International comparisons in postgraduate education: quality, access and employment outcomes

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Executive summary

This report is the outcome of a study to compare postgraduate education in eight countries: Australia, England, Germany, India, Norway, Scotland, Spain and the United States. The study focused on taught (PGT) and research (PGR) postgraduate programmes, and aimed to reflect the range of postgraduate degrees (masters and doctorate), diplomas and certificates. Case studies of each country were developed through a survey of relevant literature and interviews with key informants from each country.

The report focuses on the three overarching themes: quality, access and employment outcomes of postgraduate education, and includes comparisons between England and the other countries in the study in order to identify the strengths and challenges of the various postgraduate education systems.

Postgraduate education across the world faces unprecedented challenges. These challenges include: expansion of higher education and the shift from elite to mass systems and the associated funding issues; the need to assure the quality and reputation of postgraduate education in a competitive international market; the question of achieving access and realising the potential of human capital, while achieving a balance between quality and access; balancing the pressures and demands of employability with a commitment to education as a public good; and the increasing diversity of postgraduate students and programmes. Most of these were faced by all eight countries, although the ways in which they were addressed varied considerably, influenced by the history, traditions and economic circumstances of the different countries.

Within mainland Europe, the Bologna Process and associated initiatives have transformed the higher education landscape. The Bologna aspiration to create a European Higher Education Area (EHEA), and the initiatives to develop a common degree framework and credit system, a shared quality assurance framework, and the pressures for quality engendered by the Bologna goals, have had a major impact on all European countries. The influence of Bologna and wider European developments was very clear in all three mainland European countries included in the study. Germany, Norway and Spain had all used the opportunity for restructuring provided by Bologna to overhaul their higher education systems, with a particular focus on its quality.

Quality

Given the pressures of globalisation, national and international competiveness, and, increasingly, student mobility, it is not surprising that all of the countries in the study prioritise quality. This manifests itself in different ways in the countries, though it is clear that international rankings have an important role and that this is already resulting in an increasing differentiation between universities within and across countries. Germany, Norway and Spain have set up competitive 'excellence' initiatives, which provide additional funding to universities that meet certain criteria of excellence, with the intention to create a small number of 'elite' universities that are competitive in international rankings.

The countries differ in the ways in which they monitor quality: England has a clear system operated by the Quality Assurance Agency for Higher Education (QAA) and overseen by HEFCE, which played a leading role in the development of a common European Framework for quality assurance through the European Association for Quality Assurance in Higher Education (ENQA). Germany, Norway and Spain have developed quality assurance (QA) systems which comply with ENQA. In a similar vein, the European Bologna-inspired qualifications frameworks in the EHEA (QF-EHEA) and the EU European

Qualifications Framework (EQF) have created qualifications frameworks with which European countries, including England, align, thus creating a convergence in policy. In six of the eight countries postgraduate education falls within national and international qualifications frameworks. In the other two countries, India and the US, comparability with other countries' qualifications is demonstrated through masters graduates entering doctoral programmes in other countries, doctoral graduates obtaining post-doctoral positions and postgraduates from both countries having international mobility in employment. Although credit is used in most countries for masters qualifications, credit frameworks vary. The European Credit Transfer and Accumulation System (ECTS) provides a European credit system intended to facilitate student mobility. England, India and the US retain their own credit systems, though these are recognised for mobility purposes.

In all countries there is concern about timely completion of doctoral degrees. Most countries are addressing this by introducing greater structure to the programme, and by ensuring rigorous entry requirements. Although the structures (and the length) of masters degrees vary across countries, most are adopting a more structured first year of the doctoral programme, including in many countries the formation of doctoral schools, or thematically organised programmes such as the UK Centres for Doctoral Training and Doctoral Training Partnerships. These were regarded as examples of good practice.

All the countries show a concern about the standard of entry qualifications and quality of student achievement, and are attempting to ensure that the expansion of postgraduate numbers does not undermine the quality of entrants to postgraduate degrees.

Access

Although the issue of funding of higher education fell outside the remit of the study, the question of how to finance a growing postgraduate system, and, in particular, how to ensure access, was inevitably a focus in both the literature and interviews. With the exception of India and Norway, there has been a steady reduction in the proportion of state funding for higher education and a greater dependence on other sources of funding, for example, shifting the cost of tuition to students. India and Norway, for different reasons, have chosen to maintain, and in India's case increase, levels of public funding for higher education in parallel with the growth of private institutions.

All of the countries appear to have a commitment to ensure access to postgraduate higher education to those with the ability, qualities and suitable qualifications to succeed. This raises the question of how to remove barriers, in particular, financial constraints, and in all countries progress here has been slow. One form of access is a commitment to flexible and lifelong learning, which can be demonstrated through assigning greater value to the use of credit. In a few countries, for example Australia and India, a commitment to widening participation at postgraduate level extends to adapting entry requirements for applicants from under-represented groups.

Employment outcomes

A number of factors, including the recognition of earnings premiums for graduates with higher degrees, have contributed to the substantial increase in numbers of people undertaking postgraduate study and training. In most countries graduates with masters and doctoral degrees are shown to have higher earnings than those with first degrees. However, the increase in numbers and the uncertain economic climate has meant that those with postgraduate degrees are employed in a range of different contexts, some of which may not utilise all their higher level competences and

skills. The report confirms the decreasing proportions in most countries of PhD graduates entering academia, leading in some countries to a concern about providing the next generation of scholars.

Our findings show that all the countries face similar concerns and challenges, which is not surprising given the globalisation of higher education in the 21st century. There are clear cultural and geo-political influences affecting each country, which illustrate the complexities around postgraduate education and show that it is not necessarily possible to transfer initiatives or policies that work in one context to other situations.

The report concludes by summarising the main strengths and challenges faced by each country identified by the authors in Table 6 below and making explicit the complexity of different national postgraduate education systems. The report as a whole demonstrates that, partly due to national differences, there are no simple solutions to some of the common challenges identified. However, all countries investigated are attempting to implement initiatives that address their most urgent and important concerns, including changes required for the sustainability of postgraduate education. For example, some are implementing innovative funding solutions or restructuring programmes, while others are focusing on increasing enrolments.

The report makes clear the need for all countries to decide the extent to which the continued expansion of postgraduate education is sustainable and to clearly identify and articulate the benefits of postgraduate qualifications at different levels. A clear question that emerges from the study is: how many PhDs and masters graduates does a country 'need' and who should pay for postgraduate education? In almost all countries, debate about the beneficiaries of postgraduate education has led to a significant shift in the balance of funding from the state to the individual. However, the recent and pervasive focus on employability has to be balanced with the commitment to the wider benefits of postgraduate education at all levels.

Section 1: Introduction

This report is the outcome of a study to compare postgraduate education in eight countries: Australia, England, Germany, India, Norway, Scotland, Spain and the United States. The study focused on both taught and research postgraduate programmes, differentiating between the two groups wherever possible and reflecting the range of postgraduate degrees, diplomas and certificates.

Postgraduate education across the world faces unprecedented challenges. The shift to mass higher education has led to growing numbers of postgraduate students. Factors such as the recognition of earnings premiums for graduates with higher degrees have also contributed to the substantial increase in numbers of people undertaking postgraduate study and training. For most countries this raises the question of funding: who should pay for postgraduate education? Debate about the beneficiaries of postgraduate education, and the balance between societal and individual benefit, has led most countries to shift the balance of funding from state to individual. The expansion of higher education at all levels also raises the issue of quality, both in terms of the quality of programme offered and the quality of graduate outcomes. And all countries face the challenge of balancing quality with access.

Methodology

The research involved a detailed, comparative study over a 12-month period. This included review of relevant literature and interviews with key informants. Travel to the comparator countries was not feasible although the authors did visit three of the countries in the course of work during the year, which enabled further local interviews.

Three themes

The research was guided by the three themes specified by the Higher Education Funding Council for England (HEFCE): quality, access and employment outcomes.

The 'quality' theme considers the quality of postgraduate achievement and outcomes and how these are influenced by the nature and content of postgraduate training. Within this theme, qualifications and credit frameworks and quality assurance (QA) arrangements in the different countries are also examined. Given the remit of this study, opportunities were limited for a deeper qualitative evaluation of quality across countries, for example, a review of the quality of the student experience.

The 'access' theme explores participation by disadvantaged groups in postgraduate education generally, as well as the distribution of such students across different institutions within higher education systems.

In the context of this report, our definition of 'fair access' and how it differs from 'widening participation' is as follows. Widening participation may involve adjusting entry requirements to facilitate the participation of disadvantaged groups in postgraduate education. 'Fair access', or 'access', on the other hand, refers to initiatives taken to remove financial and other barriers to provide opportunities for students who have the potential to succeed in postgraduate programmes.

As well as examining fair access, the report includes examples of widening participation where they are relevant to a country-specific higher education environment, for example, in India.

In order to explore 'employment outcomes', we focused on career destinations of postgraduates, including the relationship between their qualification and type of employment and noting any differences between vocational and non-vocational degrees. Where relevant, or raised by our interviewees, we have included reference to employer perspectives and the importance of differentiating between different levels of postgraduate qualification.

Literature

Early stages of the project involved analysing the academic and policy literature to build profiles of the eight countries. For some countries, a wealth of literature was available, but for others, very little. In general, the amount of policy literature exceeded the academic literature available – little has been written specifically about postgraduate education in these areas. Interviews (see below) raised questions that we subsequently followed up through Internet research.

It became clear that the statistical data about postgraduate education and how it is collected varied considerably across countries. Wherever possible, we obtained statistical information to illustrate the text; this is represented in graphics in the different sections. We have sought to provide a variety of numerical data in each case, most of which have been generated from official sources in the respective countries.

Interviews

Interviews were conducted face-to-face, by Skype and, when we encountered technical challenges, by telephone with selected individuals who had a comprehensive knowledge of postgraduate education in their countries as well as an insight into the theme topics. All the face-to-face and Skype interviews were audio recorded. In addition, we took the opportunity to interview some international visitors, for example, colleagues from Australia and the USA.

The report includes comparisons between England and the other countries in the study and reflects on the strengths and challenges of the various postgraduate education systems.

Annexes A to G provide case studies on the seven comparator countries, including in each case a summary of the context and environment in which postgraduate education is delivered, followed by detailed information about the three themes: quality, access and employment outcomes.

The eight countries

The countries (Australia, Germany, India, Norway, Scotland, Spain, United States) were chosen because they:

i. enable some global comparisons;
ii. include one of the 'BRIC'[1] countries (India), where significant economic growth is still occurring and which has a unique set of challenges;
iii. allow for comparisons to be made between Australia and the UK, two geographically disparate countries that have nevertheless made some similar choices with regard to postgraduate education;

[1]These comprise Brazil, Russia, India and China. The term 'BRIC' was devised by Jim O'Neill in 2001 while chief economist at the bank Goldman Sachs to represent a group of developing countries with rapidly growing economies. During the first decade of the 21st century, some began to add South Africa to the group, changing the acronym to 'BRICS'.

iv. cover two contrasting northern (Germany, Norway) and one southern (Spain) European country as well as England and Scotland, enabling comparisons across Europe;
v. highlight Scotland as an intra-UK comparator with some innovative practice;
vi. explore the United States' world-leading position in postgraduate education, particularly in research degrees.

Table 1 below summarises the numbers of postgraduate awards made in each of the countries included in the study compared with the overall number of higher education awards in a given year. They provide a picture of the scale of postgraduate education in each country compared with the population and show the relative size of taught and research provision.

Country	Population	Number of Universities[1]	Number of HE awards[2]	Number of PG awards[2] (Proportion of total HE awards)	Proportion of total number of PG awards (%)	
					PGR	PGT
Australia[a]	20,000,000	39	299,474	94,456 (31.5%)	8.6	91.4
England[b]	54,000,000	130	660,925	217,915 (33.0%)	9.8	90.2
Germany[c]	82,300,000	121	307,244	85,367 (27.7%)	31.4	68.6
India[d]	1,270,000,000	659	20,706,755[2]	2,653,344[2] (12.8%)	12.8[2]	
Norway[e]	5,000,000	17	40,568	13,344 (32.9%)	9.7	90.3
Scotland[b]	5,200,000	19	68,305	25,350 (37.1%)	11.7	88.3
Spain[f]	46,500,000	79	220,583	54,663 (24.8%)	16.3	83.6
United States[g]	317,000,000	1,361	3,065,479	926,788 (30.2%)	18.9	81.1

Table 1: Total population, number of universities[1], higher education awards[2] and proportion of postgraduate awards[3] by country and type of postgraduate study

Notes

[1] In addition to the accredited universities, there are large numbers of other higher education institutions in some countries, as well as tertiary colleges and other institutions, further details of which are provided in the annexes. Numbers in this column show only the numbers of universities and university-level institutions, where postgraduate education mainly takes place. In the case of the United States, the number of universities awarding postgraduate degrees is provided, rather than the number of universities overall, which is much larger (see Annex G).

[2] With the exception of India (where the numbers in columns 4 and 5 represent *enrolments* rather than awards, so the percentage in the final column shows the proportion of postgraduate students compared with total enrolment in HE), the numbers in this column refer to the degrees awarded (bachelors and above) in the year specified and are the most recent available. These numbers are provided to enable postgraduate awards to be compared with the overall number of HE awards made in a particular year.

[3] Where countries distinguish between taught and research masters degrees, the latter are included in these figures.

[a] Source: Australian Government: Department of Education, Higher Education Statistics 2013. Available from: https://education.gov.au/higher-education-statistics

[b] Source: Higher Education Statistics Agency (2013) Student Population. Available from: https://www.hesa.ac.uk/stats

[c] Source: German Government Statistics Agency (2014) Degrees awarded in 2012 (excluding qualifications below bachelors level). Available from: https://www.destatis.de/EN/FactsFigures/SocietyState/EducationResearchCulture/InstitutionsHigherEducation/Tables/GroupsExaminationsSexAverageAge.html

[d] Source: University Grants Commission of India (2014a) *Higher Education in India at a glance* [Online] Provisional data from 2011/12.

Available from: http://ugc.ac.in In 2010-11, the number of PhDs awarded was 16,093 and the number of MPhil degrees 12,549. (UGC Annual Report 2011-12) Available from: http://www.ugc.ac.in/pdfnews/Annual_Report_2011-2012_English_Final.pdf)

[e] Source: Statistics Norway (2013) Facts about Education in Norway 2013 – key figures 2011. [Online]

Available from:

http://www.ssb.no/en/utdanning/artikler-og-publikasjoner/_attachment/89692?_ts=13c297bfca8

[f] Source: Spanish National Institute of Statistics (2012) University Education Statistics in Spain, 2010-11 Academic Year. Press release [Online]

Available from: http://www.ine.es/en/prensa/np712_en.pdf

[g] Source: National Centre for Education Statistics (2014) 31.07.14 release 'Postsecondary Institutions and Cost of Attendance in 2013-14; Degrees and Other Awards Conferred, 2012-13; and 12-Month Enrollment 2012-13 – First look (provisional data)'. [Online]
Available from: http://nces.ed.gov/pubs2014/2014066rev.pdf

University rankings

The eight countries vary in size and complexity and the higher education context in each shapes the characteristics and outcomes of postgraduate education. With the pressures of globalisation and growing competitiveness between universities, countries are increasingly developing systems of 'elite' institutions and what Watson (2014) refers to as 'the madness of supposedly "world class" provision' (p.xxxiii). Although international rankings are controversial, metrics-based and almost entirely based on measures of peer-reviewed research, the elite institutions in each country aspire to figure in the annual Shanghai Jiao Tong Academic Ranking of World Universities (ARWU)[2] or the Times Higher Education (THE) World University Ranking[3]. In both rankings, the United States dominates the top 20 (17 out of 20 in the Shanghai Jiao Tong ranking and 15 out of 20 in the THE ranking) and there are only two UK universities in the top 20 - Cambridge and Oxford.

Rankings are commonly used by universities in their marketing and publicity statements and as an in-country comparator as well as a measure of global standing in research output and recognition. It was clear from the research that all countries have been influenced by these league tables, even though it has been argued that differently nuanced measurements would be more meaningful (Marginson, 2014; Watson, 2014).

Annex H shows the ARWU 2013 and THE 2013-14 summary for the top 100 institutions in alphabetical order, with the countries featuring in this study shaded. As well as demonstrating that the range of criteria used can change positioning significantly especially for individual institutions, Annex H shows, for example, the strength of US universities, and also the diversity of institutions falling into the top 100.

[2] ARWU uses the following indicators to rank universities:

- number of alumni and staff holding Nobel Prizes and Fields Medals;
- number of researchers selected by Thomson Scientific;
- number of articles published in 'Nature and Science';
- number of articles indexed in the Science Citation Index (Expanded) and Social Sciences Citation Index;
- per capita performance compared to the institution's size.

[3] THE World University Ranking takes into account a different range of 13 indicators in five groups:

- teaching : the learning environment (30%);
- research: volume, income and reputation (30%);
- citations: research influence (30%);
- industry income: innovation (2.5%);
- international outlook: staff, students and research (7.5%).

Research quality

Given the importance of research quality to international rankings it is not surprising that universities in all countries have increased their focus on research competitiveness. The part played by postgraduates in research output, together with the influence of a vibrant research environment on postgraduate programmes, are interdependent in their contribution to research quality. UK universities perform strongly in international league tables and 'the UK has more universities in the top 10, top 20 and top 100 than any other country than the United States, and if you look at relative size then England actually outperforms the United States' (Bekhradnia, 2013). For example, using the measure of number of articles accepted for publication in peer-reviewed journals, plus citations, provides the profile shown in Figure 1.

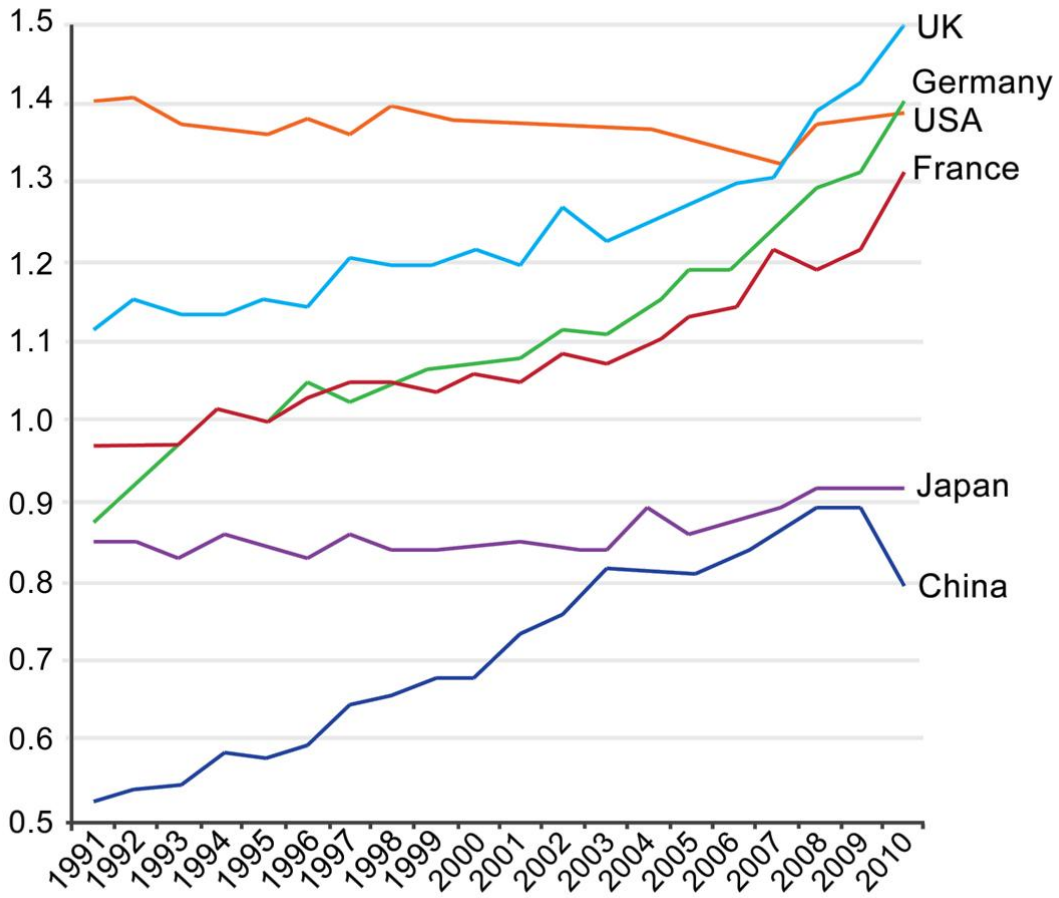


Figure 1: Normalised citations per academic paper for six countries 1991-2010[4]
(Bekhradnia, 2013)

According to Bekhradnia, drawing on data from the Department for Business, Innovation and Skills (DBIS) (Figure 2 below), one of the reasons the UK is so competitive with larger countries (including some of the other countries involved in this study), is 'the presence in this country of gifted scholars from other countries'; and that '…it is a tribute to the openness and attractiveness of this country's

[4] We have not been able to disaggregate figures and percentages for England compared with the rest of the UK, so are using the overall UK figures as a proxy for England, given the number of research-intensive universities and population in England compared with the other UK countries.

University system that we have been able to draw in so many gifted academics from overseas'. Qualifying these statements by a cautionary note, Bekhradnia expresses concern that around 48% of the UK's PhD students are international (including students from elsewhere in Europe) and that this position is 'susceptible to the vagaries of the political environment … in particular the Government's changing policies on immigration control …' (Bekhradnia, 2013). The issue of migrant status for international students was raised by several of our interviewees who also expressed concern about recent immigration and funding policies in England having an impact on their ability to recruit from overseas (as summarised in Annex C).

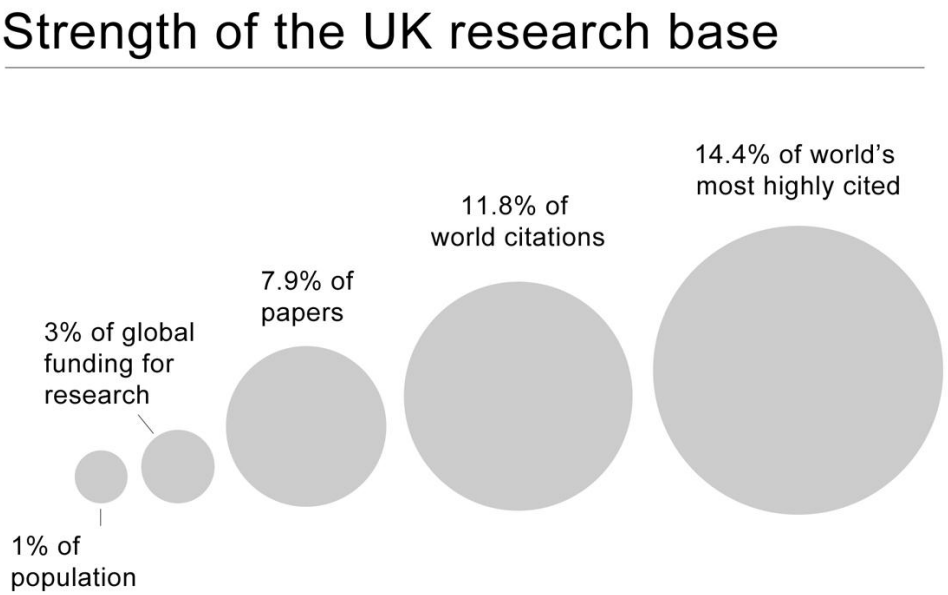


Figure 2: Strength of the UK research base
(Department of Business, Innovation and Skills, in Bekhradnia, 2013)[4]

At a general level, the UK's research excellence has a positive impact on the quality of postgraduate education across universities in England and Scotland, though this does not necessarily demonstrate equivalence or consistency of quality across institutions. The research selectivity of the Research Excellence Framework (REF) and policies of UK Research Councils means that a minority of research intensive universities is increasingly able to attract and fund the most able postgraduate students.

Attracting the highest talent

The global emphasis on research excellence has led universities in all countries to focus on attracting high quality postgraduates. At doctoral level this has involved substantial efforts to enhance doctoral programmes, in particular by introducing greater structure and initiatives for professional development. Although this was evident in almost all of the countries, it was also clearly demonstrated at European level, for example by the League of European Research Universities (LERU) which claims that 'it is talent more than technology that society or business needs from universities' (LERU 2010, and see LERU 2014). The significant expansion of numbers of masters students in almost all countries has raised concerns about quality and the potential impact this may have on doctoral programmes. In the UK, as in other countries, funding of postgraduate education is a major challenge and universities face tensions in generating income while maintaining quality.

Section 2: Postgraduate education in England: quality, access and employment outcomes – how does it compare with other countries?

Within the three themes of the project – quality, access and employment outcomes – the report focuses on the positive features of masters and doctoral education in England and the seven other countries and highlights the challenges in postgraduate systems. Although the authors' remit for this project did not include examination of postgraduate funding in the eight countries, it is not possible to consider postgraduate education without discussing funding and we inevitably found that our contributors raised questions about funding in the context of the three themes.

In this, the main section of the report, we explore some of the characteristics of postgraduate education in England within the national context, in parallel making comparisons with the other countries in the study. We note how, in England, the restructuring of postgraduate research training has had a positive impact on many research students, influencing their experience while undertaking their studies as well as preparing them for future careers. We also reflect the concerns of our contributors about the current system, ranging from funding challenges to inequalities in provision. Overall, England is comparatively successful in postgraduate education, especially in providing a vibrant research environment. However, it faces a number of challenges as can be seen from this section.

Context

By mid-2013 the population of England was estimated to be more than 54 million, comprising about 85% of the total population of the UK (circa 63.23 million). The higher education system of England consists of 130 universities, the vast majority of which are publicly funded. For many years the University of Buckingham was the only non-publicly funded university (its status is currently defined as 'not for profit'), though this has recently been joined by a small but potentially growing number of private and 'for profit' institutions. Extending the definition of tertiary education to higher education awards offered by colleges of further education demonstrates the growing diversity of the UK's higher education sector.

After a long period in England and the UK generally when few people outside higher education institutions themselves were concerned with trends in postgraduate education, the first 14 years of the 21st century have seen the publication of a wealth of information about doctoral and masters degrees. Speculation about why postgraduate education has become a 'hot topic' for government, policy-makers and universities often focuses on:

- financial imperatives, including the potential impact of undergraduate fees on demand for postgraduate study and the value to individuals, the economy and society of greater proportions of postgraduates among the population;

- the emergence of mass higher education, with increasing numbers of first degree graduates qualifying to enter postgraduate programmes, many with the purpose of differentiating themselves in the job market;

- a belief that the 21st century knowledge economy requires 'advanced knowledge workers' who are able to address complex problems using sophisticated intellectual and analytical skills; and

- perceptions that the quality of postgraduate outcomes is inconsistent and not always comparable with that in other countries.

