently, doctoral graduate respondents used formal external support in their job hunting, with 10% finding their job through a recruitment agency, 5% through their university careers service, and 8% through other careers services (including those at other universities, national services and private agencies). Use of these formal support structures appeared to be more common among physical sciences and engineering respondents (as were personal contacts). Formal external support, particularly recruitment agencies, was also more commonly used by masters graduates and first degree graduate respondents to find work (15% and 18%) than by doctoral graduate respondents.

Few doctoral graduate respondents gained their job through a speculative approach to an employer (6%), or were headhunted (1%).

Table 5.1: Comparison of how graduate respondents in UK employment found out about current job (November 2008)

Found out about current job	Doctoral graduates	Masters graduates	First degree 1st/2:1
Professional, work or educational contacts or networks	33.2%	24.3%	18.1%
Already/previously worked for the organisation	23.6%	22.1%	16.1%
Newspaper/magazine (advertisement or website)	22.1%	23.6%	18.2%
Employer's website	19.9%	18.3%	25.9%
Personal contacts, including family, friends and social networks	15.7%	14.5%	18.1%
Recruitment agency (office or website)	10.0%	15.2%	17.7%
Other careers service/or its website	7.8%	6.0%	8.7%
Speculative approach to employer	6.3%	5.2%	6.6%
Careers service at the institution at which you studied / or its website	4.9%	3.2%	6.7%
Employer approached me/headhunted	1.2%	2.2%	1.1%
I set up the business/self employed	1.4%	1.3%	1.1%
(N)	*1600*	*3285*	*12500*

Multi-response question: sum will be greater than 100%. Those with fewer than 1% not shown

5.2.1 Sources of information by cluster

Those respondents in employment in higher education (teaching and lecturing roles and particularly research positions) and in wider research roles were the most likely to have heard about their job through professional networks (36%, 40% and 36% respectively) (Table 5.3)

Those respondents in HE research positions and teaching and lecturing roles were more likely than those in other clusters to have already worked for their organisation (27% and 30% respectively).

[43] The majority of doctoral graduate respondents (54%) had moved on from the initial job that they had after graduating. Therefore for many their current job is likely to be at least their second job

Data source: Destinations of Leavers from Higher Education Longitudinal Survey 2004/05, 2009 (IES analysis)

Table 5.2: How doctoral graduate respondents in UK employment found out about current job by discipline (November 2008)

Found out about current job	All	Arts and humanities	Biological sciences	Biomedical sciences	Physical sciences and engineering	Social sciences
Professional, work or educational contacts or networks	33.2%	34.5%	27.3%	38.4%	29.6%	25.9%
Already/previously worked for the organisation	23.6%	24.6%	23.2%	29.0%	20.0%	21.2%
Newspaper/magazine (advertisement or website)	22.1%	28.0%	23.1%	21.1%	15.0%	33.0%
Employer's website	19.9%	20.0%	19.0%	23.6%	18.9%	18.0%
Personal contacts, including family, friends and social networks	15.7%	17.7%	14.5%	10.5%	19.9%	17.5%
Recruitment agency (office or website)	10.0%	6.8%	8.2%	8.1%	15.6%	6.1%
Other careers service / or its website	7.8%	10.1%	7.1%	5.6%	9.9%	7.2%
Speculative approach to employer	6.3%	7.2%	5.2%	5.9%	8.3%	2.4%
Careers service at the institution at which you studied / or its website	4.9%	4.5%	4.4%	4.4%	5.9%	4.3%
Employer approached me / headhunted	1.2%	0.0%	0.4%	0.7%	2.0%	1.5%
I set up the business / self employed	1.4%	1.8%	2.6%	0.3%	1.5%	2.1%
(N)	*1,600*	*175*	*215*	*400*	*545*	*175*

Multi-response question: sum will be greater than 100%. Those with fewer than 1% not shown.

Table 5.3: How doctoral graduate respondents in UK employment found out about current job by outcome cluster (November 2008)

Found out about current job	All	HE research occupations	Research (not in HE sector)	Teaching in HE	Other teaching occupations	Other common doctoral occupations	Other occupations
Professional, work or educational contacts or networks	33.2%	39.7%	35.9%	36.4%	31.2%	30.8%	2.3%
Already/previously worked for the organisation	23.6%	27.0%	15.7%	29.7%	21.6%	22.8%	19.2%
Newspaper/magazine (advertisement or website)	22.1%	12.1%	25.4%	27.3%	39.6%	19.2%	23.0%
Employer's website	19.9%	20.4%	26.1%	18.7%	15.7%	17.4%	21.4%
Personal contacts, including family, friends and social networks	15.7%	13.0%	16.9%	14.6%	17.9%	16.4%	17.7%
Recruitment agency (office or website)	10.0%	5.6%	14.1%	4.5%	4.4%	15.6%	12.7%
Other careers service / or its website	7.8%	13.2%	3.9%	9.6%	2.3%	5.2%	8.5%
Speculative approach to employer	6.3%	9.2%	6.2%	4.4%	5.3%	6.1%	5.8%
Careers service at the institution at which you studied / or its website	4.8%	6.9%	1.8%	4.0%	1.4%	4.8%	7.5%
Employer approached me / headhunted	1.2%	0.7%	1.3%	0.8%	1.4%	1.8%	0.8%
I set up the business / self employed	1.4%	1.7%	0.9%	0.0%	0.7%	1.7%	2.9%
(N)	*1595*	*290*	*205*	*370*	*100*	*390*	*240*

Multi-response question: sum will be greater than 100%. Those with fewer than 1% not shown

Finding jobs through newspaper and magazine adverts was more likely for those in teaching roles, particularly those teaching outside the HE sector (40%). For this group, press adverts were the most commonly cited method of finding work. This contrasts with the findings for doctoral graduates in HE research, who were considerably less likely to have found their jobs through this means (12%).

The use of recruitment agencies was relatively more common among those in common doctoral occupations (e.g. health professionals, functional managers, engineering and ICT professionals)(16%) and those in wider research roles (not in HE)(14%).

Using careers services (at their own university), using other careers services or making a speculative approach to an employer were all more common methods of finding work for those in HE research roles than those in other types of work (7%, 13% and 9% respectively).

Data source: Destinations of Leavers from Higher Education Longitudinal Survey 2004/05, 2009 (IES analysis)

5.3 Reasons for taking the job

The reasons why respondents decided to take their current job at the time of the L DLHE survey were explored with a multi-response question.

Feedback from focus groups indicated that individuals have multiple motivations for taking a job and that some were stronger drivers than others. As one doctoral graduate commented: 'Obviously most of us have jobs because we need to earn a living, but the most important thing… is to do something that challenges me intellectually'. However, the multiple response format did not allow for any ranking of responses. There were also concerns that the question wouldn't capture the compromise individuals make between money, interests and other personal aspects when making decisions about jobs.

Focus groups participants also suggested that career plans can be 'retro-fitted' to actual outcomes. This issue was also raised by the stakeholders consulted who felt graduates could retrospectively justify their decisions, and may perhaps select reasons considered to be more 'acceptable' for taking their job than those that accurately reflected their motivations at the time .

With these caveats in mind, across all doctoral graduate respondents who were in employment in the UK, the most common reasons given for taking their job were that 'it fitted into my career plans' (75%) and 'it was exactly the type of work I wanted' (67%) (Table 5.4).

Table 5.4: Comparison of common motivations of graduate respondents in UK employment for taking current employment (November 2008)

Motivations	Doctoral graduates	Masters graduates	First degree 1st/2:1
It fitted into my career plans	75.0%	68.2%	66.8%
It was exactly the type of work I wanted	67.1%	55.8%	54.3%
In order to earn a living	55.5%	45.2%	56.8%
To broaden my experience / to develop general skills	47.4%	47.5%	53.4%
It was the best job offer I received	36.9%	26.8%	38.6%
It was an opportunity to progress in the organisation	30.3%	32.0%	35.4%
To gain experience in order to get the type of job I really want	23.5%	25.4%	33.3%
To see if I would like the type of work it involved	20.0%	21.8%	28.4%
It was the only job offer I received	19.5%	11.9%	14.6%
In order to pay off debts	7.5%	9.1%	15.6%
Location	1.9%	1.2%	1.1%
(N)	*1625*	*3355*	*12675*

Multi-response question: sum will be greater than 100%. Those with fewer than 1% not shown

This suggests that the majority of doctoral graduates had a career in mind or an ideal job and were making conscious moves to achieve this. The high levels of satisfaction with career to date (see 3.3.6 p20) would also suggest that approximately three and a half years on, many are realising their goals. These career-focused motivations were the most frequently cited reasons across all disciplines, but most common among biomedical sciences respondents, where perhaps career pathways are clearer (Table 5.5).

They also appeared to be more common to doctoral graduate respondents than to either masters degree graduates (68% 'career plans' and 56% 'type of work wanted') or first degree graduate respondents (with 1st or 2:1, 67% and 54%, respectively).

Some doctoral graduate respondents took their current job as a stepping stone, either to progress within an organisation (30%) or to gain experience in order to get the job they really wanted (24%). Again, this implies taking proactive steps towards career goals. These

Table 5.5: Common motivations of doctoral graduate respondents in UK employment for taking current employment by discipline (November 2008)

Motivations	All	Arts and humanities	Biological sciences	Biomedical sciences	Physical sciences and engineering	Social sciences
It fitted into my career plans	75.0%	73.4%	75.6%	82.6%	69.2%	73.7%
It was exactly the type of work I wanted	67.1%	69.6%	62.9%	71.5%	63.5%	69.4%
In order to earn a living	55.5%	61.5%	57.0%	53.8%	56.1%	49.7%
To broaden my experience/ to develop general skills	47.4%	44.0%	49.5%	46.4%	50.3%	42.0%
It was the best job offer I received	36.9%	35.7%	36.6%	34.8%	40.4%	37.2%
It was an opportunity to progress in the organisation	30.3%	29.1%	33.5%	32.9%	30.0%	23.8%
To gain experience in order to get the type of job I really want	23.5%	20.9%	26.1%	27.9%	22.1%	18.3%
To see if I would like the type of work it involved	20.0%	14.2%	21.7%	17.5%	26.9%	11.5%
It was the only job offer I received	19.5%	19.9%	19.9%	19.0%	21.0%	18.5%
In order to pay off debts	7.5%	7.3%	9.0%	5.5%	9.1%	7.9%
Location	1.9%	0.0%	1.9%	2.1%	2.6%	1.6%
(N)	*1625*	*180*	*220*	*405*	*545*	*180*

Multi-response question: sum will be greater than 100%. Those with fewer than 1% not shown

[44] III O'Reilly, C. A., & Caldwell, D. F. (1981). The commitment and job tenure of new employees: Some evidence of postdecisional justification. Administrative Science Quarterly, 26(4), 597–616. d) London, M. (1983). Toward a theory of career motivation. The Academy of Management Review, 8(4), 620–630

Data source: Destinations of Leavers from Higher Education Longitudinal Survey 2004/05, 2009 (IES analysis)

motivations were more common among biological science and biomedical science disciplines and relatively less common among the social sciences. They were also relatively more common among first degree graduates.

Approximately half of doctoral graduate respondents reported that they had taken their current job 'in order to earn a living' (56%), 37% did so to because it was the best job offer they had. One in five respondents reported it was the only job offer they received (20%). This could imply some degree of frustration with career development or less planned/controlled pathways. Arts and humanities doctoral graduates were more likely than those from other disciplines to cite earning a living as a reason, and those from physical sciences and engineering disciplines were marginally more likely than others to cite that their job had been the best or only offer they had received. In general, doctoral graduates were more likely than masters graduates to say they had taken their job because it was the best or only offer they had received.