These concerns have resulted in a substantial number of reports, policy enquiries and reviews, many of which focus on the contribution of postgraduate education, both in economic and other terms (see p. 47), and provide very relevant background material.

Background

Exploration of features of postgraduate education in eight countries, including England, shows that almost all countries face similar challenges: the countries in the study with well-established and long-developed postgraduate education systems produce graduates who are able, in general, to meet national and international standards and fulfil the expectations of employers and society. However, in a rapidly changing HE and economic environment, the countries differ in the solutions they are adopting, according to features of the national history and context. The main challenges include:

- the general expansion of higher education and the shift from elite to mass systems and the associated funding issues;
- the drive for research excellence at the potential expense of teaching;
- the need to assure the quality and reputation of postgraduate education in a competitive international market;
- the question of fair access and realising the potential of human capital;
- the tensions in postgraduate education between employability and fulfilment of individual potential and what has been referred to in the UK as the 'skills agenda';
- the challenge to achieve a balance between quality and access; and
- the increasing diversity of postgraduate students and programmes.

In most countries, with the exception of India and Norway, and for different reasons, there has been a significant reduction in the amount of state support for higher education, and a move to sharing the costs with the 'beneficiaries', i.e. the students. Financial pressures have also led universities in many countries (Australia and England provide examples) to seek to attract international students paying full fees to bolster their economy. Expansion of absolute numbers and an increasing proportion of international students have led in some countries to a concern about quality. The 21st century also sees the growth of private and 'for profit' providers of HE in Australia, England, India and the United States in particular, at present mainly at undergraduate level, although it is likely that private providers will expand their provision to taught postgraduate programmes, especially in professional areas. In addition, despite the historical commitment to state provision of higher education in most European countries, Germany, Norway and Spain also show the emergence of 'for profit' providers.

International profile in research

As mentioned earlier (p.11-12) the international impact of UK research is high. According to research carried out for the Department of Business, Innovation and Skills (Elsevier, 2013), the UK produced almost 16% of the most cited articles globally in 2012 and over 11% of all global citations. As in other countries such as Australia, Germany and the US, the strong research environment in England has a positive impact on postgraduate students and in particular doctoral researchers. In most metrics (also see Annex G), numbers of doctoral graduates constitute a measure of research excellence.

International competitiveness in research is driving specific initiatives in Germany (Excellence Initiative), Norway (Centres of Excellence) and Spain (International Campus of Excellence

Programme). One of the purposes of these initiatives in all three countries is to increase international research impact (and by implication performance in international rankings). Similarly, the Indian government has made substantial investments in some of the public universities in order to enhance India's research performance and with the intention of attracting more international postgraduates.

Figure 3 shows the latest composite figures for annual numbers of PhD graduates 2007 – 2011, demonstrating that the UK is in a strong position internationally, and in relation to other European countries.

However, we heard from one of our Indian contributors that, because of immigration complexities, funding challenges and the uncertainty of post-graduation job prospects in the UK, the preferred destinations for Indian graduates looking to enter postgraduate programmes overseas are now Australia and Germany. As shown in Annex C, some UK universities are offering scholarships specifically to address this challenge and to attract Indian postgraduates to study here. On the other hand, one of our other contributors suggested that UK doctoral graduates are attractive, and by implication that the UK is an attractive destination for doctoral study, because of the strengths of research training and professional development they are likely to have experienced during their programme.

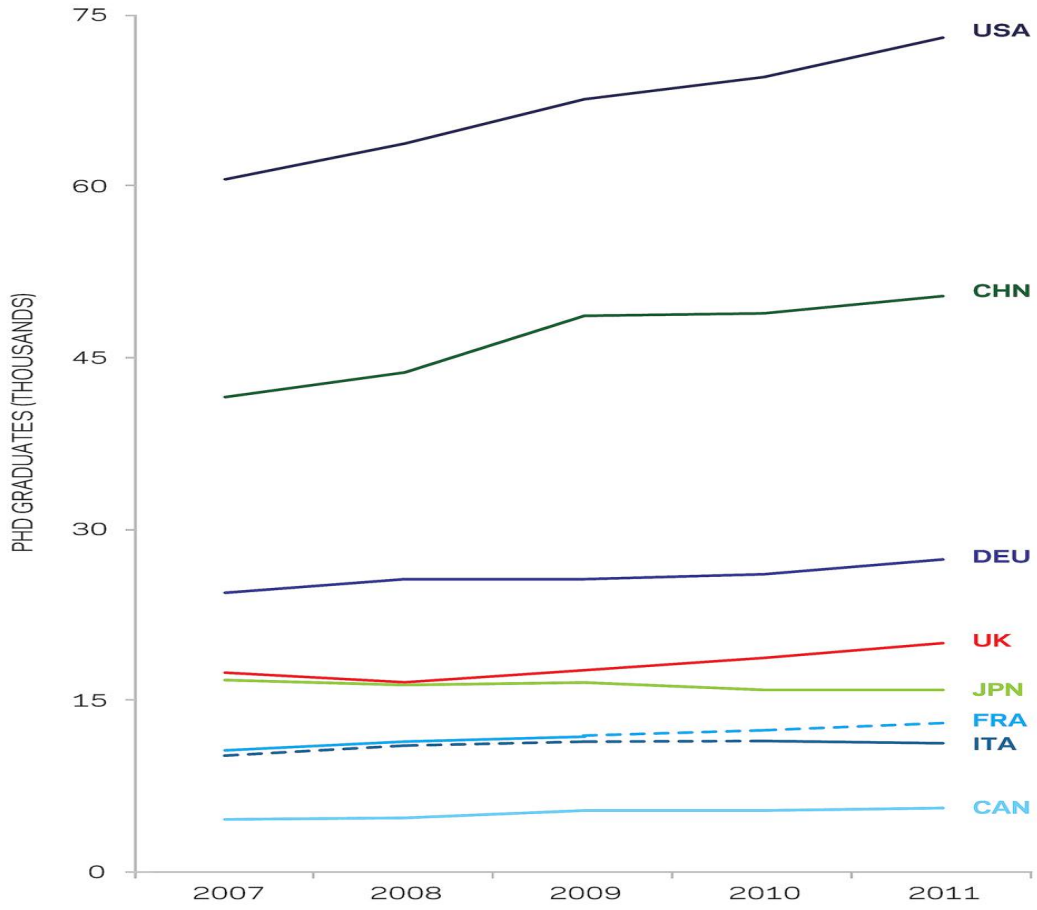


Figure 3: Annual numbers of PhD graduates 2007 - 2011 (Elsevier, 2013)

The strong research environment and the recent focus on enhancing doctoral provision in the UK (see p. 11-12) have helped the UK to remain internationally competitive in research training.

The doctoral research environment

As demonstrated by 'A Data-based Assessment of Research-Doctorate Programs in the United States' (Ostriker et al, 2010), excellence in research has a major impact on the quality of doctoral degrees, through exposure to international experts in the field and potential interaction with a wider range of researchers through collaborative networks. This is the kind of environment that the UK Research Councils are promoting through recent initiatives, such as doctoral training partnerships (DTPs) and centres for doctoral training (CDTs). According to the Engineering and Physical Sciences Research Council (EPSRC) (2013) 'The quality and availability of researchers in the UK is the prime driver for attracting foreign direct investment'. The belief that the UK needs more doctoral researchers, particularly in science, technology, engineering and mathematics (STEM) areas, is a major reason for EPSRC's substantial investment in additional CDTs. Other countries such as Australia and the US have also seen a significant expansion in doctoral enrolments in the last 10-15 years (OECD, 2013). Others such as Germany, Norway and Spain have capped doctoral numbers to avoid supply exceeding demand, although in Germany the proportion of doctoral students compared with overall postgraduate numbers is already higher than in any other country in the study at more than 31% (see Table 1). The important question of sustainability and how many postgraduates England needs is explored below.

Over the past 10-15 years institutions have invested considerable effort and resource in improving the doctoral research environment, for example through the formation of doctoral or graduate schools, the introduction of courses as part of the PhD programme, and the substantial investment of funds for professional skills training through the Roberts initiative[5] (Roberts, 2002). However, despite this effort and investment, the most recent results of the Postgraduate Research Experience Survey (PRES) present research culture as the lowest scoring scale. The scale includes four statements, for which students are asked to agree, disagree, or give a neutral response:

a) My department provides a good seminar programme

b) I have frequent opportunities to discuss my research with other research students

c) The research ambiance in my department or faculty stimulates my work

d) I have opportunities to become involved in the wider research community beyond my department

The report confirms that 'While almost three-quarters of students are positive about their department's seminar programme, positivity is substantially lower for the other items, with less than two thirds [of students] having frequent opportunities to discuss their research with other research students' (Bennett and Turner, 2013). Statements (c) and (d) have even lower ratings, with only around 58% of students agreeing they had opportunities to become involved in the wider research community, and almost 19% disagreeing with this statement.

Figure 4 below shows the relative evenness across different subject groups in the extent to which students considered they were well integrated in the research environment (a mean, taking account of responses to all four questions), with slightly more positive responses in physical sciences and other STEM subjects, compared to marginally more negative in arts, humanities and social sciences. This is not statistically significant but the relative lack of differentiation among subjects may reflect the changing nature of researcher training.

[5] As a result of the report 'SET for Success' (Roberts, 2002), the UK Research Councils allocated substantial funding to universities for professional skills training with the expectation that this would have a wide-ranging influence on all early career researchers.

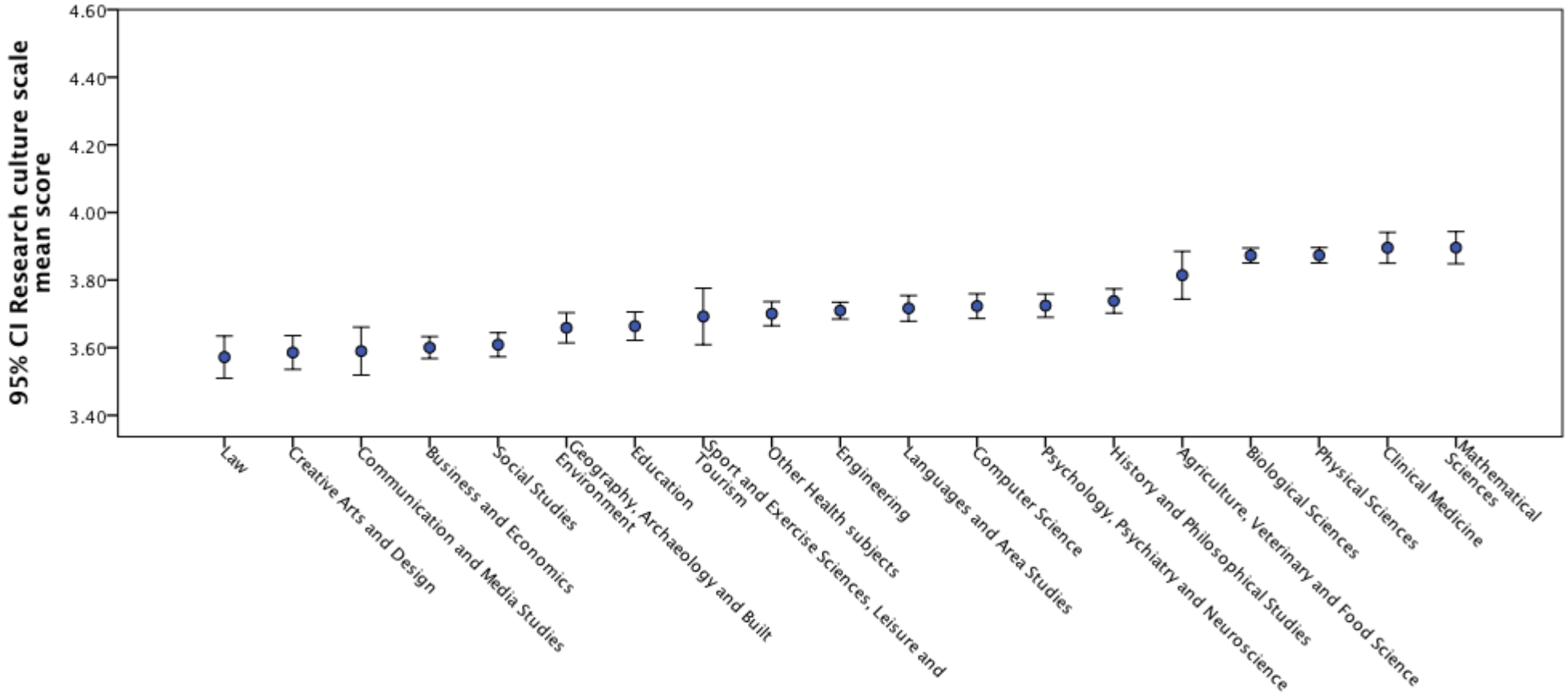


Figure 4: Mean research culture scores by grouped discipline (Table 6.6, Bennett and Turner, 2013)

The results of a corresponding survey in Australia (Postgraduate Research Experience Questionnaire, or PREQ), show similarly low levels of student agreement with the scaled statements on 'Intellectual Climate'. The Australian statements are:

- The department provided opportunities for social contact with other postgraduate students (74.7% agreement in 2012)
- A good seminar program for postgraduate students was provided (67.2% agreement in 2012)
- I was integrated into the department's community (63.7% agreement in 2012)
- The department provided opportunities for me to become involved in the broader research culture (64% agreement in 2012)
- The research ambience in the department or faculty stimulated my work (58.3% agreement in 2012)

As noted in the Postgraduate Research Experience 2012 report (Graduate Careers Australia, 2013), although all seven scales in the survey have shown an upward trend in student agreement between 1999 and 2012, research graduates agree least with the statements included in the Intellectual Climate Scale, elements of the experience that are 'intended to help students integrate their work into the broader research community'.

Some of the countries in this study, the United States and Spain in particular, make a concerted effort to embed doctoral researchers in the research effort of their universities, including them as equal contributors to research teams from early in their programmes. In Norway, doctoral researchers are given employment contracts and rights, and are treated as junior staff members. Yet it is still rare for student publications to be counted in assessments of research quality (including in the US 10-yearly assessment (Ostriker et al, 2010) and in the REF (HEFCE, 2011)). There is a growing trend in many fields that:

i) the thesis will comprise either papers published by the candidate during the doctorate, accompanied by an analytical commentary, methodology and literature review sections; or

ii) the candidate will include one or more published papers (often co-authored) in the thesis; or

iii) the candidate will be able to reference in the thesis a paper s/he has published during the doctorate.

Therefore, taking steps to increase integration of research students, especially doctoral candidates, in the research environment by taking more account formally of their contributions to research outputs would be an innovative development for England that is not currently mirrored in other countries.

Structures of doctoral programmes

In all countries pressures to improve PhD completion rates and an awareness of the need for wider skills development have led to PhD programmes becoming more structured. Apart from the US, which provides a different model of PhD training, the UK has led the integration of professional skills development in PhD programmes, with most students experiencing a structured first year. However, universities in many European countries now have in place various forms of structured training for doctoral programmes (e.g. LERU, 2010 and 2014).

Although most countries now require masters degrees as entry qualifications to the doctorate, the UK has defended the need to retain flexibility in doctoral entry qualifications because of different subject conventions, the diversity of masters degrees and graduates, and the flexibility needed by

institutions when admitting students from under-represented backgrounds with access (but not necessarily widening participation) in mind, for instance by accrediting prior and experiential learning.

The seven UK Research Councils have different approaches to masters degrees as entry qualifications for a doctorate. For example, we heard that in arts and humanities and most social sciences subjects, a masters is almost always a pre-requisite and that in STEM subjects it is often but not always the case that doctoral candidates have obtained an integrated masters degree. We were also told that some require overseas students to have a masters to check their suitability for entry to a doctorate. In addition, both PhDs and other forms of doctorate involve varying amounts of research methods and other training which may otherwise be included in masters programmes. This has led to different ways of structuring the PhD through the so-called '1+3' (year) route (masters such as MRes plus doctorate), an integrated PhD with substantial research training and coursework early in the programme followed by the research phase, or a research masters degree integrated with a doctorate through a four-year 'inclusive' model. The point was made by one of our contributors that, in some subjects, e.g. economics, changes to UK PhD structures and assessment had been driven directly by international comparisons. For example, changes to the PhD structure and length originating in the United States as a result of additional expectations of students (including publishing papers during their candidature that subsequently form the main body of the thesis) have led to suggestions that the expected period of study for UK PhDs in economics should be five rather than four years.

In India, Spain and the US, it is a requirement for doctoral entrants to possess a masters degree. The Australian Qualifications Framework (AQF, 2013), perhaps with doctoral study in mind, requires all masters programmes to include some research, replacing the previous rule that applicants for doctoral programmes should hold a research masters degree. The Bologna structure provides a 'norm' of three years first cycle, plus two years second cycle, plus three years third cycle, implying progression through masters to doctorate.

Masters degrees

All countries show a wide variety of masters degrees, including vocational/professionally focused, research preparation and subject specialisation. Masters degrees are clearly differentiated between taught and research in the UK and Australia, whereas in other European countries this distinction rarely exists. In the US, institutional classifications determine the extent of the qualifications each university is accredited to provide. As shown in Annex G, 912 'postbaccalaureate' institutions in the US[6] are accredited to award non-doctoral postgraduate degrees. Many are focused on vocational subjects, such as education or business, with around a fifth being single-subject institutions. In the vocationally or occupationally oriented institutions, arts, humanities and social sciences subjects dominate. However, a large number of postbaccalaureate institutions offer a range of subjects at masters level. 'Institutions with doctoral programs', which fall into a different classification, also offer research masters programmes.

Countries differ in the length and structure of their masters programmes; most European countries follow the Bologna structure of two years (120 ECTS credits), although even here there are one-year or one and a half -year masters. The difference in volume among different masters degrees has been widely debated; however, in European countries including the UK, it has been agreed through the Bologna process that graduate achievements and outcomes are the defining measure for awarding qualifications.

[6] Categorised as 'institutions without doctoral programs' in the Carnegie Foundation Program Classifications, Graduate Instructional Program Part 1.

We move on to address the three themes by comparing the English system with those in the other countries included in the study.

Quality

According to Bekhradnia (2013), the UK (and by definition England) has a 'highly successful' higher education system, with a 'wonderful diversity of … universities'. However, he goes on to point out that there are risks to the current postgraduate system, for example, if international student numbers decrease, or if the quality of our graduates is perceived to diminish. Several UK commentators confirmed the high quality of UK postgraduates but also voiced concerns about sustainability, a challenge for many countries. This section summarises the views of our interviewees and draws on recent academic and policy literature to provide the wider picture.

Postgraduate training

Training structures vary according to type of programme, whether vocational or non-vocational, masters or doctoral, with differences between research and taught masters and to a lesser extent between professional doctorates and PhDs. In English universities, where graduate schools exist at institution level it is often the case that professional skills development for doctoral students is managed by the graduate school, whereas research methods training for doctoral candidates and masters training is focused in departments.

Masters degrees

Masters degrees in the UK vary in length and breadth, and are both vocational and non-vocational. Whatever the nature of the masters programme, our contributors emphasised the importance of ensuring no time is lost, particularly at the beginning of the programme, because full-time students in particular have only a year in which to complete both the taught part of their programme and the dissertation, a typical full-time year for a masters programme being around 48 weeks. Some universities offer non-credit-bearing modules on learning strategies to support masters students in making the transition to a different level.

Our contributors emphasised the importance of the *process* of masters study in influencing individual outcomes (Prosser and Trigwell, 1999) and of ensuring that all masters graduates, even though emerging from a multiplicity of programmes, 'meet the quality threshold'. And in the same way that entrants to masters programmes have had varied education experiences, are from different socio-economic and cultural backgrounds and therefore have a wide range of learning needs, our contributors emphasised the associated diversity of masters entrants to doctoral degrees and the variability of training needs at the beginning of the doctorate. In Scotland, integrated masters students have already completed five years' higher education (similar to US masters graduates), whereas it remains the case that in some subjects graduates enter a PhD without a masters qualification and may therefore need more concentrated training in the first year, particularly around research methods.

Doctoral training and development and its situation in the research environment

There seems to be international agreement that UK initiatives for doctoral training have had a significant impact. For example, the provision of Roberts funding (Roberts, 2002) between 2004 and 2011 introduced what one of our Scottish contributors described as a 'national curriculum' for postgraduate training. The impact of Roberts funding was strengthened by two critical factors:

i) funding was provided to universities to support the Roberts recommendations which became enshrined in the UK Research Councils' Joint Skills Statement (JSS), whose importance was underlined by its inclusion in the 2004 version of the Code of practice for the assurance of academic quality and standards in higher education, Section 1: Postgraduate research programmes (QAA, 2004); and

ii) the organisation UKGRAD (now Vitae and covering all early career researchers) was established to underpin the implementation of the Roberts recommendations. Vitae's work continues to promote and influence researcher development, for example, through the Researcher Development Framework (RDF) and Statement (RDS), which have succeeded the JSS (Vitae, 2009).

Several of our contributors (from different countries) referred to the significance of Roberts funding for doctoral degrees in England and the UK and its revolutionary, positive impact on postgraduate training and the outcomes of doctoral degrees, even in universities that received little or no Roberts money. The Roberts initiative raised expectations about the amount and content of non-subject specific development opportunities for all doctoral candidates. We heard that the systematic introduction of structured training in parallel with DTPs and CDTs has encouraged doctoral candidates to acquire a range of perspectives and has facilitated inter-disciplinary collaborations. For instance, in one university we heard about a network of 13 energy-related CDTs, with 12 out of the 13 single-topic focused and one inter-disciplinary, with students in the latter highly positive about the breadth and flexibility offered by their training. We heard from another contributor about CDT staff and students' appreciation of the identity and prestige they acquire from being part of a CDT and the access to intellectual excellence it provides.

During the last decade, the routine inclusion of professional skills development in all forms of doctoral programmes has led to a situation considered enviable by some other countries, especially by those without a similarly structured approach, such as the US (although doctoral students in the US do experience professional skills development during the early years of their degree, there are no nationally-stated expectations of such development as are now required in the UK). Among our contributors we found support for schemes such as the one being introduced by the Biotechnology and Biological Sciences Research Council (BBSRC) for doctoral candidates to experience integrated placements in their PhD programme.

In parallel with introducing more structured training for doctoral researchers, some countries such as Spain have paid equal attention to situating research degrees in the wider research and knowledge exchange environment. The commitment to the autonomous communities provides the opportunity for regional initiatives and the integration of research with local industry and other organisations which has an impact on doctoral training.

Student or staff status?

None of our interviewees in England was persuaded by an argument for doctoral candidates having staff rather than student status, as is the case in some other European countries. We heard that it is important to ensure research students' integration in the research activities of their colleagues, irrespective of structures, but that this did not necessitate giving them staff status. As students they have different responsibilities including the successful completion of the degree; part-time students may have research assistantships and/or teaching responsibilities, but this does not affect their status with regard to their studies.

We heard that in Germany some doctoral students retain their student status while working part-time, for instance, as a research assistant to a professor, which means undertaking administration as well as research. This practice is becoming less usual, partly because these students may take up to six years to complete their PhDs, though in the process they have also gained a wide range of employment-focused skills because of their administrative tasks. On graduation they are therefore well prepared for a variety of employment destinations.

Doctoral training (and UK DTPs and CDTs)

The question of how to organise doctoral training elicited considerable interest in a large number of interviews. In several countries there is a shift, mainly but not only in STEM subjects, towards cohort-based doctoral training rather than the individual student model. In the UK, this has been exemplified by the introduction of DTPs and CDTs, spearheaded by the Research Councils. This was widely considered to be ground-breaking by our contributors, in parallel with the implementation of structured professional skills development for doctoral candidates, and has raised expectations about the doctoral student experience in England and the rest of the UK. Research Council requirements for structured training as set out by Research Councils UK (RCUK) make clear the various expectations of research organisations (including universities), of the training environment and of students (RCUK, 2013a).

We heard that a clear difference has emerged in the UK between doctoral training in STEM subjects and arts, humanities and social sciences, with the 'single-envelope' model in the latter encompassing a range of subjects, and with thematic groupings dominant in STEM. The arts, humanities and social sciences model favours those with a masters degree because 1+3 arrangements are declining (though not in some social sciences, including business, and theology related areas), as are research-preparation masters, with the shift to a non-credit-bearing four-year inclusive PhD. The inclusive four-year PhD responds to international student needs, with candidates registered for a doctorate 'from day one'.

With regard to the argument that the quality of postgraduate training across universities has improved as a result of these changes, one of our contributors acknowledged that as yet, little empirical, objective evidence exists (and see Lunt et al, 2013). However, one advantage for universities receiving funding through DTPs and CDTs is that these structures are attracting high quality students in all subjects. We also heard that evidence is beginning to emerge to show that the more structured approach to PhD study is improving productivity and enabling candidates to 'cover the ground' more easily and also that students in universities with DTPs and CDTs are 'voting with their feet' to access improved levels of training and professional development. This is also having a positive impact on the quality of supervision, according to some.

Conversely, one of our contributors highlighted the benefits of the current diversity of PhD provision which enables English universities to 'train PhD students to a very high level within existing structures', suggesting that care is needed in implementing arrangements based on the perception that students need to study in groups to have a good experience and that in some subjects the nature of a PhD may be quite solitary. Contrary to some perceptions, the latter may apply to subjects outside the arts and humanities, for example theoretical physics, pure maths and computational modelling, suggesting that diverse provision, including the CDT model, is needed to encompass a range of subject and individual needs.

One of our interviewees emphasised the significant resource burden for universities with CDTs and in particular the additional teaching resource associated with providing advanced training for cohorts of doctoral candidates, whether a single university or collaborative CDT. This is an issue,

even though some Research Councils take account of the added teaching in allocating funding. This contributor pointed out that, should all PhD education in England and the UK be delivered using the CDT model, considerably more resources would be required, particularly because advanced training modules needed to be at doctoral level and therefore could not be shared with masters students. The importance of high quality advanced training modules was also raised at another university, where we heard that departments had been strongly encouraged to think about the 'advanced training' appropriate for doctoral level students.

DTPs include a range of different partnerships: Research Council – single or multiple university; multiple Research Councils – multiple university; single or multiple Research Council – university, plus external partners such as government or industry, including creative industries. Importantly, universities with CDTs may not be part of a DTP, and vice-versa. In discussing with various contributors current postgraduate training models in England, it was apparent that, across Research Council-funded and non-Research Council supported CDTs and DTPs, there is a great deal of flexibility in structures and that subject groups are developing models to suit their particular needs. And although CDTs and DTPs are modelled on doctoral cohorts, several of our contributors emphasised that research training should be specific to the individual, that a flexible approach should be adopted and that supervisors should be encouraged to ensure training is tailored to students' particular needs.