For 47% of doctoral graduate respondents, taking their job was considered to be a way to broaden their experience and develop general skills. One fifth took their job to see if they liked the type of work (20%). These aspects appear to be about widening and exploring options, and were most common among physical sciences and engineering respondents. This may reflect their motivations to study which appeared to be less career focused than found for other disciplines. These job motivations were also more common among first degree graduate respondents (53% and 28%) than among doctoral graduate respondents.

5.3.1 Motivations by occupational cluster

Exploring motivations for taking current employment (at the time of the survey) reveals different motivations for different employment clusters.

Respondents teaching and lecturing in HE were the most likely to have been motivated by career reasons: fitting in with career plans (87%); and exactly the type of work wanted (76%) (Table 5.6). Those in research roles outside of HE, and particularly those in other occupations, were considerably less likely to cite these reasons.

Those in HE research occupations and wider research occupations tended to be similar in their motivations. Both groups were more likely than those in other clusters to say they had taken their job to broaden their experience (57% and 54%), to gain experience in order to get the type of job they really wanted (31% and 30%), and because it was the best job offer they had received (42% and 41%). In addition, those in HE research were relatively more likely than others to say they had taken their job in order to earn a living (63%), to progress in the organisation (34%), or because it was the only job offer they had received (28%).

Respondents in other occupations (outside academia, teaching/lecturing or common doctoral occupations) were less likely than others to have taken their job because it fitted with career plans (59%) or because it was the type of work they wanted (54%), but conversely more likely to have done so to see if they would like the work involved (26%).

Finally, those in teaching and lecturing roles (in HE or the wider education sector) were less likely than others to have taken their job to broaden their experience or skill base (37% and 39%), or to gain experience in order to move on to the job they really wanted (16% and 18%).

Table 5.6: Common motivations for doctoral graduate respondents in UK employment for taking current employment by occupational cluster (November 2008)

Motivations	All	HE research occupations	Research (not in HE sector)	Teaching in HE	Other teaching occupations	Other common doctoral occupations	Other occupations
It fitted into my career plans	75.0%	78.1%	67.6%	86.5%	73.4%	75.5%	59.0%
It was exactly the type of work I wanted	67.1%	71.1%	64.6%	76.0%	69.7%	64.6%	54.3%
In order to earn a living	55.5%	62.8%	58.0%	50.3%	59.9%	49.9%	59.3%
To broaden my experience/to develop general skills	47.4%	56.8%	54.4%	37.2%	38.6%	47.6%	46.9%
It was the best job offer I received	36.9%	41.6%	40.8%	35.8%	30.0%	34.9%	34.5%
It was an opportunity to progress in the organisation	30.3%	33.9%	24.5%	33.1%	30.6%	28.7%	29.6%
To gain experience in order to get the type of job I really want	23.5%	30.8%	30.2%	16.0%	17.8%	22.4%	23.1%
To see if I would like the type of work it involved	20.0%	21.8%	24.5%	11.6%	16.9%	20.5%	26.3%
It was the only job offer I received	19.5%	28.3%	20.6%	17.9%	20.7%	15.2%	17.0%
In order to pay off debts	7.5%	8.0%	7.7%	5.7%	10.8%	7.2%	8.0%
Location	1.9%	2.1%	1.5%	0.6%	4.8%	3.1%	0.7%
(N)	*1625*	*295*	*205*	*375*	*100*	*400*	*245*

Multi-response question: sum will be greater than 100%. Those with fewer than 1% not shown

Data source: Destinations of Leavers from Higher Education Longitudinal Survey 2004/05, 2009 (IES analysis)

5.4 Value of a doctorate to employers

All L DLHE respondents were asked to estimate the importance or value to their employer of various aspects of their qualifications and experience when they were recruited to their current role.

Focus group participants noted there was no negative option for the relevant question and so it assumes the value of study and experience will be positive or at least neutral to employers. This does not capture, therefore, circumstances under which a doctorate may be a hindrance, for example (some employers are) 'threatened or suspicious of PhDs' or 'assume your knowledge is too specialist'.

Type of qualification

For 50% of doctoral graduate respondents, the doctorate qualification was a formal requirement for entry into their current job, for a further 32% this was felt to be important to their employer when they were recruited, and for 12% it was helpful (Table 5.7). Very few were in roles where their qualification had not been important at all at recruitment (6%).

Generally type of qualification was more important to doctoral graduate respondents than to masters graduates (Table 5.8). 27% of masters graduate respondents felt their qualification was a formal entry requirement and 14% felt it had not been important at all. A similar pattern of perceived importance of qualification was found for doctoral graduates and first degree graduates with a 1st or 2:1.

Doctoral graduate respondents from biological and biomedical sciences disciplines were more likely to find their doctorate a formal requirement for employment, compared with those from physical sciences and engineering and social sciences disciplines (Table 5.9). One in ten doctoral graduates from arts and humanities disciplines felt their doctorate had not been at all important to their employer when they were recruited.

Subject knowledge

Subject knowledge appears to be a slightly less important or critical recruitment requirement than level of qualification. For 41% of doctoral graduate respondents subject of study was a formal entry requirement, for 41% it was important, and for 11% it had been helpful rather than important. Very few respondents were in roles where the subject they had studied was not important at all to their employer (7%).

Table 5.7: Perceived importance by doctoral graduate respondents in UK employment of educational factors and work experience in gaining current employment (November 2008)

Factors	Formal requirement	Important	Not very important but helped	Not important	Don't know	(N)
Qualification type	49.5%	31.6%	12.1%	6.4%	0.4%	*1615*
Subject	40.5%	41.2%	11.0%	7.1%	0.2%	*1610*
Class/grade of qualification	18.9%	40.8%	17.3%	18.1%	5.0%	*1580*
Skills and competencies	46.2%	46.7%	3.6%	2.8%	0.8%	*1610*
New qualifications	22.4%	24.2%	20.9%	30.4%	2.2%	*665*
Relevant work experience	27.2%	51.3%	13.6%	7.1%	0.8%	*1500*

Table 5.8: Comparison of perceived importance by graduate respondents in UK employment of educational and work experience factors in gaining current employment (November 2008)

	Importance to employer					
Factors	Formal requirement	Important	Not very important but helped	Not important	Don't know	(N)
Qualification type						
Doctoral graduates	49.5%	31.7%	12.1%	6.4%	0.4%	*1,615*
Masters graduates	27.3%	35.3%	22.4%	14.1%	0.9%	*3345*
First degree graduates (1st/2:1 only)	46.3%	24.9%	18.3%	9.8%	0.6%	*12685*
Subject						
Doctoral graduates	40.6%	41.2%	11.0%	7.1%	0.2%	*1610*
Masters graduates	21.9%	40.5%	20.3%	16.7%	0.5%	*3340*
First degree graduates (1st/2:1 only)	24.7%	30.8%	24.0%	20.0%	0.5%	*12680*
Skills and competencies						
Doctoral graduates	46.2%	46.7%	3.6%	2.8%	0.8%	*1610*
Masters graduates	39.1%	47.1%	6.6%	6.4%	0.7%	*3350*
First degree graduates (1st/2:1 only)	34.5%	52.9%	8.0%	3.9%	0.7%	*12690*

Data source: Destinations of Leavers from Higher Education Longitudinal Survey 2004/05, 2009 (IES analysis)

Subject knowledge was a more likely requirement for biomedical doctoral graduates. However, subject was less likely to be to a formal requirement for biological science doctoral graduates. Arts and humanities doctoral graduates were more likely than others to be in roles where their specialism was not considered to be important to employers.

Generally, the subject or discipline of study was considerably more important to doctoral graduates than to masters graduates or first degree graduate respondents (22% and 25% felt it was a formal entry requirement, respectively).

Skills and competencies, work experience and further qualifications

Skills and competencies also appear to be important in the recruitment of doctoral graduates, as evidence of skills and competencies was a formal requirement for 46%, important to a further 47%, and helpful to 4%. This evidence was more likely to be a formal requirement for those from biomedical sciences and social sciences, and less so for those from biological sciences, and physical sciences and engineering disciplines. There was no real variation here when comparing the responses of doctoral graduates with those graduating with a masters or first degree.

Work experience does appear to be important, rather than a formal requirement, to employers. Of those doctoral graduate respondents with work experience prior to taking up their current position, 51% felt this had been important to their employer.

Of those respondents that had gone on take further qualifications after receiving their doctorate, these qualifications were relatively less likely to have been a formal requirement for entry (22%). Generally, these were considered to be not important (30%) in the recruitment decisions of employers.

Table 5.9: Perceived importance by doctoral graduate respondents in UK employment of educational factors and work experience in gaining current employment by discipline (November 2008)

	Importance to employer					
Factors	Formal requirement	Important	Not very important but helped	Not important	Don't know	(N)
Qualification type (All)	**49.5%**	**31.6%**	**12.1%**	**6.4%**	**0.4%**	***1615***
Arts and humanities	51.3%	25.5%	11.3%	10.2%	1.7%	*175*
Biological sciences	58.7%	20.6%	14.2%	6.6%	0.0%	*220*
Biomedical sciences	54.4%	28.8%	11.3%	4.9%	0.6%	*400*
Physical sciences and engineering	44.0%	37.4%	12.8%	5.8%	0.1%	*550*
Social Sciences	45.7%	37.4%	11.3%	5.2%	0.4%	*180*
Subject (All)	**40.5%**	**41.2%**	**11.0%**	**7.1%**	**0.2%**	***1610***
Arts and humanities	40.2%	34.0%	10.7%	15.1%	0.0%	*180*
Biological sciences	38.0%	47.7%	7.8%	6.5%	0.0%	*220*
Biomedical sciences	45.0%	35.7%	13.3%	6.0%	0.0%	*400*
Physical sciences and engineering	40.1%	45.7%	8.6%	5.4%	0.1%	*545*
Social Sciences	40.3%	37.5%	14.7%	6.0%	1.5%	*180*
Skills and competencies (All)	**46.2%**	**46.7%**	**3.6%**	**2.8%**	**0.8%**	***1610***
Arts and humanities	44.7%	45.0%	4.7%	4.6%	1.0%	*175*
Biological sciences	42.5%	48.6%	5.5%	2.9%	0.6%	*220*
Biomedical sciences	51.9%	43.0%	2.7%	2.1%	0.3%	*400*
Physical sciences and engineering	40.8%	52.8%	3.7%	1.9%	0.8%	*550*
Social Sciences	55.0%	38.7%	2.7%	1.6%	1.9%	*180*

Data source: Destinations of Leavers from Higher Education Longitudinal Survey 2004/05, 2009 (IES analysis)

5.4.1 Value of a doctorate by occupational cluster

The perceived value of the doctorate and subject knowledge is likely to vary by occupational clusters. Stakeholders suggested that the doctorate was likely to be particularly important for a career in HE: '[it is] almost impossible to move on in an academic career without a doctorate'.

81% of respondents in HE research roles felt their doctorate had been a formal requirement for entry, as did 63% of those in HE teaching and lecturing roles (Table 5.10). Whereas 51% of respondents in research roles outside HE felt their qualification had been critical in obtaining employment; 41% of those in teaching occupations in the wider education sector and 31% of those in other common doctoral occupations also felt their doctorate had been a formal requirement.