Where funding is not provided by the UK Research Councils, universities have to find creative ways of providing doctoral training of quality and breadth; sometimes this leads to inter-university partnerships such as those in Scotland, which may or may not be regional and/or inter-disciplinary. We heard how growing critical mass and attracting high quality researchers is difficult for some institutions that are not in receipt of Research Council funding for research degrees. However, one contributor alluded to collaborations among 'smaller players' around 'niche' research themes, often with non-research intensive universities at the heart of the partnership. This interviewee envisaged an increase in this form of independent partnership, modelled on but not funded through the Research Council DTP/CDT arrangements.

Concentration of Research Council funding in a small proportion of highly research-intensive universities is considered by some to be controversial. This is not a new phenomenon, however, and in providing the research environment and critical mass to enable high quality entrants with much potential to succeed, is arguably having a positive rather than a negative impact. First, it is setting a standard for research training that is emulated by non-Research Council funded institutions and that therefore is influencing doctoral students generally, irrespective of how they are funded; and second it is demonstrating a model of doctoral training that non-Research Council funded institutions are adapting, to create their own, bespoke partnerships, single- or multi-discipline, either with others in the higher education sector or externally that reflect both subject and institutional needs and conventions. One university we heard about is aiming to achieve comparability of research student training, whether or not part of a research-council DTP or CDT, through a framework designed to achieve consistency in parallel with subject-specific training. Here the perspective was that there had been a 'shift away from Oxbridge' and that research student numbers were now spread more evenly across universities, especially in arts and humanities, with the Arts and Humanities Research Council (AHRC) model resulting in 'a more even distribution of a thinner amount of jam'.

Another perspective on concentration is that focusing Research Council funding in a relatively small number of universities disadvantages those institutions and students who are not part of this group and that it is 'striking at the heart of the highly charged debate about what it means to be a university' (Fazackerley, 2012). However, this article also recognises the advantages for students of larger scale research environments in some subjects and the importance of globally competitive

research training. It could also be contended that a consequence of the UK doctoral training initiative led by the Research Councils is greater differentiation and diversity among higher education institutions, with some going as far as to claim that effectively it is preventing some institutions with pockets of excellent research training from developing and exploiting them, to the detriment of all concerned. One of our interviewees confirmed that the UK Research Councils are more widely interested in doctoral training than simply the proportion they fund, that they have an interest in the whole system working effectively, and that some Research Councils are expecting their DTP awards to have a significant effect on all doctoral training in those subjects, leading to a more systematic approach to the inclusion of some elements of training programmes.

A number of our interviewees expressed concern about the quality of some postgraduate outcomes and suggested that high quality must be the primary driver for funding research training. One of our US interviewees emphasised the importance of identifying talent and potential wherever it exists and using funding mechanisms that enable those exhibiting these qualities to grow, rather than only continuing to support those who are already excellent. This contributor recognised the challenges of developing criteria that effectively support such selectivity, especially in the research context when excellence at subject level is not necessarily reflected in the host institution, and vice versa.

A number of European countries are linking initiatives for excellence in higher education to the creation of doctoral schools and inter-disciplinary research groups, thereby mirroring concentration of resource in what are considered to be the elite universities, for example the German 'Excellence Initiative', one of whose lines of activity and funding is the formation of graduate schools organised thematically and intended to provide an excellent research environment. In Spain, the International Campus of Excellence Initiative encourages the creation of doctoral schools as dynamic structures for the new trans-disciplinary doctorates. According to LERU (2014) 'increasingly doctoral education is being organised into Graduate Schools or Doctoral Schools or Centres', an innovative practice which enables doctoral programmes to provide international and inter-disciplinary exposure.

Inter-disciplinarity

Inter-disciplinarity is a major theme for all seven Research Councils in the UK. This is articulated through the formulation of strategic challenges, themed research and funding targeted at inter-disciplinary and cross-Research Council research initiatives. One of our contributors who was able to take an overview of disciplines and institutions was aware of evidence that inter-disciplinarity in doctoral training was emanating both from the evolution of disciplines (i.e. organic development) and as a result of encouragement from external initiatives, including Research Council policy and industry-related funding. This interviewee was equally supportive of both forms of development, arguing that there was a need to encourage subjects to work 'at the boundaries' of their disciplines and that big advances in research often arise from research at the interface between subjects, such as physics/biology. We also heard that it is important for graduates to be able to work in an inter-disciplinary environment, including interaction with those from other subject backgrounds and in different professional roles.

We heard that one of the outcomes of the growth in DTPs and collaboration among universities in doctoral training is that both vertical and horizontal training occurs and that this is effecting change within subjects, helping to raise students' awareness of the ways in which they can broaden their knowledge of and within the field.

The trend for inter-disciplinary research degrees is also evident in other countries. For example, in the US, annual data shows that, although some disciplinary variations are apparent, between 2001 and 2008 more than 28% of doctoral graduates reported two or more fields of dissertation (thesis)

research. And in some US universities, doctoral candidates may take a complementary 'minor' subject in parallel with researching their main topic, e.g. a physics PhD with a 'minor' in computer science.

Inter-disciplinarity is clearly a key aspiration of almost all the countries involved in the study. There is a strong belief that inter-disciplinary research is essential to the solution of complex global challenges and questions, and that top researchers need to acquire an inter-disciplinary research perspective and gain research skills which enable them to cross disciplinary boundaries. This goal is sought in various ways. For example, in Germany, Norway and Spain our contributors all emphasised the importance of an inter-disciplinary research environment. This has been strongly encouraged by LERU (2010): 'doctoral programmes often transcend traditional disciplinary boundaries … they can create multi-disciplinary and integrated programmes where doctoral candidates can broaden their scientific horizon and deepen their expert knowledge'.

Timely completion of postgraduate degrees

Rigorous selection and recruitment processes together with appropriate support and progress monitoring contribute to the mechanisms used by UK institutions to encourage timely and successful completion. In England, HEFCE has been monitoring research degree completion rates for around a decade and provides projected outcomes for individual universities based on consecutive cohorts of research students. For example, projected outcomes provided by HEFCE (2013b) (reference 2013/17) refer to full-time students who started research degrees in 2010-11; in the same publication, rates for 2008-09 and 2009-10 cohorts are updated. The projections use sector-adjusted averages that take account of the institution's research degree student profile with respect to subject, student domicile, highest qualification on entry and funding source. They are based on an expected time to completion for doctorates of seven years for full-time and 10 years for part-time candidates and those switching from full- to part-time or vice versa. In parallel, to capture the full range of completions, HEFCE is also now monitoring research degrees over a 25-year period. The time frames were originally established in 2005 when institutional data showed that after seven years the number of doctoral candidates in a cohort who have qualified, or who are 'inactive' (for example, had suspended studies) begins to level off. This reflects differences in the average times to completion between different subjects, with completion within three or four years in some subjects (as is required for Research Council-funded students and some other sponsors) and five years or more in others.

The latest projections show that research degree completion rates in England are relatively high (HEFCE 2013b) and have increased from 70.5% for 2008-09 starters to 72.9% for 2010-11 starters. Improved rates may indicate the impact of various factors in helping students towards timely completion, for example, structured training and regular progress monitoring.

Information about completion rates for masters degrees in England are available through the Unistats website[7]. Based on 2013 numbers from Unistats used in an analysis provided by an independent consultancy, according to the Guardian (Young-Powell, 2014), a higher proportion of 'taught' postgraduate students (i.e. non-research masters and postgraduate diploma students) than undergraduates leave university with a degree and 92% of full-time taught postgraduates complete their course successfully, or leave with an equivalent qualification.

English completion rates for the PhD compare well to those in some other countries. However, the increasing amount of structured training in doctoral programmes and the emphasis on professional skills development are thought by some to make it more difficult for candidates to complete within

[7] https://unistats.direct.gov.uk/

four years, the period expected by the Research Councils. Some contributors went further than this and made a link between expectations about timely completion and the risk to the quality of candidates' research output, even though institutional regulations often allow doctoral students an extra six months to complete the 'writing up' process. It was noted by our contributors and is commonly accepted at institutional level that there are still differences in completion rates between disciplines.

In the US, concerns about poor completion in doctoral programmes led to a seven-year research project - the PhD Completion Project - led by the Council of Graduate Schools (CGS). The project and its outcomes are explored in more detail in Annex G. According to Ostriker et al (2010) 'data on completion rates and average time to degree raise important questions about the proportion of students entering doctoral programs who actually complete a degree'. They confirm that the range for students who complete within six years is from around 60% (agricultural sciences) to 37% (social and behavioural sciences), but also show that the median time to degree for those who complete has a relatively narrow range of 4.8 to 6.2 years. They conclude that factors influencing attrition rates in research doctorate programmes are 'worthy of on-going attention'.

At both taught and research degree level, completion rates often vary across subjects and are also affected by students' demographic characteristics and personal circumstances. Research in the US for the PhD Completion Project (CGS, 2010b) has identified factors affecting time to completion across six areas (selection and admissions; mentoring and advising; financial support; research mode of the field; curricular and administrative processes and procedures; and programme environment), together with practices employed by some universities to support students to successful completion.

Attrition rates from masters degrees in the US are also high. The findings from a pilot study conducted by the CGS in 2013 of completion and attrition rates in STEM masters and Master of Business Administration (MBA) programmes between 2003-04 and 2006-07, based on students at five institutions showed that only 41% of the STEM masters students completed their degree within two years, 60% completed within three years and 66% completed within four years. In contrast, 67% of MBA students completed their degree in two years, 81% completed within three years and 86% within four years. Completion rates for women enrolled in STEM masters programmes were higher than those for men after two, three and four years, yet completion rates for women enrolled in MBA masters programmes were lower than those of men during the same time period. With respect to attrition, 10% of STEM masters students left their programme of study after six months, 17% left after one year, and 23% left after two years. By contrast, 10% of MBA students left their programme of study after two years. With only a few exceptions, patterns in attrition rates mirrored those of completion rates.

Time to completion is also an issue in all the other countries. In Australia, for example, the Group of Eight[8] notes doctoral completion rates as a concern and in 2003 the German Rectors' Conference made recommendations aimed at reducing the average age and time to completion of the PhD. In Norway, the average completion rate within seven to nine years is similar to England, at around 70%; this too is a concern as the average masks some much longer periods to completion in some subjects.

Irrespective of the average times to completion in England and the other countries, the expectation of UK universities, Research Councils and other sponsors is that doctoral candidates should complete within four to five years. The evidence suggests that fully funded doctoral candidates, many of whom are in STEM subjects, achieve successful completion within this period, whereas others may take several years longer and it would be interesting to study completion rates across different

[8] An alliance of eight Australian research-intensive universities

countries taking account of subject, full- or part-time mode, and source of funding. One of our contributors identified a need for further research into the effect of different doctoral training models on timely completion.

Monitoring and assessing quality

Those with a stake in the quality of postgraduate education (programmes and outcomes) include:

- applicants and entrants;
- graduates;
- Higher education institutions;
- Research Councils and other sponsors;
- the UK funding councils;
- professional bodies;
- government;
- other higher education sector policy-makers;
- QAA;
- employers.

It is unsurprising to find that there are almost as many views about quality as there are interested groups, whether participants in the 'process' or recipients of the 'product'. In this sub-section we draw on our contributors' views to identify some of the strengths and concerns that can be related to the evaluation of postgraduate 'quality'. One or two UK interviewees emphasised that 'quality' could be evaluated by the extent to which postgraduates were 'fit for purpose' or whether they 'meet the need'. These are employment-driven criteria that address the extent to which postgraduates are in demand and are perceived to be able to work effectively in their chosen field. Others, on the other hand, spoke about the intrinsic value and benefits to the individual and society of postgraduate study.

Quality assurance

In England multiple mechanisms exist for assuring and monitoring the quality of postgraduate education. These vary depending on whether the programme is at masters or doctoral level, is vocational or non-vocational, and if professional accreditation is one of the outcomes of the degree. The way in which postgraduate education is managed within institutions also varies, with masters and doctoral degrees sometimes being combined in graduate schools and in other cases, masters degrees falling under 'taught' degrees and treated separately from research programmes. As mentioned in Annex E, at institutional level, the location of responsibility for postgraduate education varies and may fall within the portfolio of a pro vice-chancellor for research (potentially helping to integrate graduate diploma, masters and doctoral development opportunities, which in turn could have an impact on the numbers of masters graduates staying on to study at doctoral level) or may be managed by a pro vice-chancellor for teaching and learning, in which case masters degrees may be more likely to be managed with other 'taught' degrees. All universities in England and the US now have some kind of programme review at both masters and doctoral level; national arrangements are flexible enough to leave the detail of this to individual universities who can adopt a system appropriate for the programmes they offer.

The quality of postgraduate degrees in the UK is currently reviewed by QAA as part of Higher Education Review which, as part of changes to periodical university review procedures in recent

years, has moved away from having a separate section commenting on doctoral education in review reports (QAA, 2014a). However, postgraduate degrees are a full part of the Higher Education Review process, which is aligned with the UK Quality Code (QAA, 2014b) and reviewers are invited, if appropriate, to make differentiated judgements between 'undergraduate' and 'postgraduate' education. QAA reviewers expect to see the outcomes of internal monitoring processes such as programme review, as well as evidence that universities' postgraduate programmes are in alignment with national standards and guidelines, such as the section of the UK Quality Code on research degrees (QAA, 2012) and comments on postgraduate programmes are made in the report. Importantly, and of particular relevance to research-intensive universities, HEFCE, which has statutory responsibility for assuring the quality of English degrees and delegates responsibility to QAA for the management of the process, specifically requires the Higher Education Review to include research degrees where they are offered by an institution being reviewed.

Postgraduate levels and standards are included in the UK Quality Code (QAA, 2014b) and in related reference points such as Doctoral Degree Characteristics (QAA, 2011) and Masters Degree Characteristics (QAA, 2010) documents[9]. Much of the policy on postgraduate education in the UK has been developed in partnership by a range of HE sector organisations (including the Research Councils, funding bodies, professional organisations and QAA), as part of HE quality assurance procedures. For example, Section 1 of the QAA Code of Practice (QAA, 2004) incorporated the shared priorities of all these organisations and, having been subject to extensive consultation with institutions, reflected effective practice and accepted standards at grass roots level. Such an approach has led to the development of policy that can be implemented in practical situations and is supported by institutions.

The European Association for Quality Assurance in Higher Education (ENQA) has influenced quality assurance in mainland Europe, with systems in Germany, Norway and Spain being aligned with cross-European practices as part of the continuing influence of the Bologna Declaration. In turn ENQA has been significantly influenced by QAA's work in the UK and British contributors have played leading roles as members of ENQA's board, which is currently chaired by the chief executive of Quality and Qualifications Ireland (QQI).

Postgraduate QA systems and policy in England are in the middle ground with respect to other national systems for monitoring quality in higher education; in some of the countries surveyed in this study, for example Spain and Australia, national QA procedures are less collaborative and more 'top-down'. In other countries, responsibility for QA is devolved, for example, in Germany to the *Länder* and in the US, to individual states, although the government approves accreditation agencies.

Scotland, on the other hand, is at the opposite end of the scale, with the concept of enhancement continuing to lead the development and monitoring of postgraduate education (see Annex E). The authors perceive the Scottish approach to offer benefits arising from its inclusivity and partnership-driven activities, although some of the advantages of the Scottish system would be difficult to replicate in larger geographical areas with more institutions.

Qualifications frameworks, credit and the comparability of degree outcomes

In six of the eight countries, postgraduate education falls within national and international qualifications frameworks. Postgraduate qualifications in India and the US are not subject to national frameworks but their comparability with other countries' qualifications is demonstrated through

[9] Both the Doctoral degrees and Masters degrees characteristics documents are currently being reviewed by QAA.

masters graduates entering doctoral programmes in other countries, doctoral graduates obtaining post-doctoral positions and postgraduates from both countries having international mobility in employment.

Table 2 (p. 34) provides an overview of levels and credit values for the higher education qualifications most relevant to this study specified in each country's framework. The characteristics of the respective frameworks are summarised below.

Australia
The first edition of the Australian Qualifications Framework (AQF, 2013) was published in 1995 and emerged from three preceding documents on qualification standards, the first issued as early as 1972. The AQF defines graduate attributes at ten qualification levels, beginning with the Senior Secondary Certificate of Education (0), four levels of HE Certificate (1, 2, 3 and 4), the HE Diploma (5), then Advanced Diploma and Associated Degree (both at level 6), Bachelors (7), Bachelors with honours, Graduate Certificate and Graduate Diploma (all at level 8), Masters (9) and finishing with the Doctoral Degree (10). As in England, Wales and Northern Ireland, all masters degrees are at one level (9), but three different types of masters are defined separately as part of the framework, whereas in the UK, the definitions of three categories of masters degree are set out in the Masters degree characteristics document (QAA, 2010). The AQF differentiates between the doctoral degree (research) and the doctoral degree (professional): the UK has deliberately chosen not to follow this path to emphasise the equivalent outcomes of all doctorates. While equivalence and comparability have been a sound defining principle of UK doctoral qualification descriptors, the Australian definition and distinction between the two forms of doctorate provide clarity while confirming equality, as follows:

> 'Research is the defining characteristic of all Doctoral Degree qualifications. The research Doctoral Degree (typically referred to as a Doctor of Philosophy) makes a significant and original contribution to knowledge; the professional Doctoral Degree (typically titled Doctor of [field of study]) makes a significant and original contribution to knowledge in the context of professional practice. The emphasis in the learning outcomes and research may differ between the different forms of Doctoral Degree qualifications but all graduates will demonstrate knowledge, skills and the application of the knowledge and skills at AQF level 10.'
> (AQF, 2013)

England, Wales and Northern Ireland
England shares the Framework for Higher Education Qualifications (FHEQ) (QAA, 2008a), now in its second edition, with Wales and Northern Ireland. The framework includes qualification descriptors for masters (level 7) and doctoral (level 8) degrees, summarising the attributes expected of graduates holding these qualifications. As well as being used by institutions to inform university level regulations and guidance, which in turn influence curriculum development and assessment practices, qualification descriptors are a reference point for QAA reviewers in the Higher Education Review against which to evaluate institutional performance and graduate outcomes. England also has a credit framework[10], setting out credit values for higher education qualifications that are not research degrees.

Germany
As well as falling within the scope of the qualifications frameworks in the European Higher Education Area (QF-EHEA) and the European Qualifications Framework (EQF) like many other European countries, Germany has its own qualifications framework (the German Qualifications Framework for

[10] Higher education credit framework for England: guidance on academic credit arrangements in higher education in England, August 2008: http://www.qaa.ac.uk/en/Publications/Documents/Academic-Credit-Framework.pdf (QAA, 2008c)

Lifelong Learning – known as the DQR), first published in 2011 after a long process of development. As in Scotland, the DQR covers both higher education and non-HE qualifications across eight levels, with levels 6, 7 and 8 representing bachelors, masters and doctoral levels. The level indicators for doctorates are highly research-focused and in the 'knowledge' category they differentiate between 'state-of-the-art knowledge in a research discipline' and 'comprehensive occupational knowledge in a strategically and innovation oriented field of occupational activity', the latter accommodating professional, practice- and industry-based doctorates.

India

India does not currently have a national qualifications framework for higher education, although in December 2013 the government approved the introduction of a National Skills Qualifications Framework, yet to be developed. Already in existence is a National Vocational Education Qualifications Framework (NVEQF) covering a range of sectors. Certification levels range from 7 and 6 (Advanced Diploma, equivalent to bachelors and second year bachelors respectively), 5-3 (Diploma, equivalent to first year bachelors (5) and higher secondary grades) and 2 and 1 (Grades X and IX, equivalent to secondary school grades). Depending on the subject of the qualification, levels 7 and 6 may be certified by boards of technical education or universities, with other levels certified by universities (5), boards of technical education (5-3) or school boards (2-1).

Norway

The Norwegian Qualifications Framework for lifelong learning (NQF) has 7 levels, which correspond to the EQF, and define learning outcomes using knowledge, skills and general competences. Postgraduate degrees are defined at levels 7 (masters: MA, MBA, Master of International Business (MIB), Master of Technology Management, Master of Laws, and professional candidates of medicine, psychology, theology and veterinary medicine) and 8 (doctorates: Doctor of Philosophy/PhD and Diploma, artistic development programme) and are intended to facilitate comparison between Norwegian and other European qualifications and to create greater transparency in qualifications. The Norwegian framework does not contain general qualification descriptors at each level but has three categories of learning outcomes at each level: knowledge, skills and general competence. It is planned that the NQF will be adopted into Norwegian law as a regulation.

Scotland

The Framework for Qualifications of Higher Education Institutions in Scotland (FQHEIS) (QAA Scotland, 2014a) has recently replaced the original 2001 version and is classified as 'part of the wider Scottish Credit and Qualifications Framework (SCQF)'. As summarised in more detail in Annex E, the English, Welsh, Northern Irish and Scottish qualification descriptors included in the FHEQ and FQHEIS are very similar. In Scotland, the bachelors degree is split between two levels: Ordinary (level 9) and Honours (level 10), and the SCQF contains additional level descriptors (for all levels of qualification), which are different from the qualification descriptors in the frameworks, including for masters and doctoral degrees. They comprise five characteristics: Knowledge and understanding; Practice, applied knowledge, skills and understanding; Generic cognitive skills; Communication, ICT and numeracy skills; Autonomy, accountability and working with others.

Whereas the emphasis in the FHEQ and FQHEIS is primarily on academic attributes, with professional characteristics implicit, the SCQF descriptors are more outward facing with a primary focus on applying academic knowledge and understanding in a professional context[11]. The Scottish approach aligns with frameworks in some of the other countries (see below).

[11] The SCQF descriptors are available at: http://scqf.org.uk/wp-content/uploads/2014/03/SCQF-Revised-Level-Descriptors-Aug-2012-FINAL-web-version1.pdf

Much of the policy and guidance developed by QAA in partnership with the higher education sector is UK-wide so the existence of two different qualifications frameworks and the SCQF are an exception, but as stated in the FQHEIS, they 'reflect the features of [the] different education systems while making clear the many similarities and alignments'. One significant difference between the FHEQ and the FQHEIS is that the latter includes the SCQF credit values for higher education qualifications including doctoral degrees. To reduce duplication and complexity, QAA is in the process of updating and revising the FHEQ and FQHEIS, with a new publication 'The UK frameworks for higher education qualifications' due to be published in October 2014.

Spain

All Spanish higher education qualifications are included in the Spanish Qualifications Framework for Higher Education (MECES), which was established in 2010-11, and conforms to the QF-EHEA. The MECES covers four levels of higher education: 1 Technician (higher level vocational training including art and sports), 2 Grade (general training in one or more disciplines), 3 Masters and 4 PhD/Doctor. The Spanish framework is concise and does not include level criteria; it is enshrined in law through a series of royal decrees.

United States

The US does not use a qualifications framework for higher education but the Department of Education[12] provides summaries of expectations of bachelors, masters and research doctorate degrees that contain information typically found in other countries' qualifications frameworks and, for masters and doctorates, in the UK Masters and Doctoral degree characteristics documents (QAA, 2010 and 2011). For example, summary tables of the structure and composition of bachelors, masters and research doctorate degrees also list typical qualification titles. The Department of Education also provides a list of professional bodies that specify disciplinary standards. The US uses a system of evaluating credit equivalence (see below) to facilitate student and graduate mobility and to recognise accredited learning by international students.

Europe-wide frameworks

One of the strengths of England's, Scotland's and the UK's approach to maintaining standards in postgraduate education is the international benchmarking of degrees and verification of the qualifications frameworks FHEQ (QAA, 2008a) and FQHEIS (QAA Scotland, 2014a) as being in alignment with the QF-EHEA (QAA, 2008b). Qualifications frameworks in Germany, Norway and Spain also align with the QF-EHEA. While all these frameworks require interpretation at subject level, they help to assure consistent expectations of graduate outcomes across higher education qualifications in Europe.

Two European frameworks exist: the QF-EHEA and the EQF. The QF-EHEA was developed in 2005 by the Bologna Working Group on Qualifications Frameworks and is based on the 'Dublin descriptors' (so-called because they were developed at a meeting in Dublin) covering first, second and third cycle qualifications, from bachelors to doctoral levels and including European Credit Transfer and Accumulation System (ECTS) credit values for each qualification. The EQF, introduced by the EU in 2008, as part of a wider commitment to lifelong learning, summarises knowledge, skills and competence at eight levels of qualification, with levels 6-8 corresponding with the same levels in the QF-EHEA. The EQF is described as 'a metaframework that can, in principle, include a reference level for all qualifications and all learning whatever route the learning takes' (European Commission, 2013) and is intended to support lifelong learning and enable different countries' qualifications to be better understood across Europe and beyond.

[12] http://www2.ed.gov/about/offices/list/ous/international/usnei/us/edlite-structure-us.html

Summary – qualifications frameworks and credit

As shown in Table 2, the level numbers chosen for different qualifications depend on country-specific contexts and on the range of qualifications included, although with the exception of Scotland and Spain, levels across European countries are consistent. Australia's qualifications framework stands out as the most comprehensive, but it is not credit-based. Individualised frameworks in India and the US reflect the need to formalise levels and credit for vocational qualifications in the former and to map in-country credit to other systems in the latter.

Countries with qualifications frameworks favour either general descriptors at the level of the qualification (England, Wales and Northern Ireland) or criteria that specify knowledge, skills and other attributes to be expected of graduates at a particular level. Only Australia and Scotland have general qualification descriptors supplemented by level-specific criteria linked to learning outcomes. General descriptors often contain summaries of academic attributes that can be interpreted at subject level, whereas level criteria seem to focus more on professional skills linked to employment. This emphasis is less obvious at doctoral level, where both the qualification descriptors and level criteria are focused primarily but not exclusively on research attributes and outcomes, many of which are also professionally related. The doctoral qualification descriptor in the second version of the FHEQ (QAA, 2008a) includes additional text to update and clarify doctoral attributes and degree titles.

Masters degrees (taught and research) are at one level in each framework, including the integrated masters degree in England, Wales and Northern Ireland and in Scotland, and although credit values and volumes differ, our contributors did not suggest that the mobility of UK masters graduates is currently affected by this. However, given that ECTS provides the framework for postgraduate qualifications in the rest of Europe, the UK could be perceived as an outlier with respect to credit values. Whereas in Australia three types of masters degree are categorised in the AQF, in England masters qualifications are explored in greater detail through the Masters degree characteristics document. The HE credit framework for England does not credit-rate research masters degrees (or doctorates).

The AQF includes pathways for progression and has guidelines for the accreditation of prior learning but Australia does not routinely operate a credit-based system.

The degree to which employability is on the national agenda is reflected in each country's qualifications framework, with some demonstrating that graduates' professional knowledge and skills have an important place in academic qualifications frameworks. In not defining more explicit statements of knowledge, skills and other attributes such as those included in the Australian, German and Norwegian frameworks and in the EQF, England is leaving open to interpretation by institutions the more specific personal attributes considered desirable in professional life.

Credit

Due to its early introduction of credits, the UK took a decision to retain its own credit levels and volumes, rather than to move into alignment with the ECTS as part of the Bologna Process. One of the most valuable effects of credit is its potential impact in lifelong learning and the extent to which this has so far been recognised by UK universities has been questioned (Watson, 2014).

UK credit values are linked with the average amount of student input needed to complete a qualification successfully. For example, 10 credits is normally equivalent to 100 hours of student input, including formal teaching and learning, independent study and all assessment, and is based on an average full-time week of around 40 hours. Thus, a year's full-time study based on 30 weeks'

work (in a bachelors degree) equates to 120 credits. In masters degrees, the year normally consists of 48 weeks, with a maximum credit value of 180 at appropriate levels (see Table 2)[13].

The ECTS is based on a similar formula, with 60 ECTS credits equivalent to a full-time academic year of student learning and a student workload of between 1,500 and 1,800 hours and one credit corresponding to 25 to 30 hours of work. Non-UK European countries such as Germany, Norway and Spain have adopted the ECTS system.

The Indian NVEQF differentiates between contact hours for vocational and academic qualifications. For vocational qualifications, the higher the level, the more contact hours are required, whereas for academic awards, fewer hours are required the higher the level of certificate. So, for example, level 1 certificates require 200-300 contact hours for vocational and 700-800 hours for academic qualifications, but at level 7, 600-700 hours are required for vocational and 300-400 hours for academic qualifications.

The US credit system assumes that a standard full-time student load at bachelors level is equivalent to either 15 credit hours per semester or 30 credit hours per year, with a minimum of 120 credit hours required. The system is based on an academic year formed of two semesters each of 15 or 16 weeks' duration, with a winter break of two to three weeks and a longer summer break, interspersed with some shorter breaks. Some institutions use a 'quarter calendar' where the academic year is divided into three terms each lasting 10 or 11 weeks; in these institutions a bachelors degree may require 180 credit hours, equivalent to the 120 required at other institutions. Credit hours represent learning in formal settings plus independent study, including research and preparation for classes or seminars. Masters programmes comprise at least 33 credit hours and include a research thesis or project, with a total of more than 4,000 hours of supervised and independent study, and doctoral programmes are expected to represent at least 8,000 hours of advanced study and research. Detailed calculations of credit hours are provided by the US Department of Education's International Affairs Office[14].

The Department's website states that '[the US] system does not exactly correspond to other credit systems in other countries and regions', but students entering US higher education can have credits they have gained elsewhere converted to US credit hours. This assumes equivalence of academic content and student academic load across universities.

It would be unrealistic to advocate an international system of credit; however, as Watson (2014) suggests, 'the flexibility which a proper credit framework brings will be needed all the more in the light of current economic turbulence and the effect this is having on employment' and the UK could consider whether adopting the ECTS would facilitate greater mobility for graduates, both within Britain and more widely across Europe.

Qualifications frameworks and credit levels and volume help institutions to develop curricula, improve the transparency of their qualifications and re-calibrate the balance between learning and teaching. They also remind examiners of the need to differentiate clearly between levels of awards. The diversity demonstrated in Table 2 is not ideal; however, harmonisation would require some effort at an international level although potentially less difficult at European level.

[13] A few UK universities do not yet use credit for masters degrees; some have increased higher levels of credit in an attempt to align their programmes with Bologna norms.
[14] Further details are available from: http://www.educationalpolicy.org/publications/pubpdf/credit.pdf

Comparison of qualifications frameworks and credit values										
	Australia	*England (W&NI)*	*Germany*	*India*	*Norway*	*Scotland*	*Spain*	*US*	*QF-EHEA*	*EQF*
General comparisons across frameworks										
Descriptors (general grad. attributes for each qual.)	Qualification type descriptors/ specifications	Qualification descriptors	None	None	None	Qualification descriptors	Qualification features	National statements of structures of bachelors, masters and research doctorates, plus lists of typical degree titles	Qualification descriptors	None
Level criteria/ indicators/ characteristics (specific grad. attributes)	Summary, plus knowledge, skills, and their application	None	Knowledge, skills, social competence, autonomy	None	Knowledge, skills, general competence	Five characteristics (see above)	None		None	Knowledge, skills, competence
Doctorate										
Level [15]	10	8	8	None	8	12	4	None	8	8
Credit	None	Not credit-rated	Adopted ECTS framework	None	Adopted ECTS framework	UK: 540; 420 at level 12	Adopted ECTS framework	8,000 hours of advanced study and research	ECTS: Not credit-rated	ECTS: Not credit-rated
Masters										
Level	9	7	7	None	7	11	3	None	7	7
Credit	None	UK: 180; min. 150 level 7 Int. M: 480, min. 120 level 7	Adopted ECTS framework	None	Adopted ECTS framework	UK: 180; min. 150 level 11 Int. M: 600, min.120 level 11	Adopted ECTS framework	At least 33 credit hours = 4,000 hours of supervised +independent study	ECTS: 90-120; min. 60 level 7	ECTS: 90-120; min. 60 level 7
Bachelors										
Level	7	6	6	7 Advanced Diploma - Bachelors	6	Honours: 10 Ordinary: 9	2	None	6	6

[15] Text qualification descriptors for doctorates and masters show that although numerical levels differ, general expectations of graduate achievement are broadly similar across countries and in the QF-EHEA (the latter being the original 'Dublin' descriptors on which the FHEQ was based).

				equivalent in NVEQF: (see below)						
Credit	None	UK: 360 - 480	Adopted ECTS framework	None specified	Adopted ECTS framework	UK: Hons: 480 with min 90 at Levels 9 and 10 Ord: 360 with min 60 at level 9	Adopted ECTS framework	15 credit hours per semester or 30 credit hours per year; total 120 or 180 credit hours	ECTS: 180 - 240	ECTS: 180 - 240
Qualifications below first cycle included in frameworks										
	Level 6: Advanced Diploma Associated Degree Level 5: HE Diploma Levels 4 - 1: HE Cert.	Level 5: Foundation degrees, Dip HE, HND Level 4: HNC, Cert. HE	Levels 5 to 1: lower level qualifications	National Vocational Educ. QF Level 6: Adv Dip = second year bachelors; Levels 5-3 Diploma; Levels 4-1: Higher secondary and secondary school grades	Level 5: Tertiary vocational training Level 4B: HE entrance req. Level 4A: upper secondary subject related and vocational education Level 3: partially completed upper secondary Level 2: competence at primary /lower secondary	Level 8: HND, Dip HE Level 7: Adv. Higher Scottish Bacc., HNC Level 6: Highers Levels 5-1: Nationals	Level 1: Technician (Superior Téchnico)	Carnegie Unit system at secondary level. 1 unit = single subj. x 1 period x 5 days per week	Level 5: short cycle (in or linked to 1st cycle or bach.) Levels 4 – 1: lower level qualifications	Level 5: short cycle (in or linked to 1st cycle or bach.) Levels 4 – 1: lower level qualifications

Table 2: Comparison of qualifications frameworks and credit values

Access

In their 2013 study which explored transition to higher degrees across the UK, Wakeling and Hampden-Thompson found that graduates from lower socio-economic backgrounds are under-represented in postgraduate education, although their evidence did not show that this was related to finance, since 'the proportion of graduates progressing to higher degrees who funded themselves varied little across socio-economic background' (Wakeling and Hampden-Thompson, 2013). They also discovered lower progression rates for women, across all subjects and differences by ethnic group.

The long tradition of free higher education in mainland Europe has had a major impact on access to postgraduate education, ensuring that financial barriers do not prevent progression from undergraduate degrees. Most strikingly this is maintained by Norway's commitment to no tuition fees at any level and Germany's decision to abandon its experiment with tuition fees at undergraduate level. In the two countries in the study with communities under-represented in higher education, for example Australia with its indigenous community and the US with large African-American and Hispanic communities, much effort has been made to achieve fair access. In 2009 the Australian government introduced two access targets: that by 2020 20% of undergraduates should be from low socioeconomic backgrounds; and that by 2025 40% of 25-34 year olds should hold a bachelors degree or higher. These goals were accompanied by financial rewards for public universities meeting the targets. In the US large numbers of community colleges play a critical role in access by enrolling 'higher percentages of low socio-economic status students' (Provasnik and Planty, 2008, in Bell, 2012c), with encouraging proportions of students from under-represented groups who had attended a community college attaining doctorates in 2009-10.

A variety of grants in the US (and see Annex G) are designed to encourage students from low-income backgrounds to enter higher education, including postgraduate programmes, and wide use of the Teaching Assistant scheme helps to level out income issues. In Germany also, PhD students are usually employed as senior research assistants or get a fully funded studentship (€12,000-€16,000) and the Federal Training Assistance Act (BAFöG) scheme supports students from lower income families until they have completed their masters degrees. Norway provides an example of a country in which the presumption of public interest and entitlement to higher education at all levels is the highest and where higher education at all levels remains free. In India a range of financial support is available from both public and private sources through grants and scholarships for students from under-represented groups to study postgraduate degrees (and see Annex C).

In England most students 'take a break of at least a year between undergraduate and postgraduate study' (HEFCE, 2013a). The HEFCE study also found that those entering postgraduate study are likely to be younger on entry than a decade ago but that 'the likelihood of part-time study … increases with age'. This is unsurprising, especially at masters level where more mature students may be returning to postgraduate study either full- or part-time as part of professional career development and are sometimes sponsored by their employers. In this context we heard that the decrease in applications for part-time study is a concern, especially if this extends to industry employees wishing to return to postgraduate study mid-career, for example in engineering. Across Europe, we heard that part-time study is considered a realistic option for those who at the same time need to work to support themselves. One view is that masters degrees may begin to be an increasingly attractive option for those considering progression to postgraduate study but who are not planning a career in research. Some universities that rely on masters degrees as reliable sources of income may be encouraged to develop more programmes at this level, especially in vocational or occupational subjects, such as is proving to be the case in the US.

Several of our UK contributors said that possession of a bachelors degree is a leveller and that on entry to postgraduate programmes, particularly at doctoral level, individuals would not necessarily think that being from a minority or a background where higher education was not the norm would inhibit their entry or affect their ability to succeed. However, several mentioned a lack of funding as a barrier to access to postgraduate degrees, both at masters and doctoral level. One contributor described access to taught postgraduate provision as 'a serious problem', with some masters programmes being 'filled with overseas students and/or British students from rich families'. From a research council perspective, funding is not necessarily a barrier at doctoral level for the most able students, especially in STEM subjects, who are sought after by universities and if research-council funded, receive a generous stipend. Some Research Councils also provide small amounts of money to support universities' strategic planning initiatives and in some cases this has been used towards fair access projects.

We heard from our contributors that to achieve access to postgraduate education, 'some problems need to be addressed', for example, to overcome barriers such as the class system, cultural differences, lack of confidence, social structures and expectations. Removing some of these barriers requires instilling in a critical mass of individuals the self-belief that they can succeed in higher and postgraduate education. One interviewee suggested that universities should start early on in undergraduate degrees to encourage graduates to aspire to postgraduate study. Some universities are thought to have 'more intelligent' recruitment processes, sometimes involving a degree of risk-taking, to enable students from under-represented backgrounds to be recruited to postgraduate degrees, although we also heard of other examples where a skew in undergraduate recruitment (not in favour of under-represented groups) was replicated at postgraduate level.

Financial considerations

The authors were not asked to consider postgraduate funding for this report but inevitably the question of sustainability of postgraduate education has arisen when conducting our research. Many of our contributors across all countries, when asked about fair access, said that it was usually related to funding, as well as aspiration, class (in some countries) and various other factors outlined in the section of the report on England.

Figure 5 below shows the already diverse sources of funding for postgraduate students in the UK.

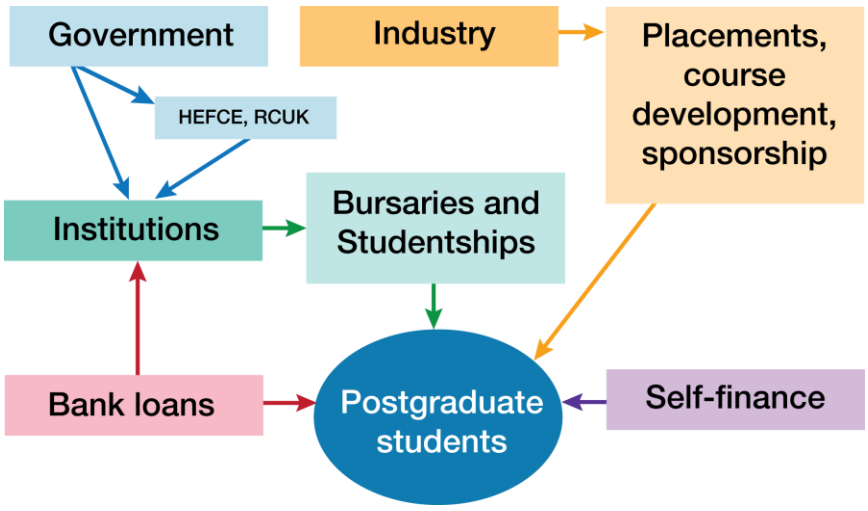


Figure 5: Sources of postgraduate funding for UK postgraduates (HEFCE, 2013a)

Fees

Countries vary substantially in their approach to funding higher education and specifically on the balance between state and other sources of funding. These differences reflect the historical question of the relationship between universities and the state. Watson (2014) distinguishes between distinct regional models which were also illustrated in the study: a North American model, a model adopted in Britain and the Commonwealth, a continental model and a Nordic model. In Table 3 we outline the tuition fees profile in each country.

	Australia	England	Germany	India[3]	Norway	Scotland	Spain[4]	United states
Bachelors	15,000-30,000 AUSD (8,621-17,241 GBP)	GBP 3,250-9,000 Some charge a range of fees, others fixed	No fees in 15 out of 16 federal states, 1,000 EUR per year in the other state[1]	Average cost of tuition at elite universities (Indian Inst. of Managem't & Tech. and Nat. Inst. Of Tech.) is USD 1,500 (91,695 Ind Rs, 897.5 GBP) but fees vary widely by region and institution	No fees for students at public HEIs (85% of all students) Small semester fee of NOK 300-600 (GBP 29.2 – 58.4) to take exams and pay for services such as university card	No fees for Scottish or non-UK EU students. Fees for English, Welsh and Northern Irish students: up to 9,000 GBP	70% of students pay fees; amount based on subject, no. of ECTS credits and exams failed. Average cost: 1074 EUR (lowest 713 EUR; highest 2011 EUR)	*Annual* average costs for tuition, room and board: Public inst. USD 14,300 (8,882 GBP) Private non-profit inst. USD 37,800 (23,478 GBP) Private for-profit inst. USD 23,300 (14,472 GBP)
Masters	20,000-37,000 AUSD (11,494-21,264 GBP)	Variable; lowest circa 3,000 GBP, highest circa 40,000 GBP	No fees for 'consecutive' masters; up to 10,000 EUR per semester for non-consecutive masters[2]	*Central univs* 1-yr PG Dip: 50-150 GBP MA AHSS: around GBP 900 MA STEM: Around GBP 1,300		Variable; similar range to England	Average cost: 2094 EUR (lowest 1052 EUR; highest 4734 EUR)	Average cost based on 2009-10 figures: USD 14,537 (9,029 GBP)
Doctorate	14,000-37,000 AUSD (8,046-21,264 GBP)	Variable: From 3,000 to 6,000 GBP	No fees for the first six semesters plus semester contribution towards costs	*Central univs* PhD admiss. Fee: 150 Ind Rs (1.50 GBP) PhD 'thesis' fee: 950 Ind Rs		Variable, similar to England	No official information available	No official information is available but costs of all graduate programmes

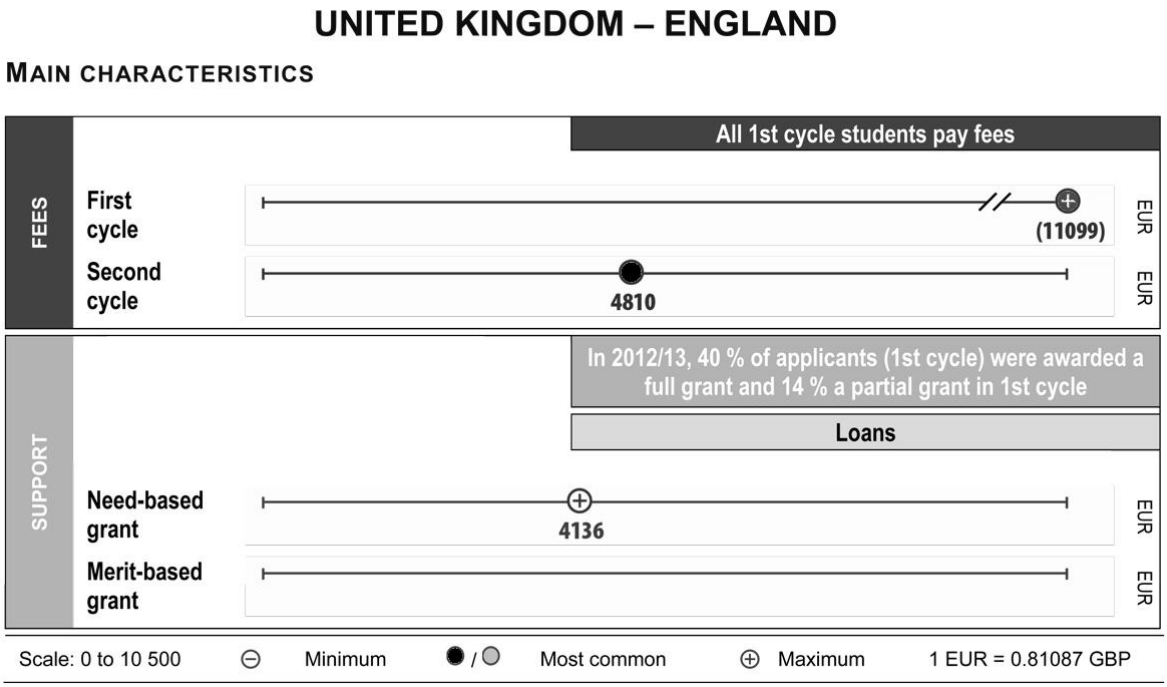
			such as ID card	(9.3 GBP) *Elite univ* Reg fee 5,000 Ind Rs (48.9 GBP); Annual course fee 40,000 (391.5 GBP); Viva fee 1,000 Ind Rs (9.8 GBP)				(masters and doctorates) are variable and not always differentiated, One source suggested a fee of 40,000 USD (24,845 GBP) for the PhD
Notes: Figures quoted are for full-time domestic students, although some may refer to international students Unless stated otherwise, numbers are for the cost of the degree; US numbers are annual costs Doctoral degrees on the whole have lower tuition fees than either bachelors or masters courses Masters degree fees are particularly variable and are affected by subject; for example, premium fees may be charged for MBA courses [1] Students in Germany who exceed the normal period may be charged a semester fee of 500 EUR [2] Consecutive masters follow straight on from bachelors degrees and do not attract tuition fees; fees are charged for non-consecutive masters degrees [3] Courses in medicine and other health related disciplines often attract significantly higher fees [4]In Spain fees are calculated per credit with different values at bachelors, masters and doctorate levels; at each level they are variable								

Table 3: Tuition fees profile by country

It is clear that all countries face the challenge of funding what has become a mass higher education system at both undergraduate and postgraduate level and that differences between them reflect historical and cultural norms as well as political and economic/fiscal priorities. In most of Europe a tradition of free HE has prevailed; Norway manages to sustain free tuition at all levels through high levels of public funding, whereas countries such as Germany and Spain have experimented with tuition fees. However, even in these cases, the student voice forces universities to keep tuition costs to an absolute minimum. The UK bucks this trend. The question facing most countries is: how much is it reasonable to expect postgraduates to contribute to their education, and, by implication, what proportion should be funded by the state and other sources?

One view is that English universities will consider using some of their income, specifically additional fees raised through undergraduate programmes, to subsidise postgraduate education (and see Wolff, 2014) either through bursaries and scholarships or by re-prioritising other sources of income. Extension of the undergraduate loan scheme to postgraduates has been proposed by several organisations, including the National Union of Students (NUS) and in Scotland a pilot project, the Postgraduate Tuition Fee Loan scheme is currently supporting some postgraduate diploma students (see Annex E).

Eurydice[16] (2013) provides useful comparative tables on the main characteristics of student funding in European countries. Table 4 below demonstrates the average fee for masters programmes in England and sources of financial support for students. Similar Eurydice summaries are included in Annexes 2, 4, 5 and 6.



Key Points

Fees (2013-14)

• 1st cycle full time – fees are set by institutions but capped at a maximum of GBP 9 000 for institutions with an approved tuition fee plan to promote fair access and GBP 4 000 for institutions without a plan. Students are

[16] The Eurydice Network provides a variety of information about higher education systems across Europe. The Network extends to 36 countries and is part of the Education, Audiovisual and Culture Executive Agency of the European Commission.

not required to pay up front and can apply for a fee grant of up to GBP 5 425 and a fee loan of up to GBP 3 575 to cover the full tuition fee. The 'most common amount' shown represents the repayable fee of GBP 3 575. Loan repayments are income-contingent, and made at the rate of 9 % of income above the threshold of GBP 21 000. These fees apply to students from all parts of the UK but the fee grant is only available to students from Wales.

• 1st cycle part-time – fees are unregulated.

• 2nd cycle – fees are unregulated. The 'most common' fee (GBP 3 900) represents an indicative amount for doctoral research programmes (which may incorporate masters level study) set by the Research Councils and used as a guide by many institutions. Actual fees charged vary widely, particularly for taught programmes.

• 1st and 2nd cycle international students – fees are unregulated.

Support (2013/14)

• 1st cycle full-time – the support package includes a need based **grant** for living costs. The maximum is GBP 5 161 (for students with a household income of GBP 18 370 or less). In 2012/13, 38 % of applicants were awarded a full grant and 30 % were awarded a partial grant. Students who are lone parents or who have certain disabilities may be eligible for a special support grant.

• 1st cycle full-time – the support package includes a **loan** for living costs for all students. The maximum loan for students living in the family home is GBP 5 150 and GBP 3 987 for students living away. The amount is reduced for students who receive a need based grant. Repayments as for tuition fee loans.

• 1st cycle full-time – students who receive the maximum grant for living costs or special support grant and who study at participating institutions may receive an additional bursary of a minimum of GBP 347.

• 1st cycle part-time – a need-based grant for tuition fees and other costs is available. Loans are not available.

• 2nd cycle – with the exception of a few specific disciplines, such as teaching, social work and some health professions, the majority of students following taught programmes are self-financing. There is some support for students on doctoral research programmes (which may incorporate masters level study). The Research Councils set a minimum level for this stipend which for 2013/14 is GBP 13 726 per year.

• Around 60 % of students on taught programmes and 30 % of research students do not receive any support towards tuition fees or living costs.

• **Tax benefits for parents** and **family allowances** do not play a role in the student support system.

Recent changes

• Following the announcement of plans to raise the cap on tuition fees for students in England, the Welsh Government approved regulations allowing institutions to charge higher fees from September 2012. However, Welsh domiciled students do not have to pay the increased fees as the additional cost is met by the Welsh Government through the tuition fee grant.

Table 4: Main characteristics of HE student fees and support – UK England 2013-14 (Eurydice, 2013)

Debt

Several of our contributors were concerned about the impact of undergraduate debt on graduates' enthusiasm for and ability to progress to postgraduate degrees. Currently there is little empirical evidence in the UK to provide insight into this question but evidence from the US shows that many postgraduates on completion of their studies have amassed a significant amount of debt. In some cases this is accumulated, but in others the debt has built up during postgraduate study and, as CGS puts it 'the groups that should be a growing percentage of domestic students' have higher levels of debt than their peers.

As recognised by Wakeling and Hampden-Thompson, 'Graduates from lower socio-economic backgrounds are under-represented among those progressing to higher [postgraduate] degrees' and, although in their study they did not find that funding was an impediment, the HEFCE (2013) report notes that 'there is some evidence that it is increasingly the better off who engage in

postgraduate study, especially masters or PhDs'. This is clearly a concern and we heard that some selective universities are introducing policies to restrict entry to research degrees by self-funding students.

One of our contributors suggested that around a third of English PhD students enter their programme straight after a first or a masters degree; approximately another third progress after a year or two, and another third enter doctoral study after a much longer period. As with many other trends in doctoral education, the balance varies among disciplines, and is also affected by whether or not a masters degree is required for entry to a doctorate. For example, physical sciences graduates have 'a substantially higher progression rate than other disciplines' to research degrees (Wakeling and Hampden-Thompson, 2013).

Research Councils are explicit in their expectation that universities make funding decisions based on the applicant's academic quality and potential to succeed in research without reference to their background. In most disciplines this has resulted in a greater diversity of doctoral candidates. One of our contributors, speaking of industry-related research and PhDs, suggested that evidence was emerging to indicate that mixed teams of researchers, i.e. from different backgrounds and with a gender balance, may produce better outcomes.

We also heard that there is currently little evidence in England of a burden of debt affecting applications to postgraduate study but this may not play out until the first of the graduates paying £9,000 fees per year reaches the stage of applying to postgraduate study, around 2015-16. A further consideration is whether loan repayment is considered a debt by postgraduates, especially in the current scheme where significant repayment is not required until earnings reach £21,000 per year or over. Universities are clearly aware of the need, as part of access strategies, to provide support for graduates considering progression to postgraduate study and a recent Office for Fair Access/HEFCE report (OFFA, 2014) has found 'steep increases in outreach work and work to support progression into employment and postgraduate education'.

Employment outcomes

Those we interviewed were in no doubt about the need for all postgraduates to be employable and to possess the professional skills valued by a range of organisations, irrespective of the diversity of employer groups. The importance of ensuring that postgraduates, particularly researchers, are well matched to their careers was emphasised by one contributor, who added that some of the most successful 'first-time' employers of doctoral graduates were small and medium-sized enterprises (SMEs), especially if targeted through collaborative partnerships in technical areas such as digital technology.

The relatively few places for post-doctoral researchers in the arts and humanities appears to be a feature in the majority of the countries included in this study, although in the US, teaching assistantships may extend beyond completion of the doctorate.

With respect to the postgraduate attributes most valued by employers, we heard that there is 'a need to develop a narrative around this', as often universities and postgraduates themselves fail to differentiate postgraduate characteristics from those inherent in first degree graduates, and it is also important to distinguish between masters level and doctoral professional skills. The 'Facets of Mastersness' project undertaken in Scotland has helpfully begun to address the attributes of masters graduates.