Subject of study, or specialism, appeared to be more important (i.e. a formal requirement) to respondents taking up research roles in HE, than to those in research roles outside academia (49% compared with 38%). Generally subject of study was more commonly a formal requirement for respondents in teaching roles.

For those in other common doctoral occupations (e.g. working as health professionals, functional managers, engineering and ICT professionals) and other occupations, evidence of skills and competencies was considered to be a more common requirement than either type of qualification or subject specialism.

Table 5.10:

Perceived importance by doctoral graduate respondents in UK employment of educational factors and work experience in gaining current employment by outcome cluster (November 2008)

	Importance to employer					
Factors	Formal requirement	Important	Not very important but helped	Not important	Don't know	(N)
Qualification type (All)	**49.5%**	**31.6%**	**12. 1%**	**6.4%**	**0.4%**	*1615*
HE research occupations	80.6%	16.9%	1.8%	0.7%	0.0%	*295*
Research (not in HE sector)	51.2%	34.9%	10.7%	3.3%	0.0%	*210*
Teaching and lecturing in HE	63.4%	29.7%	4.2%	2.3%	0.4%	*370*
Other teaching occupations	40.8%	24.7%	23.5%	11.0%	0.0%	*105*
Other common doctoral occupations	31.1%	40.1%	20.1%	7.9%	0.8%	*395*
Other occupations	22.1%	38.7%	19.8%	18.5%	1.0%	*240*
Subject (All)	**40.6%**	**41.2%**	**11.0%**	**7.1%**	**0.2%**	*1610*
HE research occupations	49.2%	43.7%	4.2%	2.6%	0.3%	*295*
Research (not in HE sector)	37.8%	52.2%	8.2%	1.3%	0.4%	*205*
Teaching and lecturing in HE	54.1%	37.8%	6.1%	1.9%	0.2%	*370*
Other teaching occupations	51.4%	21.5%	11.9%	15.2%	0.0%	*105*
Other common doctoral occupations	33.5%	40.9%	18.1%	7.2%	0.2%	*395*
Other occupations	19.1%	41.0%	16.8%	22.8%	0.3%	*240*
Skills and competencies (All)	**46.2%**	**46.7%**	**3.6%**	**2.8%**	**0.8%**	*1610*
HE research occupations	50.2%	48.3%	0.8%	0.4%	0.4%	*295*
Research (not in HE sector)	46.2%	49.2%	2.4%	1.8%	0.3%	*205*
Teaching and lecturing in HE	51.2%	43.7%	2.6%	1.2%	1.2%	*370*
Other teaching occupations	29.0%	58.0%	6.6%	5.7%	0.7%	*100*
Other common doctoral occupations	45.3%	45.7%	4.2%	4.3%	0.5%	*395*
Other occupations	41.3%	44.3%	7.6%	5.3%	1.5%	*240*

Data source: Destinations of Leavers from Higher Education Longitudinal Survey 2004/05, 2009 (IES analysis)

6 Impact

6.1 Key statistics

Use of knowledge, skills and experience of their doctoral experience in the workplace

- Research skills were used most of the time by 49% of doctoral graduates: 40% frequently engaging in research activities (conducting, interpreting and evaluating research); at least 40% conducting research some of the time in all clusters.
- General disciplinary knowledge was used some (24%) or most of the time (66%); at least 70% used this some of the time in all clusters; highest in HE teaching and lecturing (97%).
- Generic skills were used some (32%) or most of the time (59%); at least 80% used these some of the time in all clusters; highest in HE occupations (96%).
- Tendency to work autonomously (59%) most of the time and with no close supervision (43%); 89% worked as part of a team at least some of the time.
- Enabled respondents to be innovative to some (46%) or great extent (46%); at least 80% to some extent in all clusters; highest for non-HE research (51% to great extent).
- 92% felt they made a difference in the workplace to some (52%) or great extent (40%); at least 80% to some extent in all clusters; Very few (6%) felt they had no impact at all.

The value of the doctorate to careers and quality of life

- Enabled progess towards long term career goals to some (40%) or great extent (50%); at least 70% to some extent in all clusters; not at all for 22% in 'other occupations' cluster
- Provided access to immediate or short-term job opportunities in a chosen career to some (41%) or great extent (34%); at least 60% to some extent in all clusters; not at all for 34% in 'other occupations' cluster
- Enhanced their social and intellectual capabilities to some (47%) or great extent (40%); at least 80% to some extent in all clusters; highest in HE teaching and lecturing (91%).
- Enhanced the quality of doctoral graduates lives to some (50%) or great extent (38%); at least 80% to some extent in all clusters; highest in teaching roles (90%).

Assessing the impact of the doctorate and doctoral graduates is becoming increasingly important. However, there are few standard measures of impact and impact can take many years to become evident. A new section was added to the L DLHE survey specifically targeted at postgraduate researchers[45] to try to examine this issue, particularly to identify how and where doctoral graduates have the potential to create impact. The challenge of measuring impact was also an important focus of discussions with stakeholders and doctoral graduates. Their feedback provides a context for the findings on impact that follow.

6.2 Challenges in measuring impact

Stakeholders talked of the difficulties of assessing impact, especially within the short career horizon of the study (three and a half years after graduation) This was echoed in the focus groups with doctoral graduates: 'someone may do some research that contributes to the development of a drug to treat cancer in 40 years time'

There are further challenges in applying similar measures of impact across doctoral graduates from different disciplines and employed in different sectors. For example, the stakeholders talked of how, in academia, impact measures could include contribution to the research field and numbers of publications; while, in the private sector, more appropriate indicators of impact might be salary levels, employment rates, and the innovation and success of organisations employing postgraduate researchers. In general they felt that doctoral study had a positive impact particularly to individuals:

- acting as a passport to specific careers, particularly HE careers. This is supported by the finding that 81% of doctoral graduate respondents in HE research roles felt their doctorate had been a formal requirement for entry
- acting as a signal to potential employers of key skills such as creative thinking, innovative approach, analytical and problem solving skills, in-depth specialist knowledge, presentation skills, teamworking and communication skills. This is supported by the finding that 93% of doctoral graduate respondents felt that evidence of their skills and competencies had been either a formal requirement or important in gaining their current role
- enabling faster progression in organisations and in their careers. This may be evidenced by the finding that 93% were either very or fairly satisfied with their career to date, a higher proportion than found across graduates of all levels (particularly first degree graduates).

'…the maturity that comes with a doctoral qualification, the understanding of the whole variety of complex issues and principles of critical thinking mean that doctoral graduates can progress faster once they are in employment'.

Stakeholder comment

Doctoral study can also add value for employers, providing them with a broad range of skills that are crucial for innovation. The application of skills and knowledge and the potential to be innovative in the workplace were explored in the survey. Stakeholders felt that capturing and quantifying added value or impact on a wider social level would be particularly challenging.

[45] These additional questions were only answered by research postgraduates, so comparison with other qualifying cohorts is not possible

Data source: Destinations of Leavers from Higher Education Longitudinal Survey 2004/05, 2009 (IES analysis)

In the focus groups, doctoral graduates discussed the individual benefits to a doctorate. They also mentioned the 'passport' nature of the qualification for HE careers. Yet some felt the impact of a doctorate may 'wear off' after the getting initial job, particularly in HE: 'it gets you in the door but once you're there it's irrelevant. Your progression depends much more on your personal relationships within the department, how good you are at winning work, and what you publish'.

These skills were considered to be very different to those developed during doctoral study.

Doctoral graduates in the focus groups felt the wider benefits of a doctorate to be:

- the skills doctoral graduates bring (the ability to innovate, problem solving, analytical skills and risk taking) provided the organisation culture would allow these to thrive
- independence, showing a commitment and an ability to 'deliver something large on your own'; qualities essential for self employment
- wider impacts not necessarily related to one's job, such as inspiring others to study to a higher level, becoming involved in charitable work, sitting on committees and writing on community issues.

6.3 Use of knowledge, skills and experience

Reflecting some of the themes outlined by the stakeholders and focus groups, three groups of indicators were explored in the survey to identify the potential impact of doctoral graduates in the workplace: engagement with research activity, use of knowledge and skills, and the potential to work with and influence others (Table 6.1).

6.3.1 Engagement in research activity

Approximately two in five doctoral graduate respondents frequently engaged in research activities in their work: critically evaluating research findings (41% most of the time), interpreting research data (40%), and conducting research (40%) (Table 6.1). A further quarter to one-third did so some of the time (34%, 33% and 26% respectively). Regular engagement with research was more common among those from biological sciences and social sciences disciplines, and rarer for those from arts and humanities.

Those in HE research roles were the most likely to regularly engage in research activities, considerably more so than those in wider research roles (Table 6.3). 88% of respondents in HE research conducted research most of the time, 76% interpreted research data most of the time, and 77% critically evaluated research findings most of the time[46]: this compares with 54%, 58% and 54% of those in wider research roles. Research activities were less common for those in teaching roles outside HE and in other occupations.

Table 6.1: How often doctoral graduate respondents in UK employment have the opportunity to undertake the following in their current job (November 2008)

N=1575	Most of the time	Some of the time	Occasionally	Not at all
Engage in research activity				
Conduct research	40.0%	26.1%	19.1%	14.7%
Interpret research data	39.5%	33.1%	16.4%	10.9%
Critically evaluate research findings	41.1%	34.0%	14.5%	10.5%
Use of knowledge and skills				
Draw on the detailed knowledge on which your research degree was based	34.0%	33.2%	16.5%	16.3%
Use your general disciplinary knowledge	65.6%	24.2%	6.6%	3.6%
Use the research skills you developed as a research student	48.5%	33.0%	12.4%	6.1%
Use the generic skills you developed as a research student	59.3%	32.0%	6.7%	1.9%
Work with others				
Work autonomously	59.0%	36.4%	3.4%	1.2%
Work as part of a team	39.4%	49.3%	8.5%	2.9%
Work under close supervision	4.2%	14.0%	39.3%	42.5%
Have responsibility for supervising the work of others	32.4%	37.6%	18.5%	11.5%

[46] A few doctoral graduate respondents working in HE research roles reported limited engagement in research activity; these individuals may be in more managerial roles

Data source: Destinations of Leavers from Higher Education Longitudinal Survey 2004/05, 2009 (IES analysis)

Table 6.2: How often doctoral graduate respondents in UK employment have the opportunity to engage in research activity in their current job by discipline (November 2008)

	All	Arts and humanities	Biological sciences	Biomedical sciences	Physical sciences and engineering	Social sciences
Conduct research						
Most of the time	40.0%	26.6%	49.8%	40.9%	38.3%	49.5%
Some of the time	26.1%	39.0%	16.9%	21.8%	25.9%	31.0%
Occasionally	19.1%	20.2%	12.5%	25.1%	19.0%	11.5%
Not at all	14.7%	14.2%	20.8%	12.2%	16.7%	7.9%
(N)	*1575*	*175*	*220*	*385*	*535*	*180*
Interpret research data						
Most of the time	39.5%	23.1%	49.5%	43.1%	37.0%	44.5%
Some of the time	33.1%	38.2%	26.5%	34.5%	31.6%	34.0%
Occasionally	16.4%	22.6%	12.2%	16.2%	17.3%	13.0%
Not at all	10.9%	16.1%	11.8%	6.1%	14.1%	8.5%
(N)	*1575*	*175*	*215*	*385*	*535*	*175*
Critically evaluate research findings						
Most of the time	41.1%	27.3%	48.5%	45.7%	37.0%	50.1%
Some of the time	34.0%	40.6%	26.4%	37.9%	30.5%	33.2%
Occasionally	14.5%	15.7%	12.9%	12.1%	16.9%	13.5%
Not at all	10.5%	16.4%	12.3%	4.3%	15.5%	3.2%
(N)	*1575*	*175*	*215*	*385*	*540*	*175*

Table 6.3: How often doctoral graduate respondents in UK employment have the opportunity to engage in research activity in their current job by outcome cluster (November 2008)

	All	HE Research Occupations	Research (not in HE sector)	Teaching and lecturing in HE	Other teaching Occupations	Other Common doctoral Occupations	Other Occupations
Conduct research							
Most of the time	40.1%	88.4%	53.5%	36.2%	19.0%	16.1%	17.2%
Some of the time	26.2%	7.2%	26.8%	44.4%	19.6%	27.8%	23.4%
Occasionally	19.1%	2.5%	11.4%	15.0%	21.5%	35.7%	25.3%
Not at all	14.7%	1.9%	8.3%	4.4%	39.9%	20.4%	34.1%
(N)	*1575*	*290*	*210*	*365*	*100*	*375*	*235*
Interpret research data							
Most of the time	39.5%	76.2%	58.0%	34.7%	17.5%	21.0%	20.3%
Some of the time	33.2%	18.0%	28.2%	45.6%	20.6%	41.1%	30.6%
Occasionally	16.4%	3.7%	10.9%	12.7%	29.0%	25.6%	23.6%
Not at all	10.9%	2.2%	2.9%	7.0%	32.9%	12.3%	25.5%
(N)	*1570*	*290*	*210*	*360*	*100*	*375*	*235*
Critically evaluate research findings							
Most of the time	41.1%	77.1%	54.1%	39.9%	19.2%	23.6%	21.0%
Some of the time	34.0%	16.6%	30.4%	48.1%	21.4%	42.7%	29.0%
Occasionally	14.5%	4.7%	11.8%	8.2%	28.1%	21.9%	21.6%
Not at all	10.4%	1.6%	3.7%	3.8%	31.2%	11.8%	28.5%
(N)	*1575*	*290*	*210*	*365*	*100*	*375*	*240*

Data source: Destinations of Leavers from Higher Education Longitudinal Survey 2004/05, 2009 (IES analysis)

6.3.2 Use of knowledge and skills in employment

Generally, doctoral graduate respondents were more likely to use their general disciplinary knowledge (66% most of the time and 24% some of the time) and their generic skills developed whilst studying (59% most of the time, 32% some of the time); than engage in research or work with others (Table 6.4).

Research skills developed during their doctoral study were used by 49% of doctoral graduate respondents most of the time, and 33% some of the time. The detailed knowledge on which their research degree was based was used by 34% of doctoral graduates most of the time, and 33% some of the time.

Regular use of specialist knowledge was more common among those from social science disciplines, as was the regular use of the research skills and generic skills developed as a doctoral researcher. This range of specialist and generalist knowledge and skills was used relatively less regularly in the workplace by those from physical sciences and engineering courses.

Those in the HE sector, in teaching and lecturing, and particularly research roles, were the most likely to regularly use the skills and knowledge developed during their doctoral study (specific subject knowledge, general disciplinary knowledge, research skills and generic skills) (Table 6.5). It is interesting to note that even in HE research roles a fairly large majority are drawing on generic skills and general disciplinary knowledge most of the time (75% and 75%, respectively); which outstrips the proportion using their detailed doctoral knowledge most of the time (54%).

Table 6.4: How often doctoral graduate respondents in UK employment have the opportunity to use their knowledge and skills gained during doctoral study in their current job by discipline (November 2008)

	All	Arts and humanities	Biological sciences	Biomedical sciences	Physical sciences and engineering	Social sciences
Draw on the detailed knowledge on which your research degree was based						
Most of the time	34.0%	36.2%	34.8%	35.6%	30.0%	41.8%
Some of the time	33.2%	28.6%	33.3%	33.9%	31.7%	38.0%
Occasionally	16.5%	16.4%	16.3%	17.5%	15.8%	13.8%
Not at all	16.3%	18.7%	15.6%	13.0%	22.5%	6.5%
(N)	1575	175	215	385	540	180
Use your general disciplinary knowledge						
Most of the time	65.6%	67.1%	63.0%	71.4%	62.9%	63.0%
Some of the time	24.2%	19.8%	26.2%	22.6%	25.6%	24.0%
Occasionally	6.6%	6.3%	8.0%	3.8%	6.9%	9.4%
Not at all	3.6%	6.8%	2.9%	2.2%	4.5%	3.6%
(N)	1575	175	215	380	540	180
Use the research skills you developed as a research student						
Most of the time	48.5%	51.1%	49.9%	45.3%	47.6%	57.8%
Some of the time	33.0%	33.8%	27.9%	36.3%	31.3%	33.7%
Occasionally	12.4%	9.9%	14.9%	13.3%	13.5%	4.3%
Not at all	6.1%	5.2%	7.2%	5.1%	7.6%	4.2%
(N)	1575	175	215	385	540	180
Use the generic skills you developed as a research student						
Most of the time	59.3%	55.4%	59.2%	56.4%	61.9%	64.7%
Some of the time	32.0%	32.9%	35.8%	34.6%	29.1%	27.0%
Occasionally	6.7%	7.9%	3.1%	7.5%	6.8%	7.6%
Not at all	1.9%	3.9%	1.9%	1.6%	2.2%	0.7%
(N)	1575	175	215	385	540	175

Data source: Destinations of Leavers from Higher Education Longitudinal Survey 2004/05, 2009 (IES analysis)

Table 6.5: How often doctoral graduate respondents in UK employment have the opportunity to use their knowledge and skills gained during doctoral study in their current job by outcome cluster (November 2008)

	All	HE Research Occupation	Research (not in HE sector)	Teaching and lecturing in HE	Other teaching occupations	Other common doctoral occupations	Other occupations
Draw on the detailed knowledge on which your research degree was based							
Most of the time	34.0%	54.3%	31.2%	46.6%	18.3%	20.5%	19.7%
Some of the time	33.3%	31.6%	38.5%	40.6%	30.9%	33.2%	20.1%
Occasionally	16.4%	10.9%	15.7%	9.3%	16.7%	22.0%	26.0%
Not at all	16.2%	3.3%	14.5%	3.5%	34.1%	24.3%	34.2%
(N)	*1575*	*290*	*210*	*365*	*100*	*375*	*235*
Use your general disciplinary knowledge							
Most of the time	65.7%	74.9%	67.0%	77.3%	59.0%	59.6%	47.6%
Some of the time	24.1%	19.9%	27.7%	20.0%	24.6%	28.1%	25.6%
Occasionally	6.6%	3.9%	5.0%	2.5%	8.5%	8.3%	14.1%
Not at all	3.6%	1.2%	0.4%	0.2%	7.9%	4.0%	12.7%
(N)	*1575*	*285*	*210*	*365*	*100*	*375*	*240*
Use the research skills you developed as a research student							
Most of the time	48.6%	77.8%	60.8%	59.8%	29.0%	27.3%	25.2%
Some of the time	33.0%	18.2%	27.0%	35.2%	37.4%	43.8%	34.4%
Occasionally	12.4%	2.5%	8.4%	3.7%	19.5%	21.8%	23.7%
Not at all	6.0%	1.5%	3.8%	1.3%	14.0%	7.0%	16.7%
(N)	*1575*	*290*	*205*	*365*	*100*	*375*	*240*
Use the generic skills you developed as a research student							
Most of the time	59.4%	74.7%	66.7%	66.5%	46.6%	49.0%	43.7%
Some of the time	32.0%	21.3%	27.8%	29.1%	42.8%	40.3%	36.5%
Occasionally	6.7%	3.0%	5.5%	3.8%	5.8%	9.1%	13.8%
Not at all	1.9%	1.1%	0.0%	0.6%	4.7%	1.7%	6.0%
(N)	*1575*	*290*	*210*	*365*	*100*	*375*	*240*

Data source: Destinations of Leavers from Higher Education Longitudinal Survey 2004/05, 2009 (IES analysis)

6.3.3 Working with others

Generally, doctoral graduate respondents tend to work autonomously (59% did so most of the time) and without close supervision (43% worked with no close supervision) (Table 6.6). However, almost half (49%) of doctoral graduates worked as part of a team some of the time, particularly biomedical science doctoral graduates (49% most of the time and 46% some of the time). Indeed, working autonomously and working as part of a team were not found to be mutually exclusive. For example, of those working autonomously most of the time, 42% were also working as part of a team most of the time, and 44% were working as part of a team some of the time.

Respondents most likely to regularly work autonomously were from social science disciplines (71%), and concomitantly were least likely to regularly work as part of a team (32%). This suggests that, to a certain extent, the way of working mirrored experiences of doctoral study (see 2.4); but teamworking was generally more pronounced in employment than during studies. Respondents from arts and humanities disciplines appeared to have the most autonomy over their work, with 51% reporting working without close supervision.

Most doctoral graduate respondents had at least some degree of supervisory responsibility. Approximately one-third of respondents supervised the work of others most of the time (32%) and a further 38% did so some of the time. Those most likely to supervise others were from biomedical science disciplines (40% did so most of the time), and those least likely to do so were from social sciences (20% had no supervisory responsibilities at all).

Those working in HE, either in research or in teaching and lecturing roles, were considerably more likely to be regularly working autonomously (66% and 71% did so most of the time) (Table 6.7). This contrasts with those working in wider research roles (outside academia) and in other common doctoral occupations, who were much less likely to be doing so (49% and 51%, respectively).

The same pattern is seen with teamworking. Respondents in HE were less likely to work as part of a team most of the time (30% of those in HE research and 31% in teaching and lecturing roles) whereas those in common doctoral occupations and wider research roles were more likely to regularly work as part of a team (48% and 44%).

Respondents in teaching roles were least likely to work under close supervision. 56% of those teaching and lecturing in HE and 50% of those in wider teaching roles did not work under close supervision at all.