Under- or over-supply of doctoral

The question of how many doctoral graduates are needed is a challenge for all countries. The challenge includes both how to fund doctoral programmes and their contribution to the economy and society. Cyranoski et al (2011) argue that in some countries 'supply has outstripped demand' and question whether investing time and effort gaining a PhD is worthwhile in all cases. They cite Germany's approach in marketing a PhD as a distinctive career path as an indicator of how to solve the problem of over-supply.

One of our contributors indicated that government aspirations for doctoral graduates in particular, supported by the views of some employers, are that the more doctorate-holders entering industry the better. To a great extent, this is also one of the key intentions for doctoral outputs sought by the UK Research Councils and we heard that some of them are prioritising areas where the UK is currently not producing enough of the kind of graduates sought-after by employers, sometimes because of institutional barriers. In the UK, the Research Councils fund around 6,000 doctoral candidates annually. This number is enhanced through other scholarship funding and sponsorship, as well as international fee-paying candidates and domestic self-funding students. To assure quality and access, a small number of universities have taken the decision to cap the number of PhD students and ensure that all receive studentship or scholarship funding.

However, some interviewees made the point that academic careers also need to be made attractive enough to appeal to the next and subsequent generations of academics who will educate future doctoral students at the same time as sustaining and if possible increasing England's current levels of research productivity both within and outside universities. One described academic departments in universities as 'guardians of their subject', involving 'constant engagement' with curriculum and scholarly developments.

A challenge is to find a balance between producing the right number of doctoral graduates so that there are enough both to maintain a steady supply for academia and industry-based research and to enter other careers, benefitting society and contributing to a thriving economy. As demonstrated by Mellors-Bourne et al (2013), recent data show that salaries for postgraduates entering academia are, on average, higher than those in many other careers.

We heard from contributors in several countries including Spain, Germany and the US about the potentially decreasing benefit of embarking on postgraduate education in some areas. One contributor suggested that, not just in England but Europe-wide, there are concerns about the over-supply of doctoral graduates even though most now emerge with a high level of professional skills. Apart from India, the countries in this study aim to maintain or reduce current numbers of doctoral graduates. Yet in recent first destination statistics of graduates from English and UK universities, it is those with a PhD who are the smallest group still seeking employment, thus proving to be in demand from different groups of employers. To what extent doctoral graduates in employment are performing at a level reflecting their high level knowledge, skills and competence inevitably varies, but we heard that individuals with high level skills such as those possessed by doctoral graduates can 'revolutionise' their work environment, even if their role appears to be at a lower level than might be expected for someone with their qualification. Another of our interviewees emphasised the fact that the Research Councils are concerned with investing in doctoral programmes that produce future leaders, both in research and in society generally and that successfully completing a PhD can develop leadership abilities that are relevant across all sectors.

We heard that leading companies are well aware of the value inherent in recruiting PhD graduates, especially but not solely in technical areas. Such employers are looking for personal qualities as well as technical and professional skills and may find one or more universities from which they have

recruited doctoral graduates in the past with great success and return to recruit from the same institution. Research Councils recruit the 'product' they fund in the form of new PhD graduates and have begun to notice the difference that structured development is making to their capabilities.

Several of our interviewees made the point that a growing number of doctoral candidates who intend not to enter academia on graduation embark on their programme with the intention of gaining an advantage in the employment market and that this does not necessarily detract from their enthusiasm for their research. The example of the Doctor of Engineering (EngD) was used to demonstrate that the original intention of this qualification was to provide an edge in employment; it still remains the case that doctoral candidates on professional engineering doctorates, whether badged as EngD or PhD, may be employed by the company in which they undertook an industry-based research project during their doctorate.

We also heard that some employers, for instance large pharmaceutical and engineering companies, target particular universities when recruiting doctoral graduates because of the quality of training at those institutions and may also have previously recruited strong graduates from the same institution.

Recent data published by Vitae and CRAC (Mellors-Bourne et al, 2013) show that those with postgraduate degrees can expect to earn more than first degree graduates, as demonstrated by Table 5 below. This was confirmed by the views of more than one of our contributors, who said that PhD graduates were more likely to be successful in securing employment, and a higher level job, than other graduates.

	2010 L DLHE			2007 DLHE			2008 L DLHE		
	Doctoral graduates	**Masters (taught or research)**	**First degree 1st/2:1**	**Doctoral graduates**	**Masters (taught or research)**	**First degree 1st/2:1**	**Doctoral graduates**	**Masters (taught or research)**	**First degree 1st/2:1**
£25,000 or less	8.4	22.6	54.2	28.2	45.7	85	10.6	25.4	55.8
£25,001 to £30,000	19.4	21.3	24.3	37.2	17.4	9.2	22.9	16.7	22.9
£30,001 to £40,000	43.7	28	16	19.5	20.1	4.4	41.3	26.6	15.2
£40,001 to £50,000	16.1	14	3.8	7.9	8.2	0.9	12.3	14.8	4.2
£50,001 or more	12.4	14.1	1.8	7.1	8.6	0.4	12.9	16.5	1.9
(N)	1385	2575	11010	1055	1990	6625	1205	2365	9819
Median £	35000	32000	25000	28000	27000	20000	34000	33000	25000

Table 5: Gross annual earnings for graduate respondents in UK full-time employment
(Mellors-Bourne et al, 2013)

Table 5 compares the salary ranges and median salaries of doctoral, masters and 'good' first degree graduates for three groups of students who graduated at different times. Comparing the median salaries for doctoral graduates in 2004-05 and 2006-07 at the same point in their careers (3.5 years post-graduate) showed a 3% increase in the median salary, similar to the rise in overall average earnings in the UK over the same period, which was 3.1%. Doctoral graduate earnings kept pace with national earnings trends, but those with good first and masters degrees fared less well: first degree graduate median earnings remained at the same level and masters graduate median earnings dropped by £1,000, while remaining higher than those of first degree graduates.

Recent publications used as background for the study

The Postgraduate Crisis (1994 Group, 2012)
This report sets out the concerns of many institutions (not just 1994 group universities) about the future of postgraduate education in the UK. It highlights the risks to the economy, society and higher education if no affirmative action is taken to address funding of postgraduate degrees (PGT and PGR). Recommendations include support for the 2014 launch of a European Masters Degree Mobility scheme (including a student loan guarantee facility) and encouragement for the UK Research Councils to continue supporting masters degrees. The report also highlights the importance of promoting the UK brand of postgraduate study overseas.

Postgraduate funding: the neglected dimension (British Academy, 2012)
As well as articulating the value to all concerned of a strong postgraduate sector, this report contributes to the debate about the widely-held view that there is a crisis in postgraduate funding, especially with respect to PGT programmes in the arts and humanities. The report highlights the STEM bias in postgraduate funding and the conclusions make some practical recommendations that are supported by others, including NUS, in particular a government-backed postgraduate loan system.

The economic contribution of PhDs (Casey B., 2009)
This journal article considers the potential benefits of a PhD to individuals, employers and society. It concludes that acquiring a PhD does not always improve an individual's earning capacity, that women are more likely than men to improve their earning power through gaining a PhD, and that the subject studied has a significant effect on earning power. One assertion in the paper is that employers might put a higher value on PhD training than PhD graduates themselves.

Postgraduate education in England and Northern Ireland: Overview report 2013 (2013/14) (HEFCE, 2013a)
This is a comprehensive summary of the English and Northern Irish postgraduate education environment and summarises trends in postgraduate education during the 10 years prior to publication. In 2011-12 HEFCE was asked by the government and in particular through its grant letter from the Government, to 'gather evidence to improve our understanding of the postgraduate sector'. As noted in the introduction to this report, work is ongoing to fulfil this aim. Complementary to this report is: *Trends in transition from first degree to postgraduate study: Qualifiers between 2002-03 and 2010-11* (ref. 2013/13) (HEFCE, 2013c)

The Postgraduate Premium (Lindley and Machin, 2013)
This report examines trends in social mobility in Britain and the US, with a particular focus on the role of education. It concludes that inequality in education affected by family income has 'risen significantly in both countries', that this appears to be gender neutral and that increasingly it affects higher graduate qualifications. In parallel, those with higher qualifications are earning more than in

the past, so individuals who are now earning higher wages are those with higher education qualifications. Lindley and Machin also found that increasingly those with higher qualifications were from more wealthy backgrounds.

Higher Education in England 2014: Analysis of latest shifts and trends (2014/08) (HEFCE, 2014)
A recent statistics-based publication that provides an insight into current postgraduate student trends, for example in part-time applications and the numbers of international entrants. The report takes account of recent policy papers and reports and is designed to inform higher education institutions and others about the latest changes to England's higher education profile.

What do researchers do? (Mellors-Bourne et al 2013)
This document builds on a series of Vitae publications about doctoral graduate destinations. It is of particular interest because it includes the destinations of two cohorts of doctoral graduates (2008 and 2010) and compared the outcomes more than three years post-graduation. One of the outcomes of this survey shows that only 2% of leavers from these two cohorts were unemployed at the point of the survey, although 18% had experienced periods of unemployment (for around 50% of this group, this was for three months or less). Among other information provided, such as a summary of the earnings of doctoral graduates more than three years after graduation, this publication also compares doctoral employment outcomes with those of masters and first degree graduates.

The Impact of Universities on the UK Economy (Universities UK (UUK), 2014)
This report focuses on the potential of higher education to support economic development in the context of what the authors describe as 'a renewed and extensive public debate about the purpose and nature of higher education, the types of higher education society wants and, in particular, who should pay for the cost of a higher education sector'. The report notes the divergence of higher education policy that exists across individual nations within the UK and highlights the significant contribution made by higher education to the economy.

Transition to higher degrees across the UK: an analysis of national, institutional and individual differences (Wakeling and Hampden-Thompson, 2013)
The 'Transition to higher degrees' publication addresses this topic through three themes: institutions, the four UK nations and the individual characteristics of graduates, including academic and demographic background. The report contains some enlightening statistics to inform policy and action with respect to fair access for under-represented groups in higher education and is particularly relevant to this report because of its focus on higher, or postgraduate, degrees.

Conclusions

In this section we summarise some of the features of postgraduate education that are central to the three themes: quality, access, and employment outcomes. As noted earlier, we were struck by the amount of common ground shared by most of the countries in our study; this has helped to highlight strategies that might be adapted in other contexts. India stands out as the only developing country in the group, with its unique circumstances and perspective, although it shares some of the challenges faced by the other countries: mass higher education; assuring consistency of the student experience and quality of outcomes; and how to assure fair access and exploit human capital for the benefit of the country and the individual.

Quality

Generally the quality of masters and doctoral graduates seems not to be in question in almost all of the countries researched, some of which have centuries of experience and tradition in postgraduate education. India faces particular challenges but also has areas of excellence, as we have highlighted in Annex C. Often in response to national needs or global trends, individual countries are committed to initiatives that are intended to achieve higher quality in research and, by implication, in postgraduate degrees. However, the increasing numbers and diversity of students undertaking degrees at bachelors level puts pressure on numbers (and possibly quality) at postgraduate level in all countries. This means that it is becoming increasingly important for all countries to ensure that students undertaking postgraduate study have the requisite skills and competencies. Some countries (e.g. India and the US) use graduate examinations or entry tests for those entering research degrees as one way of assuring that students studying at this level have the potential to succeed.

Interviewees have identified countries where they think doctoral education is excellent, with some naming particular subjects. For example, when asked about recruiting post-doctoral researchers, one US interviewee considered that Eastern European countries and Germany (specifically mentioning the Max Planck Institutes) continue to produce strong scientists, that France is very strong for mathematicians and that the biggest increase in quality (in physical sciences) is in graduates from India and China. An Australian interviewee with a social sciences background mentioned strong candidates from Scandinavia, the US, Canada, New Zealand and South East Asia.

All countries seek good language skills in applicants for postgraduate programmes and in post-doctoral researchers. Increasingly this means competence in English language skills, in addition to the native language. This gives Indian postgraduates, for example, looking to study in the UK and other English-speaking countries an advantage as they tend to have strong English language skills due to the continued strong influence of Britain on the education system in India.

Structures of postgraduate degrees

The structures of postgraduate degrees vary across the countries. The Bologna Process has had an impact on non-UK European countries, which have been working to separate bachelors and masters programmes, moving away from their previous five-year integrated degree structure. In Bologna-related fora there is also some flexibility over the length of masters degrees (typically defined in terms of ECTS). Most common is the 120 ECTS masters degree (though there are masters of 90 and even a few of 60 ECTS load). As one of the earliest European countries to embrace the three-cycle Bologna structure[17], Norway has developed the most mature masters programmes, though even here the expansion in masters degrees causes some concern over quality issues. Germany and Spain

[17] First cycle: bachelors; second cycle: masters; third cycle: doctorate.

adopted the Bologna structure more recently and are still adapting to the two cycle structure. All countries have retained a few programmes using their earlier structure: most explicit in this is the Norwegian commitment to integrated five- or six-year programmes in professional fields such as medicine, psychology and veterinary practice. England has a different profile with its one-year masters programmes, and the four-year integrated masters degree in STEM subjects.

Our research points to a need for the 'broken bridge' between undergraduate and doctoral degrees to be repaired; as HEFCE noted in their 2013 report (HEFCE, 2013a), if this issue is not addressed, it is 'a potential constraint on the future diversity of researchers'. One of our contributors referred to 'deep concern about the pipeline', noting that in some subjects the overseas market for masters degrees is declining. It is encouraging to some that at least one of the Research Councils is prepared to fund overseas students in some subjects.

Structures of doctoral degrees also vary across all countries, although there are signs of some convergence with initiatives at regional level such as in Europe. In all countries there are moves to develop 'doctoral programmes' i.e. to provide greater structure than provided in the traditional PhD; this is partly related to a greater concern for completion times and rates, and partly an awareness of the need to include a wider range of generic skills which contribute to doctoral graduates' employability. Professional doctorates feature in Australia, England and the United States but rarely in the other countries in this study, which mainly regard the PhD as the only doctoral qualification. A frequently mentioned feature of strength in the English PhD was the generic and professional skills programmes which have been developed as a result of the Roberts report. Here it was generally agreed that England leads the way, and many countries (e.g. Germany, Norway and Spain) are following.

Qualifications frameworks provide benchmarks for comparability as well as facilitating mobility of students. Within Europe, the QF-EHEA and the EQF have led to greater convergence in qualifications structures and levels. Globally, the AQF stands out as a comprehensive, integrated framework for HE that encompasses both academic and professional priorities, but does not contain credit values. The new Scottish framework (FQHEIS) is also inclusive, yet the numerical HE qualification levels are different from others in the UK and in the ECTS. The long-standing and detailed credit system in the US is distinctive and well-embedded. We have demonstrated that no one system includes all desirable features while combining a qualifications and credit framework, but elements of other countries' systems could be considered in England, for example, the introduction of professionally-focused knowledge and skills descriptors that would complement the existing academically-focused qualification descriptors and might add clarity for non-academic sectors.

Quality is clearly an important feature of postgraduate education in all countries. With the increase in numbers of postgraduate students comes a growing concern to maintain the quality. The growth in both number and nature of providers in all countries also raises the concern to maintain quality of student and provision.

Access

> 'Equity in access [in higher education] is the ability of the brightest students to study at the most intellectually demanding universities, unrelated to their socio-economic background. To ensure this, higher education has to be free at the point of use. Thus, an increase in fee levels is usually accompanied with the introduction of suitable grants and loan programmes that are designed to be, as closely as possible, both need-based and generally available to the academically prepared students without regard to the wealth or credit-worthiness of their parents or their individual career and earning prospects.'
>
> (Agarwal, 2009: p.153)

This is one interpretation, but is 'equal' access the same as 'fair' access in postgraduate education? Fair access is an area of diverse practices which reflect each country's perceived needs and political situation. Although it is possible to identify regional models, according to historical levels of public funding and traditions of higher education, all countries are facing the challenge of how to fund a mass higher education system (at all levels), and how to provide support to enable the most able students to fulfil their potential regardless of background. Funding of higher education is an area where there is currently considerable turbulence in many countries, for example in Spain and in Germany with largely state-sponsored institutions now becoming forced to introduce tuition fees. According to several commentators, this is changing the whole culture and tradition of higher education as a public good and an entitlement for all.

In general, commentators considered that students 'left behind' the socio-economic and other features which had defined them as in some way disadvantaged at undergraduate level. Nevertheless, the question of who should pay for postgraduate education, how much they should pay, and how to support those who are unable to afford to pay arose in all countries. In Australia, there is a move to support more of the indigenous community to enter higher education as part of a nationwide project that affects different aspects of Aboriginal culture and life. As one interviewee put it, '[asserting] the rights of the indigenous community is Australia's greatest social problem'. Norway's commitment to free tuition at all levels, a long tradition of student loans to finance living costs, and doctoral research positions within universities sits at one end of the continuum. The other countries are spread across the continuum of fees, loans and bursaries for postgraduate education.

Even as we complete this report, the challenge faced by higher education in ensuring that 'today's students get as much benefit from university as their predecessors did' (Hillman, 2014a) is to overcome the effects of debt and to persuade students that to invest in higher (and postgraduate) education will improve their life chances. As Hillman points out (and we have privately observed since the introduction of loans, which seem like one of the 'least bad' options), the point at which graduates and postgraduates are earning enough to be required to repay their loan is likely to be precisely when they will have other financial priorities, such as young children and mortgages. We await developments in other countries to see the impact of the debt burden on emerging graduates. The long experience of income contingent loans provided by Australia suggests that debt may not necessarily be the deterrence feared by many commentators in the UK.

Employment outcomes

Cultural differences appear to affect how postgraduates are perceived by employers in different countries. However, the UK appears to lead the field in employer criticisms of postgraduate skills on graduation: industry dissatisfaction with postgraduates' personal qualities seems to be less of an issue in other countries, except for Australia, where one interviewee mentioned 'bleating by industry', indicating employer dissatisfaction with graduate attributes. This person also expressed the view that postgraduate programmes were about much more than 'training people to go to work'.

On the surface, impact in employment can clearly be demonstrated by masters and doctoral degrees in vocational/occupational fields. In other cases, employers value the range of graduate attributes they perceive in postgraduates, but it is not always clear what value is added in employment by the higher level of study.

In all countries, government interventions have money attached. As well as addressing ethical and political priorities, initiatives are often linked to the national economy and the value for money

aspects of investing in postgraduate education, sometimes prompted by industry, e.g. a need to respond to employers' criticisms of postgraduate abilities in the workplace, although from our research it appears that employers are most likely to be critical of new postgraduates' abilities in Australia and the UK and more appreciative of postgraduates' contributions to the workforce in other countries.

The area often linked to funding and special initiatives, where there is more likely to be national rather than local-level intervention, is postgraduate training and development and related structures. This is particularly noticeable in the European countries included in this study (England, Germany, Norway, Spain and Scotland) and is driven by government and research council/institute initiatives. For example in 2009-2010, the Spanish government decided to introduce doctoral schools, an initiative which was based on new national level regulation for doctoral studies and underpinned by earmarked government funding. Key principles include the doctorate being 'inextricably linked to the [knowledge exchange] and research missions of universities' and to '…economic and cultural development and social cohesion' (Moreno-Navarro, 2010). Universities were encouraged to manage doctoral education with programmes through their 'scientific units' [faculties] as a way of embedding postgraduate research in the university's research effort, something that is not necessarily fully replicated in the UK.

The formal introduction of structured doctoral training is one of Europe's great strengths, with England and Scotland being well placed because of the Roberts initiative and related developments, as outlined in the section on England. The way in which the Research Councils set the agenda for doctoral training models, currently the doctoral training centre/partnership schemes is also changing university structures and the way in which postgraduate education is managed.

Within the current project, it is difficult to evaluate the impact of some government interventions on university practices or on the quality of graduate achievement. There are clear links between resources and the quality of postgraduate students' experience but the relationship between the quality of a doctoral graduate's research achievements and their employability skills is more complex.

Impact of the subject on qualification and outcomes, including the next stage of employment

At masters level, and to some extent also at doctoral level, programmes are differentiated by being either vocational/occupational (i.e. students take them either to gain entry to a profession or for professional advancement) or as an entry qualification for a doctorate. Generally the professional masters route is more common in social sciences fields such as law, business, management, health care, social work and other public sector careers. At doctoral level the main fields are education, engineering, psychology (where a doctorate is essential for professional practice), and other social sciences.

Some PhDs similarly prepare graduates for employment in a chosen area (not just academia). For example, in biosciences, chemical or engineering industries, it would be difficult to enter or to progress without a doctoral qualification. One interviewee from Germany emphasised the importance of possessing a PhD in selection for top leadership roles, also suggesting that the difference (in Germany) between subjects studied was not so important in the longer term but that the transition from PhD to first job was harder in the humanities than say in law, engineering or mathematics, and that this is all dependent on the labour market and its needs. This situation is probably relevant in all eight countries.

All our interviewees have commented on the importance of the student's subject in shaping their experience and the outcomes of postgraduate education. This is equally true at PGT and PGR levels and for different countries. At all levels and in all programmes, the personal skills of the postgraduate are inextricably linked with the subject studied. An Australian interviewee illustrated this by saying that there is a 'big difference between the skills of someone who's done social work as opposed to maths'. Choice of subject may be equally if not more important than country or university of study at postgraduate level: discipline-specific training, cultures and expectations appear to transcend geographical location.

Some of the most striking characteristics of postgraduate education in England include:

- the drive to maintain globally competitive postgraduate degrees at all levels: department, school/faculty, research institute, DTP, CDT, university and national level, which results in an outward-facing, dynamic postgraduate sector that is benchmarked with other countries;
- the multiple routes to postgraduate qualifications that provide flexibility for students from different backgrounds;
- the enthusiasm for recruiting international postgraduates, for intellectual and cultural enrichment and for economic reasons;
- the strength of its structured postgraduate training, particularly at doctoral level, during the last decade and the high regard in which it is held internationally;
- the investment made by the Research Councils, for instance through the Roberts initiative, to support universities in developing doctoral programmes.

What actions could help to address current challenges and/or further enhance English postgraduate education?

- more opportunities for part-time study, particularly if student debt does become a barrier to progression from first degree to higher degree and more prospective students wish to combine work and study (this could also increase study opportunities for mature students and those wishing to engage in professional development even if not employer-sponsored);
- development of a transparently sustainable funding model, particularly for masters programmes;
- evaluation of current doctoral training models for all students, to compare the relative experiences of a variety of cohort-based and non cohort-based training and to consider the impact of differences between subjects and university approaches.

In Table 6 below we aim to identify some of the strengths and challenges of each of the eight countries. Given the complexity of the field of postgraduate education and of the contexts of each of the countries, it is difficult to see how interesting initiatives in one country might be used to inform practice in others. However, we consider that some of the strengths are noteworthy and of merit. It should be noted that the features identified as strengths and challenges in Table 6 are based on the authors' judgements as a result of the findings in the report and have not been verified by our contributors in the countries concerned.

Strengths and challenges, by country			
	Strengths and innovative practice	Attributes that may be both a strength and a challenge	Challenges
Australia	• A successful income contingent loan system available to postgraduates • A detailed, robust and inclusive qualifications framework	• Demand-driven funding system, found to be meeting key aims of increasing participation and responding to skills needs in the economy	• The extent to which 'coursework' masters prepare doctoral students to undertake research • Improving educational opportunities and access for indigenous people • Low levels of Research Training Scheme (RTS) grant, with no increase for over a decade
England	• Strong international position in research output • Strong doctoral training and development, both in Research Council initiatives and independent university developments • International recognition for research and positioning of postgraduate education, including alignment with international standards of degrees	• Continuing high levels of support for STEM programmes, with considerably less funding overall for arts, humanities and social sciences (with the exception of advanced quantitative studies in economics)	• The uncertainty around postgraduate funding generally, particularly at masters level, and whether debt will deter graduates from postgraduate study, coupled with a concern that either rich students will have the advantage, or that universities will have to subsidise postgraduate programmes using undergraduate tuition fee income • Relatively high tuition fees in the context of global competitiveness for postgraduates
Germany	• Funding for doctoral students • No tuition fees • 'Germany scholarship' to support gifted students and other scholarships intended to support fair access • High numbers of undergraduates,	• The Excellence Initiative which provides considerable funding for 'elite' universities (at the expense of the rest) • Grading of the PhD • Increased numbers of masters students, potentially of variable	• Uncertainty around postgraduate funding and tensions over the introduction of tuition fees • The increasing gap between 'excellent' universities and others, resulting in variable quality • 'Level inflation' of higher education

	with the effect of increasing demand for masters programmes and potentially providing a good supply of PhD entrants	quality	qualifications, with fewer jobs for bachelors graduates because employers do not see them as being fully qualified • Increasing numbers of students exercising their entitlement to higher education potentially compromising quality
India	• The healthy economy and potential to increase participation in postgraduate education • Entry tests for research degrees • The quality of some Indian graduates, such that they are sought after in many countries • Continuing initiatives to widen access to higher and postgraduate education, targeted at under-represented groups with potential	• The human capital with the prospective talent to succeed in access higher and postgraduate education is a potential strength, but the vastness of the country and complexity of the higher education system is an enormous challenge to widening access	• The relatively poor quality of some institutions and the general divide between elite and other institutions, coupled with regional inconsistencies • The gap between rich and poor/urban and rural communities that restricts access to HE for many, coupled with low adult literacy rates • Lack of internationalisation and global positioning • Low numbers of PhD graduates • Demand for higher education exceeds supply and growing enrolments are not linked with greater consistency or quality • The bureaucratic burden of affiliated colleges on some institutions that constrains development in other areas, e.g. postgraduate education
Norway	• No tuition fees • Funding for doctoral students who are treated as staff with employment contracts and rights • Centres of Excellence Initiative provides incentives for universities	• The expansion of masters programmes and the importance of assuring their quality	• The need to balance the demands of a regional college sector which is increasingly offering postgraduate degrees with maintaining quality • Concerns about grade inflation as a result of a new grading system for

	both to collaborate and develop innovative provision		postgraduate degrees resulting in a potential lack of consistency
Scotland	• The introduction of research pools and the opportunities these provide for collaborative and inter-disciplinary research, also helping to strengthen the Scottish research base to increase international competitiveness • The enhancement-driven approach to policy development that is enabled by a relatively small country and collaborative relationships between institutions, both regional and country-wide • Postgraduate tuition fee loans (currently for PG Diploma students) • Development of the concept of 'mastersness' using UK and international case studies	• Research pools are a strength in research critical mass and for collaboration but they add to the complexity of doctoral training structures	• The need to rationalise the multiplicity of doctoral training and development opportunities offered through: research pools; graduate schools; and CDTs
Spain	• University observatory of student grants, aid and academic performance • The International Campus of Excellence programme which aims to achieve greater social and economic integration with the surrounding urban or regional area	• The expansion of numbers of masters programmes and students participating in masters degrees	• Funding challenges, both in the wider economy and in higher education • An apparently conservative and still developing qualifications framework
United States	• International recognition for research and positioning of postgraduate education, including alignment with international standards of degrees	• Continuing high levels of support for STEM programmes, with considerably less funding overall for arts, humanities and social sciences (with the exception of	• Relatively high tuition fees • The lack of a national QA organisation and the concomitant devolution of responsibility for QA to individual states could create inconsistencies and

	• Entry tests for research degrees • A large, well-known and respected CGS that has established funding streams is clearly an advantage; the CGS identifies good practice, promotes it, and provides a high level of statistical information as well as scholarly articles that contribute to research in the area • Community colleges that play an important part in fair access to higher education and in opening up postgraduate education to under-represented groups • The Teaching Assistant scheme which helps to support postgraduates while undertaking their study	advanced quantitative studies in economics) • That there is no government department with statutory responsibility for higher education is both a strength and a potential challenge, although there is little evidence from our findings that it has inhibited development or limited the amount of funding available for postgraduate education	lead to variable academic standards in postgraduate education • Doctoral degrees are mostly structured and many are designed to enable candidates to develop professional skills; however, there is no national imperative for skills development

Table 6: Strengths and challenges, by country

As noted by Sir Peter Lampl (Lindley and Machin, 2013) 'a postgraduate degree is increasingly expected, with a remarkable 11 per cent of people in work, aged 26-60, holding a degree at this level'. He acknowledges that 'a better educated workforce should be good for Britain' and that 'brainpower adds value in today's economy' but also warns that 'this should not come at the expense of widening inequalities of access…'. The authors suggest that the evidence in this report demonstrates justifiably high aspirations for postgraduate education in the UK and more widely and that although improvements are needed in some areas, in many cases these ambitions are being achieved. It is essential that the postgraduate higher education sector, globally and in individual countries, remains sustainable, of high quality, and beneficial both to individuals and society.