Table 6.6: How often doctoral graduate respondents in UK employment have the opportunity to work with others in their current job by discipline (November 2008)

	All	Arts and humanities	Biological sciences	Biomedical sciences	Physical sciences and engineering	Social sciences
Work autonomously						
Most of the time	59.0%	62.9%	57.8%	62.1%	51.3%	71.4%
Some of the time	36.4%	34.0%	37.9%	32.4%	44.1%	25.7%
Occasionally	3.4%	1.2%	2.1%	4.6%	3.4%	2.9%
Not at all	1.2%	1.9%	2.2%	0.9%	1.2%	0.0%
(N)	*1580*	*175*	*215*	*385*	*540*	*180*
Work as part of a team						
Most of the time	39.4%	32.9%	36.7%	49.0%	35.8%	32.1%
Some of the time	49.3%	53.0%	52.2%	46.2%	52.4%	45.5%
Occasionally	8.5%	7.2%	6.7%	4.4%	10.3%	14.8%
Not at all	2.9%	6.8%	4.3%	0.3%	1.5%	7.6%
(N)	*1575*	*175*	*215*	*385*	*540*	*180*
Work under close supervision						
Most of the time	4.2%	3.5%	3.3%	5.8%	4.3%	2.9%
Some of the time	14.0%	12.8%	12.1%	16.0%	14.1%	12.6%
Occasionally	39.3%	33.2%	43.6%	39.6%	40.1%	39.1%
Not at all	42.5%	50.6%	41.0%	38.6%	41.4%	45.4%
(N)	*1575*	*175*	*215*	*385*	*540*	*180*
Have responsibility for supervising the work of others						
Most of the time	32.4%	30.5%	30.4%	39.5%	27.1%	27.3%
Some of the time	37.6%	39.0%	40.4%	38.8%	37.3%	33.9%
Occasionally	18.5%	16.0%	17.8%	15.3%	23.0%	19.3%
Not at all	11.5%	14.6%	11.4%	6.5%	12.6%	19.5%
(N)	*1575*	*175*	*215*	*385*	*540*	*180*

Data source: Destinations of Leavers from Higher Education Longitudinal Survey 2004/05, 2009 (IES analysis)

Table 6.7: How often doctoral graduate respondents in UK employment have the opportunity to work with others in their current job by outcome cluster (November 2008)

	All	HE Research Occupation	Research (not in HE sector)	Teaching and lecturing in HE	Other teaching occupations	Other common doctoral occupations	Other occupations
Work autonomously							
Most of the time	59.0%	65.8%	48.8%	70.9%	60.5%	50.9%	54.8%
Some of the time	36.4%	31.5%	44.6%	28.5%	32.9%	42.0%	38.9%
Occasionally	3.4%	1.8%	5.1%	0.4%	4.0%	5.8%	4.0%
Not at all	1.2%	0.9%	1.5%	0.2%	2.5%	1.3%	2.3%
(N)	*1580*	*290*	*210*	*365*	*100*	*375*	*240*
Work as part of a team							
Most of the time	39.4%	30.1%	44.4%	31.4%	47.6%	48.3%	40.5%
Some of the time	49.3%	56.6%	46.9%	55.4%	39.3%	45.3%	43.0%
Occasionally	8.5%	10.8%	7.7%	10.2%	2.9%	6.4%	9.2%
Not at all	2.9%	2.4%	1.0%	3.0%	10.2%	0.0%	7.3%
(N)	*1575*	*290*	*210*	*365*	*100*	*375*	*235*
Work under close supervision							
Most of the time	4.2%	1.6%	5.4%	1.3%	4.5%	6.9%	6.4%
Some of the time	14.1%	20.1%	17.7%	8.6%	12.0%	14.0%	11.5%
Occasionally	39.3%	40.4%	43.9%	34.0%	33.8%	40.3%	42.1%
Not at all	42.4%	37.8%	32.9%	56.2%	49.7%	38.8%	40.0%
(N)	*1575*	*290*	*210*	*365*	*100*	*375*	*235*
Have responsibility for supervising the work of others							
Most of the time	32.4%	20.7%	25.0%	36.5%	52.7%	38.7%	30.1%
Some of the time	37.6%	42.6%	42.0%	44.3%	20.9%	34.1%	28.6%
Occasionally	18.5%	23.2%	19.7%	12.0%	17.9%	17.9%	22.3%
Not at all	11.5%	13.5%	13.3%	7.2%	8.5%	9.2%	19.0%
(N)	*1575*	*290*	*210*	*365*	*100*	*375*	*240*

6.4 Benefits and wider impact of doctoral study

The potential wider impact or benefits of research training were explored through three groups of indicators: benefits in the workplace (workplace change and innovation), benefits to careers (short-term opportunities and long-term direction), and benefits to wider life (intellectual and social capabilities, and quality of life) (Table 6.8). Generally, they show that all doctoral graduate respondents, whether in employment or not[47], have a very positive view of the wider impact of their doctoral study experience, particularly in terms of helping them to achieve their career goals in the long-term, and being able to be creative/innovative.

Table 6.8: Extent to which the doctoral experience has enabled all doctoral graduate respondents to undertake the following in their work and lives (November 2008)

Extent	Great extent	Some extent	Not at all	Don't know	(N)
In the workplace					
Be innovative in the workplace	45.7%	45.5%	6.1%	2.7%	*1990*
Make a difference in the workplace	38.8%	51.3%	6.9%	3.0%	*1985*
In careers					
Access immediate or short-term job opportunities in your chosen career	33.3%	40.1%	20.4%	6.3%	*1990*
Progress towards your long term career aspirations	47.8%	39.1%	9.4%	3.7%	*2000*
In wider life					
Enhance your social and intellectual capabilities beyond employment	40.1%	46.4%	10.6%	3.0%	*2005*
Enhance the quality of your life generally	37.8%	49.2%	10.1%	2.9%	*2005*

[47] In exploring the wider benefits of doctoral study, the analysis in this section includes all doctoral graduate respondents, not just those in employment in the UK

Data source: Destinations of Leavers from Higher Education Longitudinal Survey 2004/05, 2009 (IES analysis)

6.4.1 Benefits in the workplace

46% of doctoral graduate respondents felt their doctorate had enabled them to be innovative in the workplace to a great extent, and a further 46% felt they were able to do so to some extent (Table 6.10). The majority of doctoral graduates also felt they were able to make a difference in the workplace, with 39% feeling able to do so to a great extent, and a further 51% to some extent.

The data suggests that social science and arts and humanities doctoral graduate respondents were relatively less likely than those from other disciplines to feel their doctorate had enabled them to have an impact in the workplace (Table 6.10).

There was no real difference in terms of workplace benefits between respondents either working in the UK or working overseas (Table 6.9), but there were differences by occupational cluster (Table 6.11). Respondents in research roles, either in HE or beyond, were the most likely to innovate in the workplace (49% and 51% respectively, to a great extent). Those in research roles outside the HE sector were the most likely to feel they make a considerable difference in the workplace (49%). Those in teaching roles outside HE and in other occupations were least likely to feel they could be innovative or that they made a difference.

6.4.2 Benefits to careers

Overall, respondents believe their doctoral study is helpful to their careers, particularly to their longer-term careers. This is consistent with the general career and long-term focus seen in motivations for taking current job (see 5.3.) and with the high levels of satisfaction with career to date (see 3.3.6).

The doctoral study experience had enabled progress towards long-term goals for 48% of doctoral graduate respondents to a great extent, and for 39% to some extent (Table 6.13). One third of respondents felt it had enabled them to access immediate or short-term (career) job opportunities to a great extent, and a further 40% to some extent. However, one in five felt that their research experience had not helped them in this way at all. There was very little difference in perceived career benefits between those working in the UK and those working in the rest of the EU (Table 6.12).

A doctoral qualification was regarded as particularly helpful to careers for those from biomedical sciences, who also tended to be more career focused, and feel that their doctoral qualification, their field of study and their skills and competencies were a formal requirement for job entry (Table 6.13). A doctoral qualification was relatively less likely to have helped the careers of arts and humanities doctoral graduate respondents. 30% of respondents from arts and humanities disciplines felt their doctoral study had not enabled them to access job opportunities at all, and 17% felt their doctoral study experience had not helped them progress towards their longer-term career aspirations.

Table 6.9: Extent to which the doctoral experience has enabled all doctoral graduate respondents to undertake the following in their work and lives by labour market activity and location (where known)

	All	In employment in the UK	Other UK	Overseas (working or other)
Be innovative in the workplace				
A great extent	46.3%	46.2%	38.5%	50.1%
Some extent	45.6%	46.2%	39.4%	43.7%
Not at all	5.5%	5.1%	15.4%	4.7%
Don't know	2.6%	2.5%	6.7%	1.5%
(N)	*1930*	*1580*	*90*	*260*
Make a difference in the workplace				
A great extent	39.2%	39.6%	23.5%	42.4%
Some extent	51.6%	52.0%	46.2%	50.8%
Not at all	6.4%	5.9%	19.1%	5.1%
Don't know	2.7%	2.4%	11.1%	1.8%
(N)	*1925*	*1580*	*90*	*260*

Table 6.10: Extent to which the doctoral experience has enabled all doctoral graduate respondents to undertake the following in their work and lives by discipline

	All	Arts and humanities	Biological sciences	Biomedical sciences	Physical sciences and engineering	Social sciences
Be innovative in the workplace						
A great extent	45.7%	43.5%	48.8%	46.2%	47.4%	41.0%
Some extent	45.5%	40.9%	44.5%	47.8%	45.3%	46.6%
Not at all	6.1%	12.0%	4.3%	3.7%	4.7%	10.1%
Don't know	2.7%	3.5%	2.4%	2.3%	2.6%	2.4%
(N)	*1990*	*240*	*270*	*450*	*675*	*250*
Make a difference in the workplace						
A great extent	38.8%	35.2%	39.6%	41.8%	38.1%	37.6%
Some extent	51.3%	49.4%	54.3%	49.3%	52.8%	50.3%
Not at all	6.9%	11.8%	3.5%	6.2%	5.9%	9.1%
Don't know	3.0%	3.7%	2.6%	2.7%	3.2%	3.1%
(N)	*1985*	*240*	*270*	*450*	*675*	*245*

Data source: Destinations of Leavers from Higher Education Longitudinal Survey 2004/05, 2009 (IES analysis)

Table 6.11: Extent to which the doctoral experience has enabled doctoral graduate respondents in UK employment to undertake the following in their work and lives by occupational cluster

	All	HE Research Occupation	Research (not in HE sector)	Teaching and lecturing in HE	Other teaching occupations	Other common doctoral occupations	Other occupations
Be innovative in the workplace							
A great extent	46.2%	48.9%	50.9%	46.5%	46.5%	43.9%	41.6%
Some extent	46.2%	46.8%	45.2%	47.1%	42.1%	49.4%	40.3%
Not at all	5.1%	2.6%	3.2%	4.2%	9.2%	3.5%	13.1%
Don't know	2.5%	1.7%	0.7%	2.1%	2.2%	3.2%	5.0%
(N)	*1580*	*290*	*205*	*365*	*100*	*375*	*240*
Make a difference in the workplace							
A great extent	39.7%	38.7%	49.3%	40.4%	35.2%	40.1%	31.7%
Some extent	52.0%	55.6%	47.0%	52.9%	48.8%	52.9%	49.8%
Not at all	5.9%	4.2%	2.6%	4.5%	11.7%	4.5%	14.1%
Don't know	2.4%	1.4%	1.1%	2.2%	4.3%	2.5%	4.5%
(N)	*1575*	*290*	*205*	*365*	*100*	*375*	*240*

Table 6.12: Extent to which the doctoral experience has enabled all doctoral graduate respondents to undertake the following in their work and lives by labour market activity and location

	All	In employment in the UK	Other UK	Overseas (working or other)
Access immediate or short-term job opportunities in your chosen career				
A great extent	33.6%	34.0%	14.2%	38.7%
Some extent	40.5%	41.3%	29.7%	39.5%
Not at all	19.9%	19.4%	40.6%	15.4%
Don't know	5.9%	5.3%	15.4%	6.4%
(N)	*1925*	*1575*	*95*	*255*
Progress towards your long term career aspirations				
A great extent	48.4%	49.5%	25.1%	49.9%
Some extent	39.6%	39.6%	38.8%	40.3%
Not at all	8.5%	7.7%	30.9%	5.2%
Don't know	3.5%	3.2%	5.2%	4.5%
(N)	*1930*	*1580*	*95*	*260*

Table 6.13: Extent to which the doctoral experience has enabled all doctoral graduate respondents to undertake the following in their work and lives by discipline

	All	Arts and humanities	Biological sciences	Biomedical sciences	Physical sciences and engineering	Social sciences
Access immediate or short-term job opportunities in your chosen career						
A great extent	33.3%	29.0%	30.3%	37.2%	33.7%	35.3%
Some extent	40.1%	36.4%	43.4%	41.3%	40.1%	38.4%
Not at all	20.4%	29.6%	18.9%	16.4%	19.2%	20.9%
Don't know	6.3%	5.0%	7.4%	5.1%	7.0%	5.4%
(N)	*1990*	*245*	*270*	*445*	*680*	*250*
Progress towards your long term career aspirations						
A great extent	47.8%	42.2%	45.2%	57.6%	42.2%	53.5%
Some extent	39.1%	39.5%	44.6%	34.8%	43.9%	29.8%
Not at all	9.4%	16.5%	6.7%	6.3%	8.8%	10.0%
Don't know	3.7%	1.8%	3.6%	1.4%	5.1%	6.7%
(N)	*2000*	*240*	*275*	*450*	*680*	*250*

Data source: Destinations of Leavers from Higher Education Longitudinal Survey 2004/05, 2009 (IES analysis)

Table 6.14: Extent to which the doctoral experience has enabled doctoral graduate respondents in UK employment to undertake the following in their work and lives by occupational cluster

	All	HE Research Occupation	Research (not in HE sector)	Teaching and lecturing in HE	Other teaching occupations	Other common doctoral occupations	Other occupations
Access immediate or short-term job opportunities in your chosen career							
A great extent	34.0%	43.1%	32.3%	44.6%	20.3%	29.6%	19.7%
Some extent	41.3%	41.9%	44.8%	35.9%	45.5%	42.6%	41.2%
Not at all	19.4%	11.9%	14.4%	14.0%	27.5%	23.0%	33.6%
Don't know	5.3%	3.1%	8.5%	5.4%	6.7%	4.8%	5.5%
(N)	*1575*	*290*	*205*	*365*	*95*	*375*	*240*
Progress towards your long term career aspirations							
A great extent	49.5%	62.4%	47.4%	66.1%	24.4%	43.2%	29.0%
Some extent	39.6%	34.1%	44.1%	28.5%	48.8%	45.1%	46.6%
Not at all	7.6%	2.0%	4.8%	2.9%	17.2%	7.8%	21.7%
Don't know	3.2%	1.5%	3.7%	2.6%	9.5%	3.8%	2.6%
(N)	*1575*	*290*	*210*	*365*	*100*	*375*	*240*

Respondents in HE research roles and HE teaching and lecturing roles were the most positive about the career benefits of their doctoral experience, both long-term direction (62% and 66% respectively, to a great extent) and short-term opportunities (43% and 45% to a great extent). (Table 6.14) This is in particular contrast to those doctoral graduate respondents in teaching roles outside the HE sector and those in other roles.

Respondents in HE research roles were also considerably more positive about their career prospects than those in research roles outside of HE. This contrasts somewhat with the finding that those in HE research roles were less likely than others to be very satisfied with their careers to date (see Table 4.9 p25). As noted earlier, this group were relatively more likely than those in other occupational clusters to be motivated by a desire to broaden experience and skills, to be able to progress in the organisation, and to gain experience in order to move on to their ideal job. This suggests that doctoral graduates in HE research may have longer-term goals, and see their current role as a stepping stone (see 5.3.1. Table 5.6 p29).

Those in teaching roles outside HE and, particularly, those in other occupations were the least likely to feel their doctoral study had had a positive impact on their short-term job opportunities or long-term career aspirations. These are also the clusters where respondents were the least likely to feel they could be innovative at work or make a difference in the workplace. It is interesting to note that although doctoral graduates in other common doctoral occupations have relatively positive views of benefits of the doctorate to their long-term career progression, almost one quarter (23%) felt their doctoral study had not helped them at all to access immediate or short-term career opportunities. This corresponds with the lower likelihood amongst this cluster that the doctorate and/or subject specialism was regarded as a formal entry requirement by their employers.

Table 6.15: Extent to which the doctoral experience has enabled all doctoral graduate respondents to undertake the following in their work and lives by labour market activity and location (where known)

	All	In employment in the UK	Other UK	Overseas (working or other)
Enhance your social and intellectual capabilities beyond employment				
A great extent	39.7%	39.5%	37.0%	42.2%
Some extent	46.8%	47.2%	48.5%	43.3%
Not at all	10.5%	10.6%	9.7%	10.6%
Don't know	3.0%	2.7%	4.8%	3.9%
(N)	*1935*	*1580*	*100*	*260*
Enhance the quality of your life generally				
A great extent	37.6%	37.9%	29.5%	39.2%
Some extent	49.6%	50.0%	53.0%	45.9%
Not at all	9.8%	9.4%	13.7%	10.5%
Don't know	2.9%	2.7%	3.8%	4.4%
(N)	*1935*	*1580*	*100*	*260*

6.4.3 Benefits beyond employment

Looking beyond the workplace, the doctoral study experience had also enhanced the quality of doctoral graduates' lives and enhanced their social and intellectual capabilities. 38% of all respondents felt their doctoral experience had enhanced their quality of life to a great extent and a further 49% said it had done so to some extent (Table 6.16). Similarly, 40% felt it had enhanced their social and intellectual capabilities to a great extent and 46% to

Data source: Destinations of Leavers from Higher Education Longitudinal Survey 2004/05, 2009 (IES analysis)

Table 6.16: Extent to which the doctoral experience has enabled all doctoral graduate respondents to undertake the following in their work and lives by discipline

	All	Arts and humanities	Biological sciences	Biomedical sciences	Physical sciences and engineering	Social sciences
Enhance your social and intellectual capabilities beyond employment						
A great extent	40.1%	51.6%	33.3%	36.5%	37.3%	47.6%
Some extent	46.4%	40.4%	51.0%	49.1%	46.5%	44.6%
Not at all	10.6%	5.7%	13.1%	11.7%	11.9%	5.9%
Don't know	3.0%	2.2%	2.7%	2.6%	4.3%	1.9%
(N)	*2005*	*245*	*270*	*450*	*680*	*255*
Enhance the quality of your life generally						
A great extent	37.8%	54.0%	29.0%	35.3%	35.3%	41.4%
Some extent	49.2%	36.3%	56.3%	50.4%	52.7%	42.0%
Not at all	10.1%	6.3%	13.1%	11.5%	8.3%	13.8%
Don't know	2.9%	3.4%	1.5%	2.8%	3.7%	2.8%
(N)	*2005*	*245*	*275*	*450*	*680*	*250*

Table 6.17: Extent to which the doctoral experience has enabled doctoral graduate respondents in UK employment to undertake the following in their work and lives by occupational clusters

	All	HE Research Occupation	Research (not in HE sector)	Teaching and lecturing in HE	Other teaching occupations	Other common doctoral occupations	Other occupations
Enhance your social and intellectual capabilities beyond employment							
A great extent	39.5%	34.9%	29.8%	45.8%	46.6%	39.8%	42.0%
Some extent	47.2%	50.0%	57.8%	45.4%	40.9%	45.5%	41.5%
Not at all	10.6%	12.7%	9.8%	6.7%	11.8%	11.5%	12.3%
Don't know	2.7%	2.4%	2.6%	2.1%	0.7%	3.2%	4.2%
(N)	*1575*	*290*	*210*	*365*	*100*	*375*	*240*
Enhance the quality of your life generally							
A great extent	37.9%	34.4%	29.8%	47.8%	35.3%	37.8%	36.6%
Some extent	50.0%	53.7%	55.9%	43.3%	54.7%	49.4%	48.5%
Not at all	9.4%	10.0%	11.6%	5.5%	8.6%	10.5%	11.2%
Don't know	2.7%	1.8%	2.7%	3.4%	1.4%	2.4%	3.7%
(N)	*1575*	*290*	*210*	*365*	*100*	*375*	*240*

some extent. Only one in ten doctoral graduates could perceive no wider benefits to their doctoral study experience.

The wider life benefits to doctoral study were considerably more likely to be recognised by those from arts and humanities (52% enhanced social and intellectual capabilities to a great extent, and 54% enhanced quality of life to a great extent) and also social science disciplines (48% and 41%, respectively) and less so by those from biological sciences disciplines (33% and 29%, respectively) (Table 6.16). This contrasts with perceptions around workplace impact and value in employment, where doctoral graduates of the social sciences and arts and humanities disciplines appeared less likely to perceive impact in the workplace (making a difference or ability to innovate) than those of other disciplines. This may reflect the different motivations of various disciplines to doctoral study. (Table 2.5, p12)

Those in UK employment compared with undertaking other activities, e.g. further study, time out of the labour market, looking for work, were more likely to feel that their doctoral study experience had brought wider benefits to their lives, particularly enhancing the quality of their lives (Table 6.15). These wider benefits of the doctoral experience were also more commonly reported by respondents employed in teaching roles, particularly those in the HE sector. 46% of this cluster felt their social and intellectual abilities beyond employment were enhanced to a great extent, and 48% felt their quality of life had been enhanced to a great extent by their doctoral study experience) (Table 6.17). This may be linked to the higher proportion of respondents from the social sciences and arts and humanities disciplines in these clusters.

Data source: Destinations of Leavers from Higher Education Longitudinal Survey 2004/05, 2009 (IES analysis)

7 Evidence of impact

In this chapter we bring together key messages that highlight that both employers and doctoral graduates are benefiting from investments in research training. It presents a picture of how doctoral graduates have the potential to have an impact in the workplace through the application of their knowledge and skills, through engaging in research activity, through working with and influencing others, and being innovative. It also explores how their doctoral training has an impact on their wider lives through developing fulfilling careers, enhancing social engagement and improving the quality of life.

We identify the dominant occupations of doctoral graduates three to four years after graduating to see where in the labour market the potential impact of doctoral graduates is likely to be seen. In this way we add evidence to the value that doctoral training brings to the UK, an area which the Smith review of postgraduate education[48] notes has been 'under-researched and under-appreciated'.

7.1 Do researchers make a difference?

Measuring the value or impact of researchers is important but challenging, not least because it can become manifest at any stage in their careers or through the research life cycle and beyond, and can often stem from unexpected or unintended outcomes. These issues were echoed in the feedback we collected from stakeholders and research doctoral graduates through focus groups and interviews on the impact of doctoral graduates.

Through the Doctoral Careers Pathway Study, RCUK Research Outcomes project and Pathways to Impact, Research Councils UK is attempting to capture and harmonise quantitative and qualitative evidence of the research and researchers they fund, and the ways in which potential impacts can be realised, both academic impacts and wider economic and societal impacts[49].

7.1.1 Innovation

This report explores doctoral respondents' perceptions of their impact in the workplace, and shows that between three and four years after graduating many feel they make a difference in the workplace (39% to a great extent and 51% some extent) and are able to be creative/to be innovative at work (46% to great extent, 46% to some extent). Very few (7%) felt they had no impact at all at work.

Ability to innovate was a benefit or value recognised by both employers and doctoral graduates. Recent work by Vitae[50] and CIHE[51] found that employers particularly valued the new ideas and innovation that doctoral graduates bring to their business. However focus group discussions with doctoral graduates indicate that this impact may only be realised if organisational culture supports and encourages innovation and allows it to thrive.