Potential for further research

Much ground has been covered in conducting the research for this project. However, we have not been able to pursue some of the areas and issues that have arisen during conversations with our contributors and which we have mentioned in passing when relevant. We are also aware that the theme of fair access may require further exploration as it is a complex and changing area. Further work may prove useful to explore the following:

- the question of whether access at postgraduate level is mainly determined by funding as many of our interviewees suggested, or if it is also affected by student identity and other factors (it was not possible to interview students about this issue within the scope of the project);

- the medium- to long-term impact of structured, cohort-based research training on graduate outcomes;

- the complexities of management and training structures for postgraduate education;

- the multiplicity of assessment practices for doctoral degrees (different in almost every country);

- possible differences in the completion rates of funded and non-funded students in different subjects.

Annex A - Australia

Australia

Context

Australia is a large country geographically, though its population is only just over 20 million. It has a federal system of government with six states and two territories. Most universities are established under state acts of parliament, though the majority of government funding for universities comes from the federal government. While education is a constitutional responsibility retained by the nation's six states at the time of the federation in 1901, the Australian Government has greater access to the resources needed to fund the higher education system. Higher education policy is thus mainly enacted by central government and is primarily the responsibility of the Department of Industry, Innovation, Science, Research and Tertiary Education (DIISRTE).

University system

Australia has 39 fully accredited universities, the oldest established in the 1850s on the British model, and the newest established over the past 10 years. Of these, 37 are public institutions, two private. There are also five further institutions with university in their title. In the THE rankings for 2014, Australia had five universities in the top 100, bettered only by the USA, Britain and Germany. However, according to Norton (2013), although universities educate most higher education students, they are a 'minority of higher education providers in Australia – 44 of the 173 operating in late 2012.' The 'majority' (i.e. 129) are the non-university higher education providers (NUHEPs), mainly private, which are a diverse group of schools, colleges and other institutions, mainly teaching-only and therefore very few offering postgraduate degrees, and often in vocational fields, sometimes linked to professional bodies or religious affiliations. However, as pointed out by Norton (2013), the practical and policy trend is towards greater blurring of vocational and higher education, and the public sector vocational education providers (Technical and Further Education providers (TAFEs)) are adding degrees to their programmes.

Universities in Australia have grouped themselves into various alliances:

- the Group of Eight (Go8) research-intensive universities;
- the Australian Technology Network (ATN) of five universities, originally Institutes of Technology, gaining university status in the late 1980s/early 1990s;
- the seven Innovative Research Universities (IRU) mostly established in the 1960s/1970s as multi-disciplinary universities;
- the six universities located in and committed to Australia's regional areas, and brought together in the Regional Universities Network (RUN), which was established in 2011.

Recent numbers of postgraduate students by home/overseas, postgraduate 'coursework' (labelled PG 'other' in the table) and postgraduate research and by broad subject area are shown in Table 7.

	Nat/ Phys Sci	IT	Eng/ Tech	Arch/ Bldg	Agric/ Enviro	Health	Educ	Man/ Comm	Socie/ Cult	Creat Arts	Total
HOME											
Home PG other	4,402	4,406	6,276	4,513	2,845	31,294	33,635	40,873	46,484	5,585	180,313
Home	7,561	1,156	4,029	706	1,759	7,069	3,798	2,733	11,175	2,966	42,952

PGR											
Totals	11,963	5,562	10,305	5,219	4,604	38,363	37,433	43,606	57,659	8,551	223,265
OVERSEAS											
OS PG other	2,572	7,918	5,416	1,843	1,108	4,217	5,437	49,555	7,907	1,983	87,956
OS PGR	4,153	1,074	4,188	325	1,150	1,887	1,102	1,904	2,759	396	18,938
Totals	6,725	8,992	9,604	2,168	2,258	6,104	6,539	51,459	10,666	2,379	106,894
Grand totals	18,688	14,554	19,909	7,387	6,862	44,467	43,972	95,065	68,325	10,930	330,159

Table 7: Postgraduate numbers by broad subject area 2013
(OECD Statistics database; data extracted 20 March 2014, OECD library)

As in Europe, proportions of postgraduate 'coursework' and postgraduate research students vary depending on the subject, with numbers of research students high in sciences, engineering and health. There are about twice as many domestic (Australian) as overseas postgraduates in total; for research postgraduates, approximately two thirds are domestic compared to one third overseas. Comparing Australia with some of the other countries included in this study, it has around six times as many postgraduates as Norway, over half as many as the UK and approximately one tenth as many as the US.

Demand-driven funding system

In 2009 the Australian Government announced the removal of the 'cap' or limit on the number of undergraduate students that universities could enrol. Before this, universities were allocated a quota of student numbers with guaranteed funding through the Commonwealth Grants Scheme. The removal of the cap led to a significant increase in applications and a growth in the number of students of low socio-economic status (SES) background participating in higher education (at undergraduate level).

According to Norton (2013) 2012 was 'a year of policy change'. It was also the first year of the new 'demand-driven' funding system for undergraduate university places in public universities when previous restrictions on student numbers were lifted, and universities became free to offer as many places in each course as they chose.

In their 'Review of the Demand-Driven Funding System', Kemp and Norton (2014a) endorsed the system, concluding that 'there is no persuasive case for returning to the "capped" system and that the demand-driven system should be retained, expanded and improved'. In an article for THE they claim: 'we found it was meeting its key aims of increasing participation in higher education, especially for students from disadvantaged backgrounds, and responding to skills needs in the economy' (Kemp and Norton 2014b). They also recommended opening up the demand-driven system to all types of higher education provider, including private colleges and vocational education providers.

Recent reforms

The recently elected government in Australia (sworn in in September 2013) has decided on a further reform of the higher education system, with the result that, according to several of our commentators, the system is experiencing 'considerable turbulence'. Part of the reform involves shifting a greater proportion of the funding of higher education from the state onto students and

student debt, by introducing fee de-regulation, and by giving universities the freedom to set their own fees at whatever level they want. These changes have aroused considerable controversy: 'a future of limitless fees, education for the privileged, and heavy student debts has been poorly received by a society brought up on low-cost public education and the ideal of social egalitarianism' (Miller 2014). In addition to tuition fee de-regulation the government has decided to provide state funding to private organisations, including professional colleges and vocational institutions.

Funding of higher education

Higher education in Australia has historically been generously supported by public funding, though this has gradually reduced over the years. The majority of the funding has been provided by the government, although as Table 8 shows, international student fees (and full fees for domestic students) have played an increasingly important role in university funding. Government funding takes the form of:

- direct grants primarily for teaching (the Commonwealth Grants Scheme);
- student loans (income contingent) taken out by students but paid to the HE institutions on students' behalf (through a range of different versions of the Higher Education Loan Program (HELP));
- student income support payments (such as the Australian Postgraduate Awards);
- direct research grants.

Table 8 below provides an overview of public funding sources.

Year	State Government	Federal Government	Student Contributions (incl HECS)	International Student Fees	Investments, Endowments and Donations	Other income
1907	38.2	0.0	38.4	0.0		23.5
1939	44.9	0.0	31.7	0.0	16.1	7.2
1951	43.7	20.5	16.7	0.0	8.5	10.5
1961	36.3	43.9	8.6	0.0	6.2	5.0
1971	35.7	43.0	10.4	0.0	5.5	5.3
1981	0.8	89.3	0.0	0.0	4.4	5.5
1987	1.0	82.9	2.3	0.5	5.4	7.9
1991	5.1	61.7	17.6	4.0	6.4	5.2
2001	1.7	46.0	24.8	11.0	2.9	13.8
2011	3.5	42.4	21.7	17.4	6.6	8.3
2012	3.1	43.6	22.7	16.4	6.3	7.9

Table 8: Overview of public funding sources for higher education (Norton, 2013)

Currently public spending on higher education is in four streams:

- direct grants (primarily for teaching);
- student loans, paid to institutions on behalf of students;
- student income support payments;
- direct grants for research.

Table 9 below provides a summary of public subsidies for higher education, distributed among the four income streams, excluding some one-off capital grants, funding for short-term programmes and 'legacy' superannuation costs (Norton, 2013).

Category	Sub-category	Description	$ Millions
Teaching grants (~$5.5bn)	Commonwealth Grant Scheme	Funding based on the number of supported domestic student places. Program uncapped from 2012.	$5,513
Loan costs (~$1.5bn) **(Distinct from new loans of ~ $3.8 bn)**	Higher Education Loan Program: HECS-HELP, FEE-HELP, OS-HELP, SA-HELP	Costs include interest subsidies, debt not expected to be repaid, and discounts for up-front payment or early repayment.	$1,515
Income support for students (~$2.2 bn)	Aus. Postgrad. Awards	Living expense support for postgraduate students.	$219
	Youth Allowance	Living expense support for students aged 16-24.	$1,618
	Austudy	Living expense support for students aged 25 or more.	$345
	Abstudy	Support for living expenses for Indigenous students.	$32
Research grants ($2.7 bn), (Not including 'other recurrent grants')	Competitive research grants	ARC	$809
		NHMRC	$573
	Performance-based block research grants	Research training and general research funding. Funding is based on research activity.	$1,354
	Other recurrent grants	For example: equity, national institutes, TEQSA.	$408
Total			**$12,387**

Table 9: Overview of public higher education subsidies 2011-2012 (Norton, 2013)

Australia introduced an income-contingent student loan scheme in 1989, a year before the UK. The original loan scheme was known as the Higher Education Contribution Scheme (HECS); this has developed into the Higher Education Contribution Scheme – Higher Education Loan Programme (HECS-HELP) which provides loans for students with a 'Commonwealth Supported Place' (i.e. directly funded by the state). Although mainly intended to support undergraduates, HELP is also available to postgraduates on some 'strategic' courses (Hillman, 2014b).

There is also a scheme, FEE-HELP which provides support to Australian students without Commonwealth Supported Places and who are therefore required to pay full fees. FEE-HELP is available to postgraduate students at privately funded NUHEPs approved by the Australian Government and to non-research postgraduate students at public universities. Hackett (2014)

emphasises the difference from the UK system pointing out that 'FEE-HELP in Australia ensures that virtually all students can access a fee loan that is repaid after graduation. Given the relatively low level of loan subsidy, they are able to offer a lifetime loan allocation (around $100,000) giving everyone maximum flexibility and choice to enable them to up-skill and re-train in support of a diverse and rapidly evolving job market' (p. 3). However FEE-HELP cannot be used for additional study costs such as accommodation or study materials (textbooks etc). For 2014, the FEE-HELP limit is $120,002 for students undertaking medicine, dentistry and veterinary science courses (as defined in the *Higher Education Support Act 2003*), and $96,000 for all other students. The higher FEE-HELP limit only applies to courses that lead to initial registration to practise in those fields. The lower limit will apply to any further study undertaken beyond the requisite level for initial registration. The FEE-HELP limit is a lifetime limit and is the total amount available to eligible students under both the FEE-HELP and VET FEE-HELP loan schemes.

Quality

Postgraduate courses are offered by universities and increasingly by private colleges, although some fields such as medicine and architecture are only offered by universities. They include:

- Graduate certificates (6-12 months) or
- Graduate diplomas (one to two years full time)

  Both graduate certificates and diplomas (AQF level 8) are vocational qualifications and require a bachelors degree for entry;

- Masters degrees (one to two years full time) AQF level 9

  Masters degree by coursework: this involves coursework, project work and some research;
  Masters degree by research: at least two thirds research, including a substantial thesis or research project;
  Masters (extended) work-based project. Entry requires professional qualification and/or extensive professional experience;

- Doctorate AQF level 10

  Research doctorate or professional doctorate.

According to a projection by the Group of Eight (Hare, 2014) 'demand for postgraduate places is likely to double over the next 16 years as waves of bachelors graduates seek to gain competitive advantage in the workplace'. According to this analysis 'the Go8 estimates domestic demand for higher education of 344,000 students by 2020 and 563,000 by 2030. Postgraduate enrolments are anticipated to rise greatest and fastest'.

As may be seen from Figure 6, enrolment shares in higher education have been affected by the growth in postgraduate study, particularly at masters level, which is said to be 'more vocational than undergraduate study' (Norton 2013). This probably reflects students upgrading their professional qualifications.

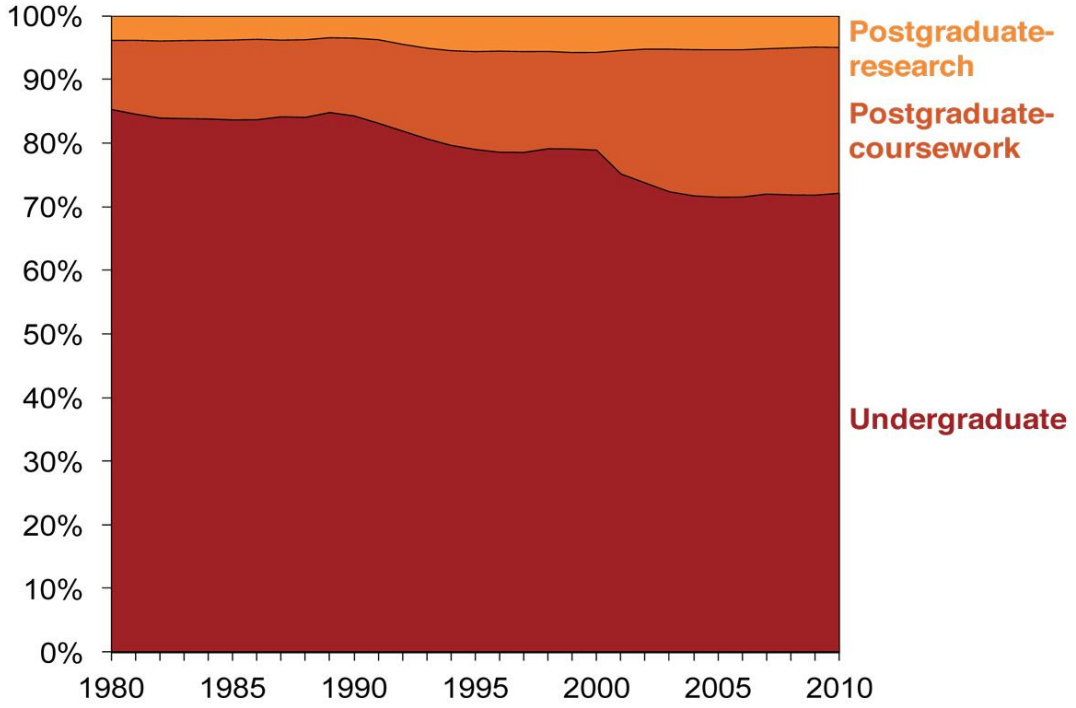


Figure 6: Enrolment share by level of study, 1980-2010 (Norton 2013)

Enrolment numbers in research degrees have grown steadily over the past 30 years or so (see Figure 7). According to Norton (2013), Australia now produces 6,400 PhD graduates a year, and almost 1,500 graduates with masters by research qualifications. However, the greatest growth has been in masters degrees by coursework, where numbers grew from 21,125 in 2006 to 28,605 in 2011 (Gale and Parker 2013).

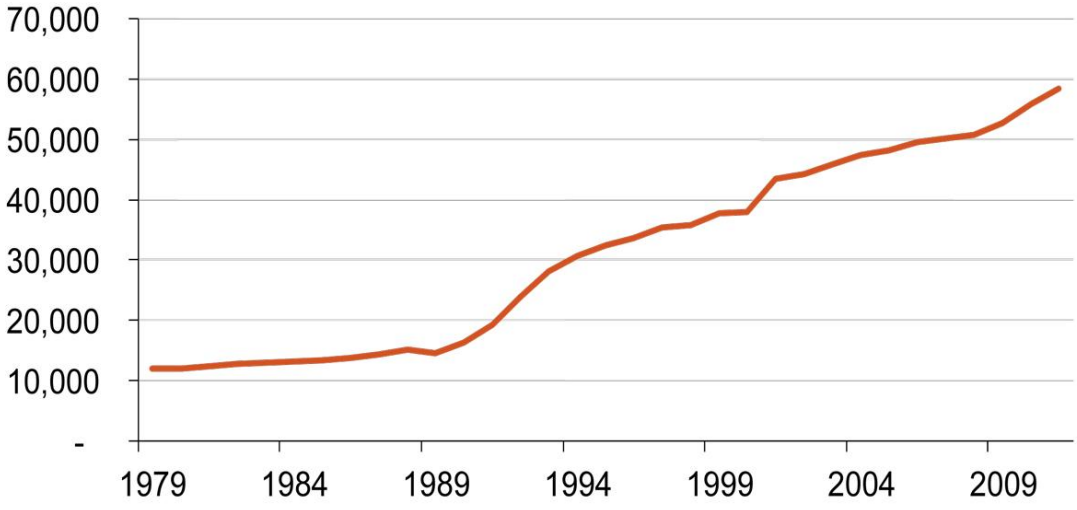


Figure 7: Enrolment numbers in research degrees, 1979-2011 (Norton 2013)

Masters degrees

As mentioned above there are two types of masters degree, masters by coursework (with at least two thirds coursework) and masters by research (with at least two thirds research). The masters by

coursework is a full fee-paying programme, while the masters by research has all tuition fees covered by the government for domestic students. Entry to a masters degree by coursework requires a bachelors degree (for some subjects with Honours). Entry to a masters degree by research requires a bachelors degree (Honours) or a masters preliminary year. However, the revised Australian Qualifications Framework (AQF, 2013) now requires all masters (level 9) programmes to include some research (though the extent is not specifically identified). Until recently entry to the doctorate required a research masters; however with the growth in numbers seeking doctoral qualification there has been a steady increase in the number of candidates who are seeking entry into a PhD programme following a coursework masters. This leads to two questions: first, is research a defining feature of a masters degree and second, how well can a coursework masters prepare candidates for subsequent PhD study (in terms of 'research preparedness')?

Doctorates

Australia did not start awarding PhDs until the 1940s when the University of Melbourne awarded the first Australian PhD in 1946. However, the numbers have increased rapidly over the past 60 years or so (see Table 10).

Year	Number of PhDs awarded in Australia
1950	8
1960	97
1970	584
1980	836
1990	1,367
2000	3,247
2010	6,053

Table 10: Number of PhDs awarded by year (Go8, 2013)

According to the Go8 (Go8, 2013) 'over the period 2000 to 2010 alone, the total number of doctoral enrolments at Australian universities grew by 68% from 27,966 to 47,066; and the number of completions increased from 3,793 to 6,053 per year'. Although completion rates remain a challenge, this increase demonstrates the progress achieved as a result of the changes in doctoral education over the period.

The past 20 years or so have witnessed many of the challenges for PhD education as seen by other countries. These include concern about completion times and rates, questions about the relevance of the PhD for wider employment and about its quality, and the awareness that the PhD is no longer principally an apprenticeship leading to an academic career. One Australian response to these challenges was the development of the professional doctorate, in particular in fields such as education, health, psychology and business, and Australia has led the way in terms of innovative approaches and thinking about the professional doctorate. However, this has also been controversial (e.g. Evans et al 2008) and the PhD remains the main doctorate awarded in Australia.

Doctorates are awarded by all universities, though numbers of PhD candidates vary widely, and there is some concern over the capacity of the smallest and newest universities to provide an adequate research environment and critical mass and faculty for successful PhD programmes.

The normal entry requirement for the PhD has been an honours first class (H1) or upper second class (H2A), although this varies by subject. However, over recent years the requirement for most PhD

programmes has increased and we were told that most students entering the PhD programme will now have a research masters.

Quality assurance and guidelines

All Australia's universities are members of the body Universities Australia. Although they were originally the responsibility of the states (see above), the balance between state and federal responsibility has shifted significantly over the past 20 years. Until 2007, Australian universities were self-accrediting; the change of government in that year led to establishment of a Higher Education Standards Panel to oversee accreditation and provide independent advice to the minister and then in 2012, the new regulator, the Tertiary Education Quality and Standards Agency (TEQSA), replaced state higher education bodies and took on responsibility for registration of higher education providers and accreditation of courses. However, universities have the right to accredit their own courses within the framework established by government regulation, and subject to five-yearly re-registration by TEQSA. 'University' is a regulated term in Australia, and since 2012 TEQSA has regulated which institutions can operate as universities according to Commonwealth Provider Category Standards.

The Australian quality assurance regime has been criticised for being 'heavy handed' but with another recent change in government, there are signs that a lighter touch will be introduced (Burnett, 2014).

Another body with influence over the quality and standards of research degrees in Australia is the Council of Deans and Directors of Graduate Schools (DDOGS) which, for example, has recently published 'Graduate Research Good Practice Principles', outlining similar aspects of good practice doctoral education and training as are included in Chapter B11 of the UK's Quality Code (QAA, 2012).

Integration of doctoral candidates in the research environment

As in the UK, the results of the 2012 Postgraduate Research Experience Questionnaire in Australia (Graduate Careers Australia, 2013) show relatively low levels of student agreement with the scaled statements on 'Intellectual Climate'. The Australian statements are:

- The department provided opportunities for social contact with other postgraduate students (74.7% agreement in 2012)
- A good seminar program for postgraduate students was provided (67.2% agreement in 2012)
- I was integrated into the department's community (63.7% agreement in 2012)
- The department provided opportunities for me to become involved in the broader research culture (64% agreement in 2012)
- The research ambience in the department or faculty stimulated my work (58.3% agreement in 2012)

As noted in the Postgraduate Research Experience 2012 report, although all seven scales in the survey have shown an upward trend in student agreement between 1999 and 2012, research graduates agree least with the statements included in the Intellectual Climate Scale, elements of the experience that are 'intended to help students integrate their work into the broader research community'.

Access

Gale and Parker (2013) trace Australia's long historical commitment to widening participation in higher education to its early days with the establishment of the first university in the mid-1800s. This enabled Australians to undertake university study in their own country rather than travelling to Britain (or, rarely, other countries). Since that time, there have been a number of reforms aiming to widen participation by students of low socio-economic background, and, increasingly, those of indigenous backgrounds.

Following the Bradley Review in 2008, the Australian Government announced two targets in its 'Transforming Australia's Higher Education System', Australian Government (2009):

- by 2020, 20% of undergraduates should come from low SES background;
- by 2025 40% of 25-34 year olds should hold a bachelors degree (or higher) (the figure was 36.8% in 2012).

In its vision, the government reaffirmed 'the importance of opportunity for all, especially those from groups under-represented in higher education' and 'access to university based on merit, not ability to pay' (p.8).

At the time (2009), 16.1% of undergraduates, and 10.5% of postgraduate students were from low SES backgrounds (Gale and Parker, 2013). In order to meet the targets, each public university has a low SES enrolment target, with financial rewards if the target is met (Norton, 2013).

Gale and Tranter (2011) suggest that 'periods of expansion to the Australian higher education system have always been accompanied by distributive notions of social justice: in this case, equal opportunity to access and participate in higher education. To some extent, the need to redress the disadvantages experienced by some Australians has provided a rationale for expansionary periods' (p.41). They go on to quote Julia Gillard, then Minister of Education, who stated in 2008:

> 'A nation that thinks of itself as essentially egalitarian can't sit idly by while those from disadvantaged backgrounds are denied the life opportunities that come from higher education - things like higher incomes, career progression, intellectual fulfilment and self-knowledge.'

Although several interviewees commented on the commitment to providing greater opportunities for students of low socio-economic background, particular those of Aboriginal background, researchers such as Devlin (2013) caution against a so-called 'deficit' model[18], and call for an approach that requires universities to provide both the opportunities and the support necessary to maximising success in higher education by these groups.

The Australian Tertiary Admission Ranks (ATAR) scores, which determine entry to higher education, retain a strong correlation with SES, such that Gale (2012) suggests that 'the ATAR is more indicative of socio-economic status than it is of a student's academic potential'. There have been moves to increase ATAR scores of students of low SES in order to increase opportunities for university access, though this has been controversial.

[18] According to Devlin, 'Current policy research in Australian higher education appears to support a student deficit model conception in relation to students from low socio-economic status', implying either as she states 'students are the problem' or 'institutions are the problem'.

As mentioned above, there is a distinction between postgraduate coursework and postgraduate research. For postgraduate coursework students are required to pay fees (which differ by subject), and often use the loan scheme to enable them to fund their study. This means that fair access is complicated for postgraduate coursework.

For postgraduate research there is no tuition fee requirement (for domestic students, although fees for international students are high), and students who have been selected for a research degree, and gained one of the research degree places allocated to the university, do not pay a fee. Universities have quotas for research students; our interviews indicated that scholarships for full time doctoral study are very competitive, and we were told that self-funding for postgraduate research is very rare. A 2.1 honours is required for entry to the doctorate. We were told that supply and demand for places is balanced so that applicants with the required qualification will be able to gain a place for postgraduate research provided that they are prepared to move to a university which has places.

The Research Training Scheme (RTS) was introduced in 2001, as a block grant that supports research training for students undertaking research masters and PhD degrees. The RTS is distributed to universities based on their research performance (as measured by higher degree by research (HDR) completions, research income and publications). This enables universities to provide fee-free places for domestic research students for up to two years masters, and up to four years PhD. However, the RTS grant to universities has not increased since its introduction, with the result that it does not cover the costs to universities of providing research training. Most full time research students also receive scholarships to cover living expenses.