There are indications that doctoral graduates of biological, biomedical and physical and engineering sciences are perhaps more able to innovate and make a difference in the workplace, compared with those from social sciences and arts and humanities disciplines, although this may in some way reflect the different employment profiles of different disciplines.

Indeed, those working in research roles, and particularly those working in research roles outside HE, were most likely to feel they can be innovative and make a difference. The greater feeling of value and room to be innovative may be linked to the nature of the role, but also to the nature and size of organisations researchers work for and the way their work is organised. Those outside academia are more likely to work in small or medium sized organisations, and to work under open-ended contracts: conditions that may foster a greater perceived impact in the workplace.

7.1.2 Use of knowledge and skills

Doctoral graduates also reported on the use of their specialist and general skills and knowledge in their work. In the workplace, doctoral graduates most frequently used their general disciplinary knowledge (66% most of the time, 24% some of the time) and their generic skills developed whilst studying (59% most of the time, 32% some of the time). Regular use of specialist knowledge and skills at work was less common (34% did so most of the time).

Respondents not only apply the more general knowledge and skills developed as research students in the workplace, but there is a common expectation that they will have further opportunities to develop a wider range of skills, particularly among those working in research roles in HE and beyond. Almost half of doctoral graduates surveyed reported that a key motivation for taking their current job was the opportunity they felt it would offer them to broaden their experience and develop general skills.

The predominant use of wider knowledge and skills in the workplace aligns with the increasing focus on the development of researchers' personal and professional skills in doctoral education through the Roberts agenda[52]. The Smith review of postgraduate education notes how employers expect postgraduates to have a range of skills that go beyond the discipline they studied, skills such as business awareness, languages, numeracy and quantitative methods skills, communication skills and teamworking.

This cohort of doctoral graduates had completed their studies by 2005 and so largely would have been unaffected by the growth in researcher development as Roberts funding came on stream. It will be interesting to explore more explicitly with later cohorts the development of transferable skills during doctoral study and to track the use of these wider skills in employment through further L DLHE surveys. Qualitative studies, through interviews with doctoral graduates, would enable better

[48] One Step Beyond: Making the most of postgraduate education sector, BIS, 2010 www.bis.gov.uk/postgraduate-review
[49] RCUK Impact requirements: FAQs. http://impacts.rcuk.ac.uk/cmsweb/downloads/rcuk/impacts/RCUKImpactFAQ.pdf
[50] Recruiting researchers: survey of employer practice, Vitae, 2009 www.vitae.ac.uk/CMS/files/upload/Recruiting_researchers_employer_survey_2009.pdf
[51] Talent Fishing: What Businesses Want from Postgraduates, 2010, CIHE www.cihe.co.uk/talent-fishing-what-businesses-want-from-postgraduates/
[52] Career development and skills development for postgraduate researchers and research staff www.rcuk.ac.uk/rescareer/rcdu/training.htm

Data source: Destinations of Leavers from Higher Education Longitudinal Survey 2004/05, 2009 (IES analysis)

understanding of the skills doctoral graduates feel they need to continue to develop in the workplace. The outcomes would help inform policy and practice relating to researcher development.

The less frequent use of their detailed subject knowledge indicates that not all doctoral graduates are recruited for their specialist knowledge. This fits with the Vitae and CIHE research with employers and the findings of the Rugby Team meta-analysis[53] that there is a spectrum of employers of doctoral graduates, with informed and uninformed views of skills that they bring.

7.1.3 Research skills

Research skills and techniques remain fundamental to doctoral training and interest in research is a key reason for choosing to study at this level. The PRES[54] findings highlight that development of research skills is regarded as particularly important, and more so than the development of transferable skills, to postgraduate research students. Our findings show the majority of doctoral graduates are able to apply these skills at work. Research skills were used regularly by half (49%) of working doctoral graduates, and at least occasionally by a further 45%. Few (6%) did not use their research skills at all at work.

Approximately two in five doctoral graduates frequently engaged in specific research activities in their work (41% critically evaluating research findings most of the time, 40% interpreting research data most of the time, and 40% conducting research most of the time). Those working in HE as teachers and lecturers and particularly as research staff, and also those working as researchers outside HE, were unsurprisingly more likely than others to frequently use their research skills. However, approximately one quarter of those working in wider roles regularly used their research skills, evaluating or interpreting research findings, if not actually conducting research, and so are able to bring their research training to bear across a wide range of occupations.

7.1.4 Working with and influencing others

Doctoral graduates are in roles with a high degree of autonomy and responsibility, a benefit to employers but also to individuals (in terms of greater control over their work, a factor known to be associated with job satisfaction[55]). 59% worked autonomously most of the time and 36% did so some of the time; and 82% worked with little or no direct supervision. This corresponds with employers' views that they value doctoral graduates' capacity to work autonomously (Rugby Team, 2007), and also mirrors the experiences of doctoral study, where 90% were required to work on their own to a great extent.

However, doctoral graduates also interact with others in the workplace, either by working alongside colleagues and/or managing or supervising other staff. 70% had at least some supervisory responsibilities; 39% worked as part of a team most of the time, and 49% some of the time. Autonomy and teamworking are therefore not mutually exclusive. Doctoral graduates clearly have the opportunity to influence others.

These findings would indicate that doctoral graduates have the potential to have an impact in the workplace by:

- enhancing the research capacity, knowledge and skills of businesses and organisations by undertaking research and applying their research skills and disciplinary knowledge
- enhancing business revenue and creative capacity by being able to be innovative
- enhancing the efficiency, performance and sustainability of organisations by working both autonomously and in teams
- changing organisational culture and practices by working with and managing other staff.

These are all aspects that could be explored in greater depth through qualitative research with both doctoral graduates and employers.

7.2 What benefits does doctoral training bring?

Reflecting back, doctoral graduate respondents were highly motivated and positive about their research study experience, echoing findings of PRES[56], which captures feedback during their studies. Looking at their current circumstances, respondents had a very positive view of the wider impact and personal benefits of their doctoral experience.

Reflecting on their HE choices and experiences, doctoral graduates were generally satisfied. Primarily, they were drawn to research study out of an interest in their subject, an interest in research, and a desire to improve their employability. Very few (less than 5%) felt that if they were to make these choices again that they would do things differently; and they appeared to be particularly certain about their choice of level of study. In addition, the vast majority (78%) felt their course had been good value for money. In general, satisfaction levels with study were higher amongst doctoral graduates than first degree graduates.

7.2.1 Passport to a job

For many doctoral graduates their qualification was perceived as a passport to their current employment. Half (50%) felt their doctoral qualification had been a formal requirement for entry into their current job. For a further third (32%) this was felt to be important to their employer in the recruitment decision. Very few were in roles where their qualification had not been important at all at recruitment (6%).

The potential importance of the doctoral qualification was recognised by individuals, and one third had undertaken research study because they thought it would be essential for the area of employment they wanted to work in. Subject, though important, was perceived to be less critical than the level of qualification in the recruitment of doctoral graduates. This fits with the finding that for many, detailed subject knowledge from their research degree is used infrequently in employment.

Generally, type of qualification and subject studied were considered to be more important to doctoral graduate employers than to those employing graduates with other qualifications. Unsurprisingly, the doctorate qualification and discipline studied were considerably more likely to be a formal entry requirement for those working in academia, particularly those working as research staff.

Analysis indicates that skills and competencies were as important in the recruitment of doctorates as level/type of

[53] Employers' views of researchers' skills: A comprehensive review of the existing literature into employers' views of the skills of early career researchers, Rugby Team, 2007 http://vitae.ac.uk/cms/files/Rugby-Team-Employers'-views-of-researchers'-skills-September-2007.pdf

[54] The Research Student Experience: Lessons from PRES, 2009, HE Academy www.heacademy.ac.uk/ourwork/supportingresearch/alldisplay?type=resources&newid=ourwork/postgraduate/Lessons_from_PRES&site=york

[55] For example Hackman, J. R., & Oldham, G. R. (1976). Motivation through the design of work: Test of a theory. Organizational Behavior and Human Performance, 16, 250-279; Parker, S.K., and T.D. Wall, Job and Work Design: Organizing Work to Promote Well-Being and Effectiveness," Sage Publications (1998)

[56] The Research Student Experience: Lessons from PRES, 2009, HE Academy www.heacademy.ac.uk/ourwork/supportingresearch/alldisplay?type=resources&newid=ourwork/postgraduate/Lessons_from_PRES&site=york

Data source: Destinations of Leavers from Higher Education Longitudinal Survey 2004/05, 2009 (IES analysis)

qualification. For 46% of respondents, evidence of skills and competencies were considered to be a formal requirement. However it is not known whether the valued skills and competencies are those gained through doctoral study and evidenced by the qualification, or those gained through employment.

Relevant work experience is perceived to be important in recruitment, but not as critical as the doctorate. This is at odds perhaps with the findings of research with employers which would indicate that employers value work experience and have concerns that doctoral graduates can lack commercial awareness or 'work wisdom' (Rugby Team 2007; CIHE 2010). It would be valuable to explore in more detail through qualitative studies with both employers and doctoral graduates, perceptions of value of a doctorate in the recruitment of doctoral graduates and as individuals progress in their careers.

7.2.2 Greater employability

First destination information shows that consistently employment rates of doctoral graduates are high and unemployment rates are low (WDPD; WDRD[57]). Comparing labour market outcomes at six months for doctoral graduates with those of first degree and masters degrees graduates indicates that doctoral graduates are relatively more employable, a finding highlighted in the Smith Review (2010).

Our findings show that this employment advantage persists into early careers. The vast majority (92%) of doctoral graduates are in paid employment between three and four years after graduating, and few are unemployed or taking time out of the labour market. Over time, the proportion of doctoral graduates in paid work (both full and part-time work) increased, whilst the proportion who are unemployed halved.

Doctoral graduates would appear to be an attractive proposition to employers. Studies exploring employers' views of doctoral graduate skills (Rugby team, 2007; CIHE, 2010; Vitae 2010) discovered that there is a high demand for, and strong satisfaction with, higher degrees. This research shows that to employers the doctorate is seen to indicate possession of initiative, intellectual ability and the capacity to work autonomously, capacity to learn, plus maturity, enthusiasm, technical proficiency, specialist knowledge and problem solving skills.

7.2.3 Salary and job security

It has been argued that individual returns to education and economic impact can be measured through income or salary, as market forces ensure that someone is paid what their qualifications and experience are worth. Analysis of our doctoral graduate cohort found that on average doctoral salaries were indeed higher than for other HE degree holders, indicating a premium is associated with higher level qualifications.

The median salary of doctoral graduates in full-time posts was £34,000, which was £10,000 higher than found for first degree graduates at the same point in their careers. However, doctoral salaries ranged considerably, from £23,000 to £71,000, and the median salary was only marginally higher than found for masters level graduates. Earnings also varied considerably by mode of study and subject of study. Those who studied part-time and those who had studied social sciences and biomedical sciences had higher average salaries, and a greater proportion earning over £40,000.

This variability suggests that for doctoral graduates, salary may not be a good indicator of impact, success or individual benefit. Those with the highest median salaries were working in teaching and lecturing roles in HE, or working in other professional roles common to doctoral graduates (health, engineering, IT, business, finance and statistical professions). Those with relatively lower earnings were working in HE research, wider research roles and in teaching roles outside HE.

Job security could be considered another benefit of doctoral study. Approximately three and a half years after graduating, 70% of doctoral graduates working in the UK were on a permanent or open-ended contracts. However, contractual status, and potential job security, vary by occupation, and those working as academic research staff tended to be working on fixed term contracts (79%).