We were told that one of the major challenges for Australia, and one of the highest priorities of the government, is to improve the educational opportunities and access for Aboriginal people. According to one of our interviewees, 'Australia's major social problem is the plight of the indigenous people'. There are a number of challenges which include improvement of the quality of schooling and the retention of Year 12 students so that they progress to university. These are not new challenges and we were told have already involved 'decades of effort' to improve access by Aboriginal people to higher education. At postgraduate level there are a number of special scholarships for Aboriginal graduates to pursue doctoral study.

Given the increase in numbers of students undertaking doctoral study, there is an increasing diversity in the student population. This is reflected in students undertaking both PhDs and professional doctorates. Australia was one of the countries which early on developed the professional doctorate (in particular, though not only, in education), and the country has been at the forefront of some of the innovative thinking concerning professional doctorates. However, the professional doctorate has experienced problems of credibility, status and quality in Australia, with the result that numbers have reduced, and there are now two pathways to the PhD, the 'research' pathway and the 'professional' pathway (AQF, 2013). Although the professional doctorate continues to exist, numbers have stabilised and in some cases reduced, while the two routes to the PhD provide the opportunity for diversification within the PhD itself.

Employment outcomes

According to one of our interviewees, the purpose of postgraduate programmes is not necessarily to train people for employment. Given that a minority of PhD graduates (possibly fewer than 30%) will enter an academic career, there is a problem of employability. Another interviewee raised the concern that PhD graduates are ill-prepared for employment, and that there have been a number of initiatives in Australia to increase employability. These have included generic skills courses, the teaching of communication skills, and an emphasis on independence. In several interviews the

question was raised whether there are too many PhDs, and what candidates are being trained for. Concerns were raised that too many PhDs may lead to subsequent unemployment, while undertaking a PhD in some cases keeps young people out of the unemployment figures at least temporarily.

According to the Go8 discussion paper (Go8 2013), there is a paucity of data on the employment destinations of PhD graduates. However, the report claimed that around 26% of PhDs in Australia worked in higher education in 2006, while in 2008 28% of recent PhD graduates worked in higher education, with 'the remainder being dispersed across a wide range of public and private industry employment sectors'.

Summary

Australia faces a number of similar challenges to other countries. A major challenge is funding for higher education, although there has been a comparatively successful income-contingent loan scheme for both undergraduates and postgraduates for 25 years. The past 10 years have seen a number of significant reforms to the higher education system, including the introduction of the demand-driven system, and the current government appears to be committed to maintaining the market-oriented and competitive system that has been developing over the recent period.

Annex B - Germany

Germany

Context

Germany is the largest country in the European Union, and with a population of about 82.3million has the EU's largest population. The country has a federal structure which brings together the 16 constituent federal states, or *Länder*. The *Länder* vary substantially in size and population (the smallest, Bremen, has a population of around 660,000, while the largest, North Rhine-Westphalia, has a population of over 18 million). *Länder* also vary considerably in their wealth (Bremen accounted for just over 1% of GDP in 2013, while North Rhine-Westphalia accounted for almost 22%) (Federal Statistical Office of Germany).

According to Article 30 of the Basic Law of the Federal Republic of Germany (*Grundgesetz*), the *Länder* have responsibility for education, including higher education, and provide most of its funding. This has resulted in 16 relatively independent systems of HE in Germany, and substantial autonomy for universities. The German university system is built on the Humboldtian tradition which stresses 'the ideal of scholarship, the pursuit of knowledge (as a means of developing an individual's character) and intellectual abilities' (Ostermann, 2005, p.64). The unity of research and teaching is stressed and universities see themselves as research-led teaching institutions.

Binary structure of higher education

Germany retains its binary structure of universities and polytechnics (*Fachhochschulen*), or universities of applied sciences as they are now termed, with different entry requirements and orientation. According to the German Rectors' Conference (HRK 2013), there are currently 392 higher education institutions in Germany with a student population of approximately 2.5 million. Of these, 121 are universities, 215 are universities of applied sciences and 56 colleges of art or music. All HE institutions are either state (239 institutions) or state-recognised (153) institutions. There is a growing number of private institutions (now 113) which are usually small and focused on a particular subject (e.g. business and management), and which cater for about 5% of the student population.

Of the total student population (circa 2.5m) about 1.64m (60%) attend universities, while 95% attend public state-funded institutions. Universities normally offer the whole range of subjects and tend to be research-oriented, offering the whole range of degrees up to PhD. On the other hand, the universities of applied sciences provide for about 828,260 (38%) of students and concentrate on technical subjects, engineering, business and management, social work etc. and tend to have a more professional focus. Universities of applied sciences have not traditionally been involved in research and do not provide doctoral education. About 35,144 (2%) of students are enrolled in colleges of art or music (HRK 2013).

Free higher education

Higher education in Germany was traditionally free, as enshrined in both federal and state law. However, the challenge of meeting the costs of an ever-expanding HE system, particularly since German reunification in 1990, had led to a number of debates among politicians over the possible introduction of tuition fees. According to Hotson (2014) 'the main obstacle was a federal law banning tuition fees, which echoed provisions guaranteeing free education in the constitutions of individual states'. These debates culminated in a ruling of the Federal Constitutional Court in Karlsruhe in 2005, which ruled that 'moderate fees, coupled with affordable loans, would safeguard these constitutional provisions' and in 2006 tuition fees were introduced in several federal states.

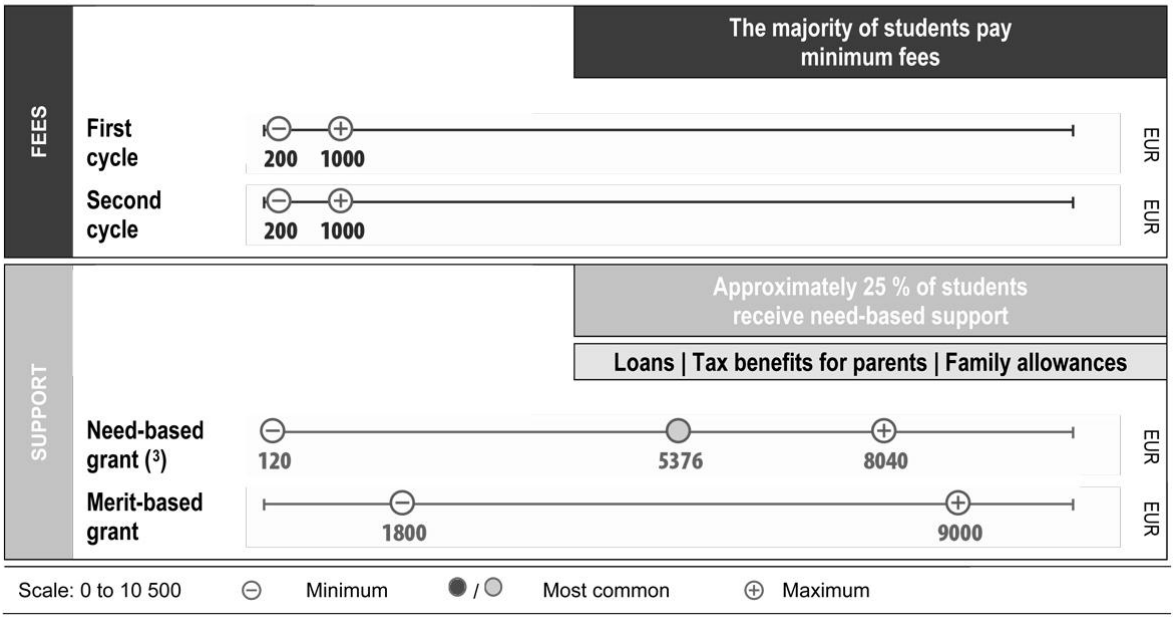
Thus 'within two years, a cascade of laws had swept through most of the federal *Länder*' (Hotson 2014; see also Orr and Jaeger 2009 and Hüther and Krücken,2014). This resulted in the introduction of tuition fees in 7 out of 10 states in western Germany. According to Orr and Jaeger (2009), 'by the winter semester 2007/2008 around three-quarters of all students were paying fees of approximately €1000 p.a.'

Orr and Jaeger explain the rationale for the introduction of fees as similar to that experienced by most other developed countries thus: 'The state wanted to introduce stimuli for competition between universities and encourage students to see themselves as critical consumers and thereby strengthen the weak demand-side influence on university performance … the universities saw the benefit of supplementary funding based on their relative quality' (Orr and Jaeger, 2009, p.43). However, following major student protests, this policy was over-turned and "in a few months, Germany's brief experiment with tuition fees (was) over" (Hotson, 2014). According to Hotson, this over-turn was in large part due to the traditions of local identity and local democracy: universities are the responsibility of the *Länder* and the majority of students continue to attend their local university, with states retaining a sense of responsibility, 'ownership' and pride in their own universities. Today, higher education is free; in most universities students are required to pay for a 'semester ticket' of about €100 per semester which covers administrative provision such as libraries. Traditionally, all universities were regarded to be of equal standing, which has contributed to the tendency of most students to apply to a university close to their homes. This 'equality' has been gradually and significantly eroded by increased competition and, in particular, by the Excellence Initiative (see below).

Table 11 summarises sources of funding and support for first and second cycle degree students.

GERMANY

MAIN CHARACTERISTICS



Key points

Fees (2013/14)

• In 15 of the 16 German *Länder* studying is free of charge (Bavaria decided that fees are not in force as of winter semester 2013/14). Only in Lower Saxony students have to pay fees of maximum EUR 1 000 per academic year, which is defined by law. Only administrative charges are paid by all students.

• When exceeding the regular study period, students may be liable to pay fees even in those *Länder* that do not charge fees.

• Students can be exempt based on need- or merit-based criteria.

• Different fees may be charged to students from outside the EU and EEA countries.

Support (2012/13)

• General public **student support** (BAföG) is awarded as a grant for one half of the individual amount, and as an interest free loan for the other half. Total amounts range from EUR 10 to EUR 670/month for 12 months/year. Eligibility and amount are determined by assessment of student need based on income, family situation, housing situation and disability. A maximum of EUR 10 000 needs to be paid back.

• Students need to be under the age of 30 (35 for master studies) to be eligible for public student support.

• Different types of **merit-based support** are awarded entirely as a grant. The amount awarded is often determined through an evaluation of student need. Total amounts of scholarships range from EUR 150 to EUR 820/month for 12 months/year. Additional support is determined by assessment of the family financial situation.

• Study **loans** are available to cover the tuition fees (in those *Länder* that charge tuition fees and limited to the amount charged) and living costs. The latter are available as a *Bildungskredit* of up to EUR 7 200 and a *Studienkredit* of up to EUR 54 600. Both loans are paid out in monthly instalments.

• Students' parents receive a monthly **family allowance** of EUR 184 for the first two children, EUR 190 for the third and EUR 215 for the fourth and more, and a lump sum **tax relief** (EUR 3 504 per annum, per child, per parent), until students are 25 years old. The tax office checks in favour of the taxpayer whether the child benefit or the deduction of the above mentioned allowances is more favourable.

Planned reforms

• In Lower-Saxony fees should be abolished as of academic year 2014/15.

• The scholarship amount is to rise to the minimum of EUR 300 as of winter semester 2013/14.

Table 11: Main characteristics of HE student fees and support – Germany 2013-14 (Eurydice, 2013)

Reforms

The German system of higher education has undergone considerable reform over the past 10 years or so, and can be said to be in a phase of 'rapid change'. This is partly due to the Bologna Reforms (following the 1999 Bologna Agreement) and partly due to pressures within Germany itself, including German unification in 1990. We note also the 'PISA shock' following the results of the first rounds of the OECD PISA (Programme for International Student Assessment) rankings which 'fundamentally undermined the implicit self-assessment of the country's education system, an assessment that had been characterised by self-confidence, belief in its efficiency and the system's important role in Germany's economic achievements' (Ertl 2006, p.620, and see Ostermann 2005). PISA is an international triennial survey which aims to compare education systems worldwide by testing the skills and knowledge of 15 year old students. Significantly, as a result of the PISA results, 'the 16 Länder agreed on national assessments … this represents a precedent in educational policy in Germany since the 1950s because it is for the first time that the KMK (*Kultusministerkonferenz* or the

Standing Conference of the Ministers for Education and Culture), the body that coordinates the educational policies of the 16 *Länder*, has agreed on a national body that is responsible for quality assurance in education beyond the level of the individual *Länder*' (Ertl 2006, p.622). Although PISA assessments operate at high school level, the 'shock' following Germany's poor performance reverberated through the whole education system leading to fundamental reforms.

The Bologna reforms led to restructuring of the traditional integrated qualification (Diploma, Magister, State Exam) to a bachelors/masters structure, although this took a long time, and it was not until 2010 that 'there were more Bachelor degrees awarded than traditional degree types' (Ertl 2013b, p.137). Even now there are some universities (e.g. LMU Munich, TU Dresden) and some subjects (e.g. jurisprudence and some technical subjects) which retain the 'Diplom' or State Examination. There is some evidence (cited by Ertl 2013a) that the reforms have contributed to reducing the overall length of degree programmes, thus decreasing the average age of graduates, and that students in the new bachelors programmes are less likely to drop out. However, again this depends on the subject, with some subjects having higher drop-out rates. The new bachelors and masters degrees are now endorsed by 'accreditation agencies' established for this purpose. These agencies are themselves subject to accreditation by a national accreditation council, which acts as a central body.

Unification contributed to substantial expansion of student participation and the creation of new universities. In general this meant that the higher education system of the Federal Republic of Germany transferred to the former GDR, leading to restructuring of HE in the former eastern *Länder* (Ertl 2013b). According to Berthold et al, (2013) the number of undergraduates will remain at 'a historically high level in the coming years' (particularly in the former eastern *Länder* and in *Fachhochschulen*) and will lead to significantly increased demand for masters programmes (and then for PhDs). According to these authors, there is a need for urgent action in education policy to meet the growing demand for masters provision.

Germany currently invests about 1.1% of its GDP in tertiary education, mainly from public sources. However, the significant majority of the funding comes from the federal states; of the €23.3 billion of public funds invested in 2010, €19.9 billion (85.4%) was provided by the federal states, and €3.4 billion (14.6 %) by the German Federal Government (Federal Statistical Office of Germany). However, with the huge increase in student numbers over the past 20 years, financing of HE is a challenge, and there are pressures to increase the amount provided by the Federal Government and by third sector providers.

'Higher Education Pacts'

While the German Basic Law allocates responsibility for HE to the individual states, it allows for co-operation between the Federal Republic and the federal states in cases of supra-regional importance on the basis of joint agreements, and funding HE has been agreed as one of these cases. The significant expansion in student numbers, the increasing demand for qualified employees, and the challenge for *Länder* to find additional funds have led to a series of so-called 'Higher Education Pacts' which serve as a collaborative arrangement between the federal states and the Federal Government.

The first phase, Higher Education Pact I (2007-2010) provided university places for an additional 91,000 first year students on the basis of co-financing (on a 50/50 basis). The Federal Government provided €565 million which was distributed according to an allocation formula based on the economic situation of the individual states. The second phase, Higher Education Pact II (2010-2015) is designed to provide places for an additional 334,000 students. According to the Federal Ministry

of Education and Research, the Federal Government plans to increase funding by €2.2 billion to a total of over €7 billion between 2011-2015, and the *Länder* have agreed to contribute comparable additional funds. A further €2.7 billion is planned for the period to 2018. With the continuing expansion of HE and the demands of international competition, the Federal Government and the *Länder* have agreed on a third phase, Higher Education Pact 2020 (2016-2020) to provide for the further projected considerable increase in student numbers, and to strengthen university research. Higher Education Pact 2020 funds two 'pillars' or strands: Pillar 1 funds additional student numbers and Pillar 2 provides one-off overhead payments for research projects funded by the DFG (the German Research Foundation). A third pillar, the Quality Pact for Teaching, will support 186 higher education institutions in improving their study conditions.

Although universities have been and continue to be the responsibility of the individual Länder, in the recent period competition has been increasing between universities across the country, in particular with the introduction of the Excellence Initiative and the substantial levels of external funding for 'excellent' universities (see below). According to Kehm and Pasternack (2009), this broke a 'taboo' and 'caused an outcry among most of the relevant stakeholders in the German higher education landscape ... the Social Democratic approach to education had been one of open access, equal opportunities; education as a public rather than a private good, hence no tuition fees; and the equal treatment of all higher education institutions of the same type' (p. 114). They note that 'the only stakeholder group supporting, even applauding, the initiative were the employers, who argued that German higher education institutions were good on average but that there was a lack of "lighthouses" ' (p. 114).

Quality

In our interviews we were informed that the Excellence Initiative has been the most powerful driver for competition and quality enhancement. The Excellence Initiative was initiated by the Federal Government and the 16 *Lände*r and launched in 2005 as an attempt to drive up the quality of universities by identifying and rewarding the best universities through a competitive ranking system. The initiative is jointly run by the DFG and the German Council of Science and Humanities and jointly funded by the Federal Government (75%) and the *Länder* (25%). Although the Excellence Initiative was aimed primarily at quality of research activity, it has nevertheless had an impact on quality of teaching activity. The funding stream for Graduate Schools has led to expansion of doctoral education and a shift in the nature of doctoral education towards greater research training and a less individualistic model.

The Excellence Initiative

The Excellence Initiative focuses on three lines of activity and funding:

- Graduate Schools - These are organised thematically, and are intended to provide an excellent research environment for the training of highly qualified and talented doctoral researchers and scholars;
- Clusters of Excellence - These involve collaborative arrangements between universities, non-university research institutions and business/industry partners to work on cutting edge areas of research;
- Institutional Strategies - These are intended to indicate innovative development of a long-term strategy to improve the organisation, making it more competitive and effective.

The title 'University of Excellence' is awarded to universities that have successfully established at least one theme-oriented Graduate School, at least one Cluster of Excellence and have a promising Institutional Strategy.

Substantial additional funds have been allocated to incentivise quality initiatives. The first phase covered the period 2006-2011 and awarded €1.9 billion of additional funding to successful universities. In the second phase (2012-2017) €2.7 billion were allocated to successful institutions. The first two rounds of funding have supported the creation of 39 Graduate Schools (which received an average of €1 million annually), 37 Clusters of Excellence (which received an average of €6.5 million per annum) and nine Institutional Strategies (which received up to €13.5 million per annum) (DFG, 2011).

In the current period (2012-2017), the third and final round of funding covers 45 Graduate Schools, 43 Clusters of Excellence, and 11 Institutional Strategies. This has led to a much greater differentiation between universities in terms of quality. According to the DFG website, this initiative has "meant a departure from a long cherished … conception that all universities are equal and hence should be treated equally. Instead the Excellence Initiative pursued a path of inequality and of funding elites" (see also Hartwig, 2011). As this suggests, the Excellence Initiative has elicited a certain amount of scepticism and criticism (e.g. Kehm, 2009) through the introduction of an internal competitive ranking system, its greater focus on research excellence as a metric (and consequent downplaying of excellence in teaching), and the effects that the whole competition has had on the landscape of German higher education (implying 'winners' and 'losers').

Quality of universities

According to one of our interviewees, this initiative has meant an increasing 'gap' between universities in terms of quality. The best universities (that have the title 'Excellent University') have considerable additional funding, which allows them to organise theme-oriented Graduate Schools which provide courses in generic skills, professional and communication skills, and which increasingly attract the best PhD students, and provide the strongest research environment. This has resulted in a wide range of quality (differentiation) both between universities, and, to some extent, between subjects. According to several of our interviewees, the majority of the 'winners' came from STEM subjects, and Kehm and Pasternack (2009) confirm this: 'the results showed a clear bias towards the natural and applied sciences' (p. 118).

Quality of students

The Abitur (A-levels) is the standard entry requirement for higher education, now at bachelors level, and Germany has traditionally granted access to HE to anyone with the relevant qualifications as a constitutional entitlement (through its so-called 1977 *Öffnungsbeschluss*). Although this has become modified through the introduction of a '*numerus clausus*' (literally, 'closed number') to limit entry to particularly popular subjects and institutions, students graduating from school continue to regard higher education as a right. This has created a challenge since increasing numbers of students exercise their entitlement to enter higher education. In one interview there was a strong observation that the diversity of students and the increasing numbers meant that quality had been compromised, and students were entering higher education without the necessary qualities to undertake study at this level. The expansion of numbers at bachelors level and the diverse characteristics of students entering university meant a corresponding challenge for quality at postgraduate level, according to our interviews.

Masters degrees

Masters degrees take two years. They are said to vary in quality, in part because they are increasingly offered by a wider range of institutions, including universities of applied sciences. According to the HRK, in 2013 there were 6,796 masters programmes, with 41,292 masters graduates that year (HRK 2013) (of a total 365,190 graduates, excluding doctorates). Following the Bologna reforms, it appears that 'the Bachelor degree is aimed at the majority of students, whereas the Masters programmes are intended for a minority' (Ostermann 2005, p. 67). At least one respondent differentiated bachelors from masters programmes by suggesting that the bachelors programme is 'more vocation-oriented' while the masters programme is 'more research-oriented'. However, there are also masters programmes which provide specialisation for graduates of rather broad and non-vocational degrees. This type of masters programme is very much a professional qualification and not research-led. We were told that although the Bologna position promotes a bachelors degree for the majority, in reality significant numbers (and indeed the majority) of bachelors graduates now progress to masters programmes, as the masters degree is increasingly seen as the main entry point to the labour market.

In 2013 there were 152,484 bachelors graduates, compared with 41,292 masters graduates (though the total number of graduates (365,190) included those graduating from the former German four to five year '*Diplom*' qualification and from teacher training institutions (*Lehrant*). Students tend still to continue in their 'home' university which means that student mobility is not as high as in a country such as England. However, according to one interviewee, the increasing differentiation between universities could lead to increased competition between universities and greater student choice and mobility.

Doctoral degrees

According to Kehm (2008) 'Germany belongs to those countries worldwide in which the highest number of doctorates is awarded' (p. 19), with about 25,000 doctoral degrees awarded annually. Over the recent decade Germany has shifted from its traditional Humboldtian 'master-apprenticeship' model of doctoral education which involved a personal relationship between a student and the 'doctor father' (as he was described by our interviewees). In this model, doctoral candidates frequently had a paid junior position associated with the professor supervisor, for whom s/he worked part-time, or even full-time, with some time free towards the end of the period for writing up the doctoral thesis. Traditionally this engendered a 'position ... of high personal dependence' (Kehm 2008, p. 21). From 1990 Graduate Colleges (*Graduiertenkollegs*) were introduced as thematically oriented, and frequently inter-disciplinary research groups which provided structure and support to groups of PhD students. This development was followed by recommendations by the German Rectors' Conference in 2003 which aimed to reduce the average age and time to completion of the PhD, to introduce taught elements as part of research training, and to enhance students' acquisition of generic competences related to employability in non-academic labour markets. Building on the Graduate Colleges, a number of which were international graduate colleges which involved partnership with universities from other countries, the German Academic Exchange Service (DAAD) established 50 international postgraduate programmes in a broad range of subjects to enhance doctoral education in Germany.

The PhD continues to be graded (into one of four levels), which reflects the range of achievement in the PhD degree.

Access

Participation rates in higher education in Germany rose from 8% in 1960 to 25% in 1990 (Peisert and Framheim, 1990) and from 27.7% in 1998 to 35.6% by 2002 (Ostermann, 2005). Between 2007 and 2011 there was a further increase from 36.8% to a 50.9% participation rate.

The Federal Training Assistance Act (the *Bundesausbildungsförderungsgesetz* or BAFöG) has, since 1971, provided state funding to enable young people to pursue education and training, even where their individual social and economic circumstances might not permit. There are strict criteria for eligibility (age, family circumstances and financial means). Students receive 50% of BAFöG aid as a state grant and 50% as an interest-free loan that must be repaid in instalments within 20 years. The requirement to pay back the loan starts five years after the completion of the period of study in the first training programme financed by the loan, with a maximum repayment total capped at €10,000.

We were told that masters students do not normally receive funding unless they are employed as research assistants. They are, however, entitled to receive BAFöG funding which is intended to enable students from lower income backgrounds to undertake masters degrees. PhD students are frequently employed as research assistants, or may be in receipt of scholarship funding (often from one of the many foundations providing support), or increasingly they may work outside the university in their place of employment on a project identified by the industry (e.g. Audi or BMW) and in a collaborative arrangement between the university and the enterprise. All universities and the majority of *Fachhochschulen* offer masters degrees; PhDs are offered by universities, and *Fachhochschulen* are required to collaborate with a university in order to award the degree.

In 2011 Germany introduced the *Deutschland Stipendium* (the Germany Scholarship) funded by the Federal Government to support high-achieving students at public and state-recognised HE institutions in Germany. We were told that this supports very gifted students, frequently of immigrant background. According to its website, the criteria for the award include a top academic record and 'social commitments and special personal achievements, such as a student overcoming challenges or obstacles in his or her educational career'. The scholarship provides €300 per month, half of which is provided by private sponsors, which is then matched by half provided by the Federal Government. An explicit goal of the scheme is to 'strengthen the increasingly important networks between science and industry, and encourage foundations, associations and private individuals to invest in young people's futures' (Germany Scholarship: *Bürgerflyer* (Federal Ministry of Education and Research/Bundesministerium für Bildung und Forschung, 2013) The Germany Scholarship is awarded by the universities which are encouraged to make innovative programmes to implement the scholarships.

In addition to these major programmes there is a wide range of funding available from foundations in Germany, for example the Alexander von Humboldt Foundation, DAAD, the Helmholtz Association, the Leibniz Association, the Max-Planck Gesellschaft, and foundations such as Volkswagen Stiftung which advertise support both for masters and for doctoral level research.

We were told that fair access is a high priority both for the government (and elicits consensus among political parties), and also for the various foundations which also prioritise this objective in various funding initiatives.

Employment outcomes

The PhD, and the professional doctorates in fields such as medicine (DMed), engineering (DIng) and in law (DIur), are considered to be positive for an individual's CV, and frequently contribute to

promotion or as part of a route to a leadership position in industry and politics. 'Almost all seniors in foundations have a doctorate' according to one of our interviewees. However, we were also told that the labour market returns for a PhD were said to vary greatly, mainly by field.

Several interviewees claimed that graduates with postgraduate degrees normally earn considerably more than graduates with bachelors degrees, although again this depends on the field. Postgraduates were said to have the following skills and competencies:

- ability to reflect and reconstruct problems;
- self-efficacy;
- stronger communication skills and 'rhetoric';
- teamwork and leadership.

According to one interview, there are now fewer jobs for bachelors graduates since employers tend not to view them as fully qualified. This means increasing numbers continuing to masters qualifications, with an estimate of over 50% of bachelors graduates continuing to masters degrees (about half in the same university where they undertook their bachelors degree). The masters programme is therefore increasingly being used as the entry point to the labour market. Employment of doctoral graduates varies by discipline; we were told that PhD graduates in sciences (basic and applied) have no difficulty in finding appropriate employment and that the degree attracts a salary premium. However, PhD graduates in other fields, particularly humanities, where academic posts are very limited, frequently find themselves taking positions which require a lower level of skills and competence.