Across the doctoral cohort, the proportion working on open contracts has increased from 52% at six months after graduation. No doubt this change reflects both respondents' progression from HE research roles, in which fixed term contracts are the norm, to those where open contracts are common; and/or recent initiatives by the HE sector to reduce the use of fixed term contracts for research staff.

7.2.4 Career progression and satisfaction

The findings show that doctoral graduates are largely proactive about their careers and that their doctoral study was believed to be helpful to their careers. A common motivation for doctoral study was a desire to broaden career prospects generally (59%). Key reasons why doctoral graduates had taken their current jobs were that they felt it fitted with their career plans (75%) and/or was the type of work they had wanted (67%). Few had taken jobs because it was the only job offer they had.

More than half of all doctoral graduates had moved on from their first job after graduating. The high levels of satisfaction with careers to date (46% very satisfied and 47% fairly satisfied) would suggest that they are realising their goals. It would appear that doctoral graduates are perhaps more career focused and better able to achieve their goals than graduates with other qualifications. This is likely to reflect the relatively greater personal investment in study by doctoral graduates.

Doctoral graduates believe that their doctoral study is helpful to their careers, particularly enabling progress towards long-term goals (48% to a great extent and 39% to some extent). It also enables access to immediate or short-term job opportunities in a chosen career (33% to a great extent, 40% some extent). Those working in HE as research staff or as teachers and lecturers were the most likely to feel their research study experience was beneficial to their careers.

However, career paths may not be linear or follow traditionally accepted directions. Additionally, career aspirations and expectations can change over time, both during doctoral studies and when in the labour market.

Comparing occupational clusters over time, from initial employment after graduation to employment some three to four years on, identifies movement between clusters. Indeed, two in five doctoral graduates had changed clusters. Some of these flows may be expected, such as the movement from HE research into HE teaching and lecturing, however, there is also evidence of movement from research roles outside HE into HE research roles.

It will be interesting to explore the L DLHE dataset further to identify the range of career pathways and to explore through qualitative studies with individuals how their careers have developed compared with their early career aspirations, and also the nature of their current career plans, to see whether their goals have changed and why. For example, 50% of respondents had moved out of HE research roles over the three years. This subset of the L DLHE provides an opportunity to explore the motivations, expectations and experiences of respondents moving out from research roles in HE.

[57] 'What Do PhDs Do?' (WDPD) publications. UK GRAD Programme; 'What do researchers do?' (WDRD) publications, Vitae www.vitae.ac.uk/wdrd

[58] Occupations with a relatively high density and a relatively high volume of doctoral graduates compared to the general workforce according to the UK Labour Force Survey

[59] Other occupations include all occupations were there is a relatively low destiny or volume of doctoral graduates working in specific occupations, according to SOC codes

Data source: Destinations of Leavers from Higher Education Longitudinal Survey 2004/05, 2009 (IES analysis)

7.3 Where do researchers work?

Despite lingering perceptions that becoming an academic is the primary career path for doctoral graduates, first destination data studies (WDPD, WDRD) indicate there is a wide variety of occupations available to doctoral graduates and that consistently about half of doctoral graduates are employed outside HE.

Our research exploring the experiences of doctoral graduates approximately three and a half years after graduating shows that doctoral researchers continue to work across a number of sectors and in a diverse range of roles.

This report introduces a new typology of destinations, 'occupational clusters', which were identified using the UK Labour Force Survey. These clusters take into account both occupations and employment sectors to identify areas with a high volume and/or density of employees with a doctorate. Using these occupational clusters to categorise doctorate graduate respondents it was identified that:

- 19% were in employed as research staff in HE, ie 'HE research'
- 22% were 'Teaching or lecturing in HE'
- 13% were in 'Research roles (not in HE)'
- 6% were in wider teaching occupations outside HE
- 27% were in 'Other common doctoral occupations'[58] outside HE and not classified as research or teaching roles, for example, working as health professionals, senior managers, engineering professionals, and business, finance and statistical professionals
- 14% were categorised in 'Other occupations'[59], containing the balance of occupations across all sectors, including science and engineering technicians, artistic and literary occupations, and sales roles.

These clusters are particularly appropriate to describing doctoral destinations. 86% of doctoral graduate respondents were employed in five main occupational clusters. Only 14% of doctoral graduates were spread across a wide range of 'other occupations' whereas first degree graduates and masters graduates are concentrated in these types of roles (63% and 56%).

Generally, the characteristics of these clusters vary by the nature of work, as does the potential for doctoral graduates to make an impact.

HE research (19%) Doctoral graduates in this cluster, along with those in research roles beyond HE, were more likely to feel they have an impact in the workplace and to regularly use their knowledge and skills at work (general, specialist and research). Conversely, HE researchers have relatively lower career satisfaction levels despite their general perception that their study experience had benefited their careers; accessing jobs and progressing towards longer term goals. It is the only cluster where fixed term working is the norm.

Wider research (13%) The perceived ability to have an impact in the workplace is greater in this group than for those working in non-research roles, and unsurprising they are more likely to regularly use their research skills at work. However, doctoral graduates in this group, along with HE research, have relatively lower levels of career satisfaction compared with those in other roles.

HE teaching and lecturing (22%) Doctoral graduates in these roles have higher career satisfaction and are more likely to feel the wider benefits of their doctoral study beyond their current job role, ie progress towards long-term goals, enhanced social and intellectual capabilities and quality of life. This cluster, along with other common doctoral occupations, appears to be the most stable over time. Over the early period of doctoral graduate careers, few doctoral graduates move from these roles to other types of occupations. Indeed, many more flow in.

Other teaching occupations (6%). Doctoral graduates in these roles are more likely to find their subject of study more important in their recruitment than their qualification level, and are considerably more likely to draw on their general skills and knowledge than their detailed research degree knowledge. They are the least likely to engage in research activity in their work but still approximately two thirds did so at least occasionally. Doctoral graduates in these teaching roles have a high degree of autonomy, but also high levels of teamworking and supervisory responsibilities. They have average levels of career satisfaction and are the least likely to perceive there to be career benefits to their doctoral study experience.

Other common doctoral occupations (27%) As with HE teaching and lecturing, doctoral graduates here do not appear to move into other clusters and this cluster increases in popularity over time. On average, doctoral graduates in this cluster have higher levels of career satisfaction. Doctoral graduates in this cluster are also more likely to work with others, regularly working in teams and also supervising the work of others.

Other occupations (14%) Doctoral graduates in this cluster work in a wide range of occupations and sectors, and are more likely to find their skills and competencies important in their recruitment than either subject or type of qualification. They have average levels of career satisfaction, and as with those in wider teaching roles, are least likely to perceive there to be career benefits to their study experience. They are more likely to use their general disciplinary knowledge and generic skills than their detailed knowledge and research skills, however, the majority feel they are able to be innovative in the workplace at least to some extent.

Data source: Destinations of Leavers from Higher Education Longitudinal Survey 2004/05, 2009 (IES analysis)

7.4 Benefits beyond employment

The doctoral study experience was also felt to bring personal benefits beyond work and careers. The survey found that for many the experience had also enhanced the quality of their lives (38% to a great extent, and 49% to some extent) and enhanced their social and intellectual capabilities beyond employment (40% to a great extent, and 46% to some extent). Only one in ten felt they had not been affected in these wider ways.

Doctoral graduates from arts and humanities disciplines were the most likely to perceive these wider benefits of their study experience.

It is interesting to note that whilst doctoral graduates of social science and arts and humanities disciplines appeared less likely to perceive impact in the workplace, ie making a difference or ability to innovate, than those of other disciplines, they were more likely to see a difference in their wider intellectual and social capabilities and quality of life. This may reflect their differing motivations to doctoral study.

Those working in all teaching roles, and particularly in HE, were also more likely than others to feel their studies had enhanced the quality of their lives and their social and intellectual capabilities beyond employment.

Focus groups with doctoral graduates felt wider societal benefits included inspiring others to higher level study, becoming involved in charitable work, sitting on committees and writing on community issues. These and other personal quality of life benefits would be interesting to explore in any further qualitative research with individuals; particularly to draw out any issues around a potential trade-off between workplace benefits and wider life benefits.

These findings would indicate that doctoral study brings a number of personal benefits to individuals that continue to be felt years after graduating.

7.5 Conclusion and next steps

The enhanced L DHLE data has provided an important insight into the occupations and potential impact of doctoral graduates in employment three and a half years after graduation. It demonstrates that doctoral graduates are highly employable and most are employed in 'doctoral occupations' that are different from the majority of first degree and masters degree occupations. It also provides evidence of the experiences and benefits of doctoral study, both in employment and wider aspects of society and culture.

It presents a vivid picture of the personal and professional benefits of a doctorate. Individuals are attracted to further research due to their interest and passion for a subject, yet most of them then report a high degree of fit between their current role and their 'career plan'. Doctoral graduates aim for and achieve careers where they perceive their qualification is enabling them to have an impact and make a difference in the workplace, and have roles with high degrees of autonomy and responsibility. This leads to high levels of reported satisfaction.

However, these doctoral graduates are only at the early stages of their careers. To really explore the impact of these talented individuals, we need to track them as their careers develop. Vitae will lead the next stage of the RCUK Doctoral Career Pathways study which will include additional qualitative studies with these respondents to explore in more detail their views of their impact and how they make a difference in the workplace and beyond.

There is also potential for further interrogation of the L DLHE dataset. Additional L DLHE surveys, providing a larger dataset for more detailed analysis, and supporting qualitative studies will provide opportunity to:

- explore the longitudinal activity history data to identify the range of career pathways within and between the occupational clusters; how careers have developed and are expected to develop, and to contrast early aspirations with current career plans to see whether and why goals have changed
- explore the factors that encourage and support individuals in making an impact in the workplace, including the nature of the role, the way in which work is organised, the organisational culture, and why individuals were recruited
- gain a better understanding of wider impacts beyond the workplace and to draw out issues around a potential trade-off between workplace benefits and wider life benefits
- explore which motivations to study and which factors in taking up employment are the strongest rather than most frequent, particularly the position of finance/potential earnings in study and career decisions; and the degree to which individuals retrofit their answers to reflect actual rather than planned outcomes
- specifically explore the subset of doctoral graduates who have been employed as research staff in HE and then moved into other occupations
- explore in more detail, doctoral graduates' and employers' perceptions of the value of a doctorate and of disciplinary knowledge, the importance of skills, competencies and work experience in the recruitment and progression of doctoral graduates
- exploring more explicitly the development of transferable skills during doctoral study, tracking the use of these wider skills in employment, and to understand what skills doctoral graduates feel they need to continue to develop in the workplace.

Data source: Destinations of Leavers from Higher Education Longitudinal Survey 2004/05, 2009 (IES analysis)

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Vitae

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Vitae works with UK higher education institutions (HEIs) to embed professional and career development in the research environment. Vitae plays a major role in innovating, sharing practice and enhancing the capability of the higher education sector to provide professional development and training for researchers.

Our vision is for the UK to be world-class in supporting the personal, professional and career development of researchers.

Our aims:

- building human capital by influencing the development and implementation of effective policy relating to researcher development
- enhancing higher education provision to train and develop researchers
- empowering researchers to make an impact in their careers
- evidencing the impact of professional and career development support for researchers.

For further information about the range of Vitae activities go to www.vitae.ac.uk or contact website@vitae.ac.uk

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