Summary

Germany has a decentralised higher education system, which falls under the federal states or *Lände*r. Over the past two decades or so, the system has experienced a period of rapid change. Major changes to the degree structure followed the Bologna Agreement in 1999, with a shift to bachelors, masters, doctorate structure. Germany retains a binary higher education system, with a strong sector of *Fachhochschulen*, which provide more vocational/professional degrees. Unification in 1990 brought with it the need to transform higher education institutions from former eastern states, a massive expansion in student numbers, and a commitment to re-distribute resources to support institutions in former East Germany. Although higher education is the responsibility of the 16 *Länder*, the past 10 years have seen agreements between the Federal Government and the *Länder* to cooperate and to co-fund initiatives to support expansion in student numbers and to strengthen universities' research infrastructure.

Annex C - India

India

Context

The Republic of India has a population of *circa* 1.27 billion, almost half of whom are under 24 years of age. Approximately 30% of the population live in towns and cities and the remaining 70% in rural locations. Geographically India is around one third of the size of the entire European continent. Around 64% of the population is of working age, less than 10% of whom have completed secondary school and the adult literacy rate is in the region of 63%. Between 2001 and 2011 India's population grew by 181 million and it is predicted that by 2025, India will have overtaken China as the world's largest country with a population of 1.44 billion.

The geographical dimensions of India, the diversity of higher education institutions and funding sources, plus the degree of autonomy of different states (which have responsibility for university funding), make it difficult to generalise about Indian higher education at country level. However, we suggest the following are some of the more significant factors affecting postgraduate education in India:

- a huge expansion in undergraduate enrolments in universities from around 5 million in the early 1990s to 13 million by 2009 (Agarwal, 2009; Tilak, 2013a), yet with India still 'lagging behind its peers' (China and the USA) with respect to enrolments in higher education generally (Ernst and Young, 2012);

- a growth in the number of science and engineering PhDs awarded: from 183 in 1954-55 to 8,663 in 2005-06 (Agarwal, 2009), but an overall decrease of 18.5% in the number of PhDs awarded (all subjects) between 2007-08 (13,237) and 2008-09 (10,781);

- the dichotomy between the diverse group of the 'top' institutions (which includes: some of the larger publicly funded universities, e.g. Delhi, older private universities such as the Birla Institute and the multiple-campus Manipal University, together with the 15 smaller, research-based Institutes of Technology ('too small and specialised to become world-class research universities' – Altbach, 2009)), and the much larger number of public and private colleges at which most undergraduates study (Heslop, 2014);

- the growth of private institutions which now make up around 64% of the higher education sector (Rizvi and Gorur, 2011; Ernst and Young, 2012);

- relatively few 18-22 year-olds entering higher education, despite an increase of 4-5% between 2006 and 2011, but with predictions that this proportion will rise to 30% by 2020 (Trow, 2006; Agarwal, 2012, Ernst and Young, 2012) even though low quality teaching and learning occurs in a significant number of institutions (Heslop, 2014);

- government recognition of the importance of expanding access to higher education and in parallel improving quality, one indicator being the 'admission preferences' afforded to Scheduled Castes and Scheduled Tribes through 'strict and binding quotas' within which universities have to operate (Frisancho Robles and Krishna, 2012);

- the qualifications of academic staff: only around one third of academics teaching in Indian universities have doctorates, the majority in research-oriented departments (Altbach, 2009).

We are focusing on postgraduate programmes, but the context for this section draws on the bigger picture of education and higher education in India: entry to and eligibility for postgraduate study is affected by all education experiences, including undergraduate education and the variable quality of these programmes is highlighted by our interviewees and by the literature. For example, there is still progress to be made at the elementary education level: Patnaik regards it as 'a national shame that even after six decades of independence nearly one-third of the population … remains illiterate, and around two-fifths of children of school-going age remain outside the ambit of formal schooling at any given time' (Patnaik, 2007: 8).

It is suggested that 'significant quality problems exist in [India's] less-selective colleges and universities' (Altbach, 2009) and that there is a gulf between the universities considered to be at the top, and therefore with the capacity to educate research postgraduates, and those at which most undergraduates are studying. This is in direct contrast to most of the other countries included in this study, where the majority of universities provide a full range of programmes from undergraduate to postgraduate.

Our contributors referred to the unevenness of funding and the increasing gulf between around 300 state universities, almost all of which are poorly funded, and others. One interviewee suggested that around 12 state universities are still 'excellent', but that of the 40 which are particularly well-funded, only around 15% are of high quality.

It is important for India's future success that these problems are addressed:

> '[Higher education] institutions today are an integral organ of the state and economy. They are embedded in the history and culture of a nation and are shaped by its contemporary realities, ideologies and vested interests. India's large size, long history and diverse culture and the complicated nature of Indian polity and policy process make Indian higher education a very complex enterprise.'

(Agarwal, 2009: p. xxx)

Globally, Indian universities under-perform compared to their competitors. For example, in the Shanghai Jiao Tong University academic ranking of world universities, the only Indian university to feature in the 2013 top 500 is the Indian Institute of Science in Bangalore, which is in the 301-440 band, although it is in the top 100 for engineering, technology and computer science and the top 200 for natural sciences and mathematics (Shanghai Jiao Tong University, 2013). The picture is slightly better in the *Times Higher Education World University Rankings*, with Panjab University in the 226-250 group and four of the Indian Institutes of Technology (Delhi, Kanpur, Kharagpur and Roorkee) in the 351-400 group (THE, 2013). In the Asia University Rankings, however, 10 Indian institutions feature in the top 100: Panjab University (32); Indian Institutes of Technology - Kharagpur (45), Kanpur (55), Delhi (=59), Roorkee (=59), Guwahati (74), Madras (=76); Jadavpur University (=76); Aligarh Muslim University (80); and Jawaharlal Nehru University (90) (THE, 2014). The extent to which global rankings are relevant in measuring the success of Indian higher education, however, is questioned by Patnaik (2007), who argues that in continuing to develop and strengthen its universities, India should focus on producing 'organic intellectuals' (Patnaik, 2007) who contribute in the Indian context, rather than seeking to address global employment needs or to increase global capital (Nerad and Trzyna, 2008).

Economic developments

One of the drivers for expansion of higher education in India is to become competitive with other successful economies, some of which are well established. Research for this case study illustrates the challenges India faces in growing its higher education system commensurate with its economic development. Of the four 'BRIC' countries (Brazil, Russia, India and China) identified by Goldman Sachs in 2003 (French, 2011), India was thought the only one that would continue to have high growth rates as far ahead as 2050, because of its young population relative to the other countries. In a 2007 follow-up report to the 2003 publication quoted by French, Goldman Sachs suggested they may have originally understated India's economic potential, even in the light of the global financial crisis that emerged in 2007-08 and more recently the slowing of annual economic growth to 5% (Burke, 2014). Agarwal suggests there is wide acceptance 'that higher education has been critical to India's emergence in the global knowledge economy' (Agarwal, 2009); however, high levels of economic growth and the surge in enrolments do not yet appear to have had a major impact on the consistency and quality of India's universities. He notes that demand for higher education exceeds supply because of the growth in population and in the middle classes, whose aspirations are rising. Along with the other BRIC countries, part of India's strategy is to attract larger numbers of international students 'for enhancing the credibility of their education programmes and generating much-needed additional resources from foreign students' (Tilak, 2013a, Panikkar and Bhaskaran Nair, 2012)

Growth in enrolments in Indian higher education and their impact on postgraduate degrees

Figure 8 illustrates the significant and steady growth in overall student enrolments in India between 1984-85 and 2009-10.

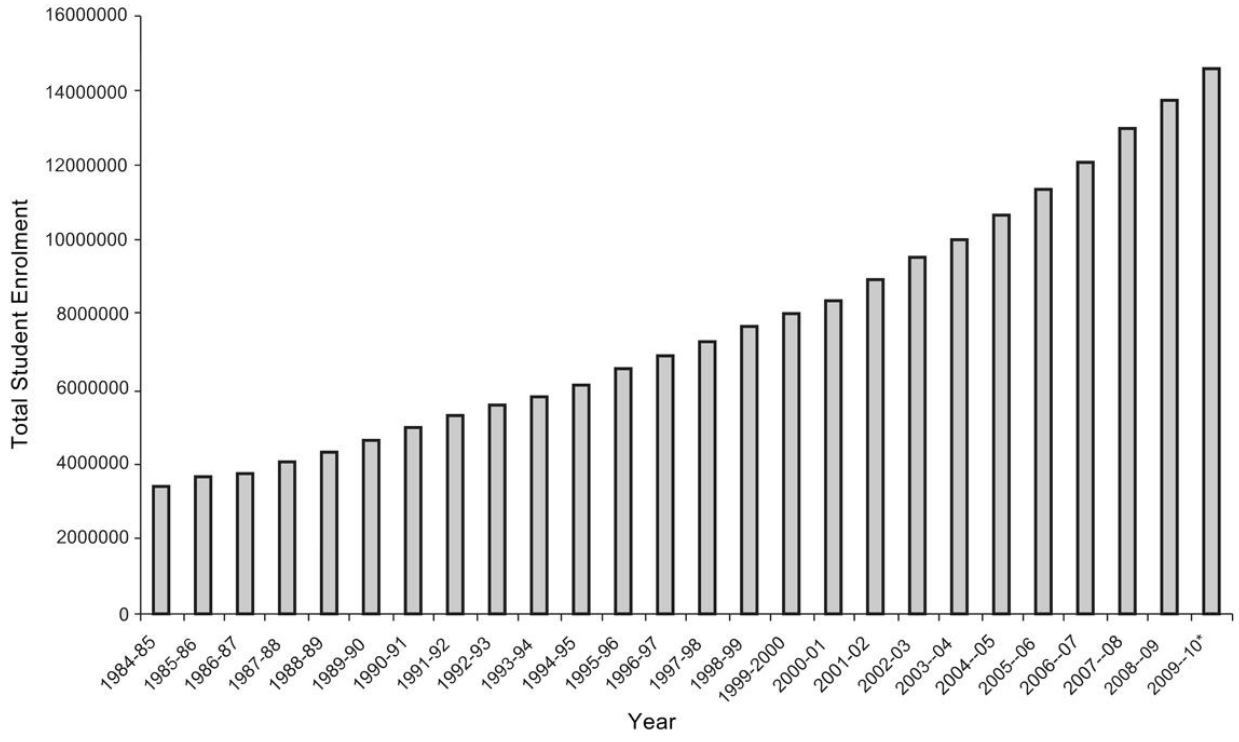


Figure 8: Growth in student enrolment in Indian higher education institutions 1984-5 to 2009-10 (University Grants Commission of India, 2012)

Yet, from Figure 9 below, we can see that by 2013, based on a total student enrolment in higher education of more than 20 million, the number of research degrees (PhD and MPhil) remained a small proportion of the whole, at 1% (160,872), with other postgraduate degrees at 12% (2,492,472). A report for the Federation of Indian Chamber of Commerce and Industry's (FICCI) Higher Education Summit in 2012 further disaggregates the PhD from other postgraduate enrolments, including the MPhil, showing the proportion of PhD students as 0.5% in 2011-12 (Ernst and Young, 2012).

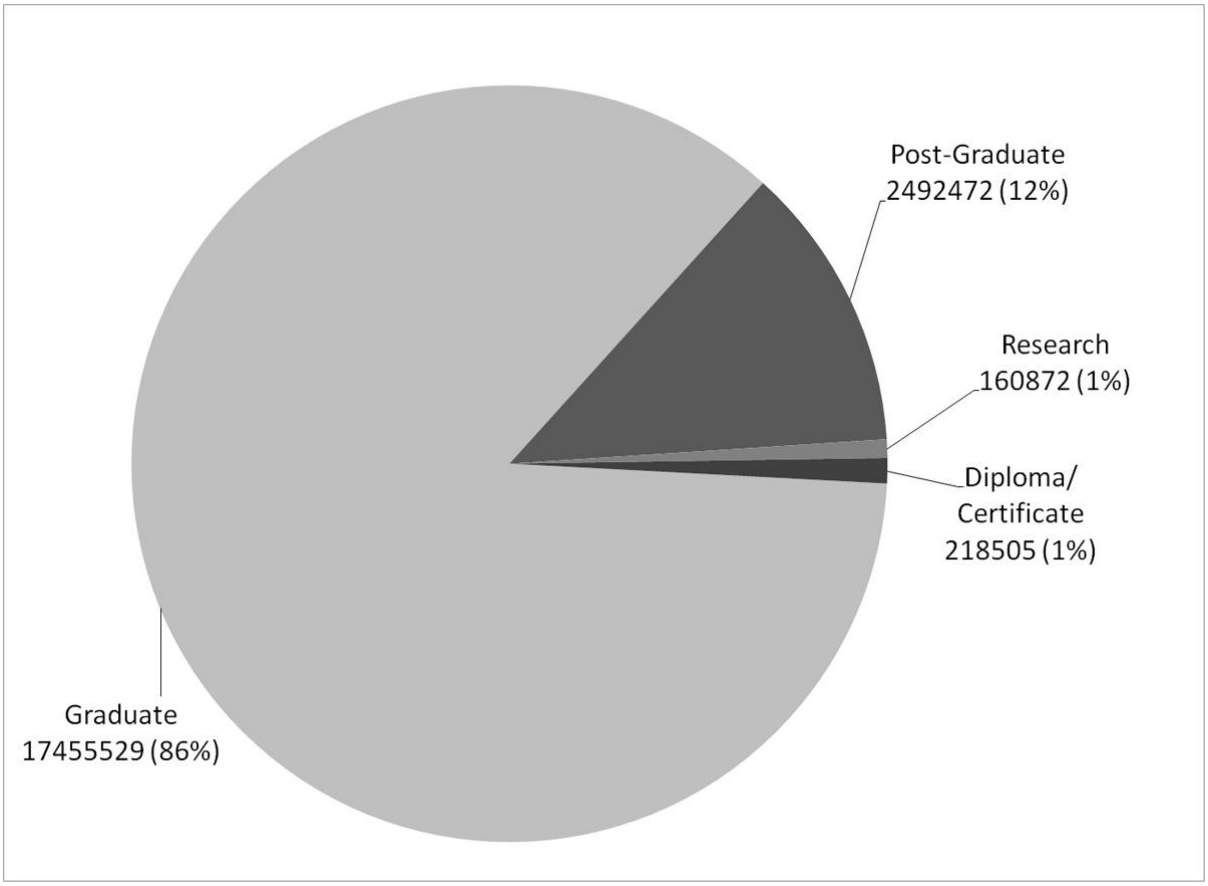


Figure 9: Proportions of graduates at different levels
(University Grants Commission of India, 2014a)

A recent British Council report confirms that 'India is not producing enough PhDs' and suggests that the 'lack of enquiry-based learning and early researcher skills is limiting the capacity of Indian institutions to engage in vital research and innovation activity' (Heslop, 2014).

Further statistics are provided by the University Grants Commission of India[19].

A 2008 report by the National Knowledge Commission (comprising staff from the National Informatics Centre, New Delhi), incorporating a letter to the prime minister and drawing on input from academic staff and industry-based employers, provided a large number of recommendations aimed at creating an environment that would lead to larger numbers of PhD graduates through government investment in and reform of Indian higher education (NKC, 2008). While it is clear that the NKC's recommendations are based on a 'knowledge economy' approach that focuses primarily

[19] http://www.ugc.ac.in/page/Other-Publications.aspx

on the impact in employment of doctoral graduates rather than their contribution to society as a whole (Patnaik, 2007), it is hard to argue with many of the proposals made in the report which, as well as calling for the creation of more universities and establishment of 50 high quality national universities, include:

- increasing research in undergraduate and masters programmes;
- introducing integrated doctoral programmes in some subjects that include placements and student exchanges, enabling students to move from undergraduate, to masters and doctoral study without a break but with possible exit points (one of our contributors refuted this suggestion, arguing that integrated masters programmes and strengthening the quality of masters education would do more to improve the quality of doctoral candidates);
- developing joint PhD programmes with industry which would be available to individuals already employed in industry who want to engage in professional development;
- introducing a national pre-PhD programme to fulfil the dual objective of broadening the perspectives of potential PhD students and increase networking among the research community;
- improving the rigour of doctoral assessment, including a compulsory viva; and
- formalising collaborations with foreign institutions and researchers by providing travel grants for Indian academics, joint supervision of doctoral students, and inviting academic staff from other countries to teach in India.

(adapted from NKC, 2008)

The extent to which the NKC's recommendations were adopted by the Indian Government is not clear although some appear to be linked to strategic plans for higher education. As identified by Rizvi and Gorur (2011), 'The complexity of Indian higher education has made it difficult for both central and state governments to implement programs of reform in any systematic and coordinated manner', yet they also acknowledge that India has begun to recognise that its higher education system needs to be situated 'within a global framework' and that this is leading to some opportunities for international collaboration and a new policy discourse.

The growth overall in student numbers does not so far appear to have had a major impact on enrolments in postgraduate research degrees in India. This could be for several reasons: financial constraints – the inability or unwillingness to invest further in academic qualifications; a lack of capacity for research student training in some of Indian universities; and/or the attractiveness to Indian graduates of studying overseas and reaping greater financial rewards after graduation. These and other considerations may all have an impact, but it has not been possible within the scope of this study to explore them further.

Foreign Education Providers Bill

According to the THE, in 2010 there were already over 600 foreign higher education providers offering courses in India, including Lancaster and Leeds Metropolitan Universities and Strathclyde Business School. In an attempt to establish formal control over the circumstances in which overseas universities can operate and to generate further investment, India has been considering introducing a law enabling foreign education providers to establish Indian campuses.The initiative began in 1995; 15 years later in 2010, India's human resource development minister, Kapil Sibal, announced that a bill was being put forward by the Cabinet and would proceed to formal government approval (Sugden, 2012). The purpose of the bill is 'to regulate entry and operation of foreign educational

institutions imparting or intending to impart higher education'. It is suggested that introduction of the bill is based on 'certain faulty assumptions' (Panikkar and Bhaskaran Nair, 2012), which include the expectation that a large amount of foreign investment will flow into India from 'top-ranking' universities who will provide high quality education, that Indian students will save money by not needing to travel abroad for study and that foreign universities will help to address some of the problems of Indian education already outlined. Since 2010 there has been much discussion about the benefits and disadvantages to India of introducing such legislation and the bill has not yet been passed. The debate has not been helped by exposés of British education in some of the regional press (e.g. The Hindu, 2012).

The complexities of the bill propose alignment by the foreign institutions with various requirements, including non-repatriation of profit, a minimum operating fund of around £6 million and that any branch campus would have 'an Indian advisory board of three national research professors per foreign institution' (Sugden, 2012). Another rule proposed in the bill and which foreign universities may find it difficult to adhere to if it becomes law, is that faculty salaries be made public (salary bands exist for all university faculty in India). Most recently, the British Council has publicly encouraged UK universities to continue establishing partnerships with Indian institutions rather than waiting for the bill to be passed (Heslop, 2014). In a report published this year, Indian academics, senior managers and policy makers set out their priorities for India-UK collaboration, the highest being to establish partnerships to support continuing improvements in teaching and learning (Heslop, 2014). All sources seem to believe that the bill will not be passed in the near future, but in the absence of legislation, the Indian Government has said it will allow overseas universities to establish campuses and offer their degrees in India (The Times of India, The Economic Times, 2012).

One of our contributors agreed that the bill should not be passed in its current form, partly because of the risk that less altruistic overseas universities might try to establish campuses with the main intention of profit-making, while the more distinguished universities might use Indian campuses as a recruiting channel for higher degrees at their home campus, in the longer term contributing to the 'brain drain' from India. This interviewee suggested there is 'immense scope' for greater collaboration between Indian and overseas universities and that it would be preferable to establish more joint programmes, with the Indian partner awarding the degree and with opportunities for two-way student (and possibly staff) exchanges for a term or semester and which could lead to an increase in PhD graduates in India. Digital programmes were described as 'the less glamorous' option but these already exist in some universities partnered with US institutions, and have developed organically through interpersonal contacts.

Agarwal (2009) emphasises the need for India to increase postgraduate numbers, particularly in new areas of science and technology, and suggests that achieving this would attract more global talent. In his view 'sub-criticality' in research can be addressed through greater collaboration, both national and international, and he notes that both China and Pakistan are 'using foreign provision to attract and retain bright people in science'. It is possible that passing the Foreign Education Providers bill would help to realise this aim.

Government and related initiatives

Successive Indian Governments institute five-year strategic plans for higher education, with each new plan evaluating developments introduced in the previous version. The current strategic plan for Indian higher education is the 12th and spans the years 2012-2017 'and beyond' (UGC, 2012; Ernst and Young, 2012). It is clear that during 2007 to 2011, much effort was made to improve access to higher education, specifically to continue to increase enrolments across the board, and to grow the number of higher education institutions, including a 10% compounded annual growth rate in private

institutions which included establishment of 98 state private universities and 17 private deemed universities (Ernst and Young, 2012). Some of the initiatives in the 11th plan have been a priority since the early 1990s, for example, strengthening of postgraduate departments (laboratories, workshops and libraries, 1992-97), improving quality and addressing the needs of under-represented social groups, including women. According to Agarwal (2009), participation in higher education in the last 10 years by Scheduled Castes, Scheduled Tribes and women has risen significantly, yet the participation of these groups in 'professional, science and commerce programmes is proportionately less'.

Table 12 in the government's most recent strategic plan, reproduced below, shows the numbers of research students (MPhil and PhD) enrolled in different subject areas in 2008-09 (and there is no reason to believe that this profile has changed significantly since then). It highlights the relatively high proportion of both masters and doctoral postgraduates in STEM, which India has in common with other countries included in this project, but also shows higher numbers in arts and humanities subjects (which is less usual). This distribution reflects the large numbers of undergraduates across India studying these subjects, especially in affiliated colleges in rural areas, because they can be delivered to a large student population without incurring the relatively high costs associated with STEM education (highly regarded science education centres are located in the large cities of Delhi, Bangalore, Hyderabad, Chennai and Mumbai). Large numbers of first degree graduates in arts and humanities therefore have the opportunity to enter postgraduate study, but it remains the case that courses in medicine, science and engineering in that order are considered the most prestigious subjects for study and able students and their families would be aiming for a place on a STEM programme.

Subject Number	Faculty	MPhil	PhD
1	Arts	3,524	3,496
2	Oriental learning	14	48
3	Science	2,374	3,317
4	Home Science	70	149
5	Computer Applications	3	15
6	Computer Science	327	122
7	Commerce	723	394
8	Management	186	330
9	Education	547	403
10	Engineering Technology	0	1,141
11	Medicine	62	298
12	Agriculture	9	427
13	Veterinary Sciences	16	93
14	Law	16	152
15	Others*	654	396
	Total	**8,525**	**10,781**

**Others include Music/Fine Arts, Library Science, Physical Education, Journalism, Social Work and Travel and Tourism, etc.*

Table 12: MPhil and PhD degrees awarded in 2008-09 (UGC Annual Report, 2009-10, Table 12)

During 2007 to 2011 there was a significant rise in funding for higher and technical education. In order to further encourage inter-disciplinary teaching and research, 417 departments in universities and colleges were each given up to six million Indian rupees (£60,000-£70,000) (Ernst and Young, 2012; Agarwal, 2009). In parallel, the UGC promoted basic scientific research by giving grants to

departments to improve basic infrastructure, promote research at undergraduate level and to provide doctoral and post-doctoral fellowships.

Another aspiration is to improve the quality of higher education generally in some locations by creating new institutions to 'meet the objective of regional equity', supported by a strategic shift in the UGC's funding distribution to strengthen state higher education (Ernst and Young, 2012). This may have the effect of increasing critical mass and creating more postgraduate opportunities at a larger number of universities.

In recent developments, the election of Narendra Modi, a Hindu nationalist, as Indian prime minister in May 2014, will inevitably lead to change. Widely regarded as a right-wing moderniser who during his campaign promised a swathe of reforms related to economic development Modi is known, among other attributed traits, for his international industry and commerce connections. His victory is widely seen as a demonstration of support from the rising middle and entrepreneurial classes (Mishra, 2014; Pagnamenta, 2014). The signs are that, similar to the previous National Democratic Alliance government, the new régime will invest more heavily in STEM programmes; for example, we heard that the first budget of the Modi government presented on 10 July 2014 includes the proposal to open five new Institutes of Technology and Institutes of Management and four new All India Institutes of Medical Sciences (Hindustan Times, 2014).

The sustained efforts of the Indian government to improve quality and make higher education available to more well-educated young people by increasing public funding and targeting it at pressure points have not so far led to major changes and 'do not give a sense of an integrated reform agenda for Indian higher education' (Agarwal, 2009), even though, as Agarwal also notes, higher education is receiving significant attention in India. He alludes to the 'weak higher education system' being 'blamed for skills shortages in several sectors' and to quotas in some universities that prevent increased access to higher status jobs which affects earning power.

Quality

Improving the quality of higher education programmes has long been a goal for successive Indian governments and the current strategic plan demonstrates this in new and previous objectives (UGC, 2012; Ernst and Young, 2012). In the executive summary of the plan, the UGC refers to 'utilizing this historic opportunity of expansion for deepening excellence and achieving equal access to quality higher education', re-emphasising a commitment to high quality programmes while recognising that 'considerable challenges remain'.

In the opening sections of its chapter on 'Enhancing Quality and Excellence in Higher Education', the UGC recognises that with respect to many of the international norms used to evaluate universities, Indian higher education suffers from a 'quality deficit'. They suggest that improving quality is linked to internationalization of higher education and contend that 'genuine internationalization of higher education in India would require setting up networks and exchanges of mutual learning with global north as well as global south…'. Yet, the aspiration in the 12th plan to 'internationalize' Indian higher education seems to be more about acting as an educational hub for South Asia and the developing world than further developing stronger links with universities in the northern hemisphere.

As part of the current strategic plan, the UGC is encouraging new models of public-private partnerships (PPPs) to establish 'research and innovation institutes'. This is seen as a strategy to improve the performance of some of the lower achieving institutions and is linked with the development of 'national knowledge clusters' and 'educational hubs' that will facilitate higher

education institutions, research organizations and business working together, with an emphasis on regional collaborations (Ernst and Young, 2012).

Institutional diversity

The range and diversity of Indian institutions offering higher education plays a large part in the quality of undergraduate programmes and where postgraduate degrees are offered. There are around 700 degree-awarding institutions across India which are vastly outnumbered by the number of colleges (35,539 in 2011-12). In 2012-13, the distribution of degree-awarding institutions, [some of which also offer postgraduate degrees], was as follows:

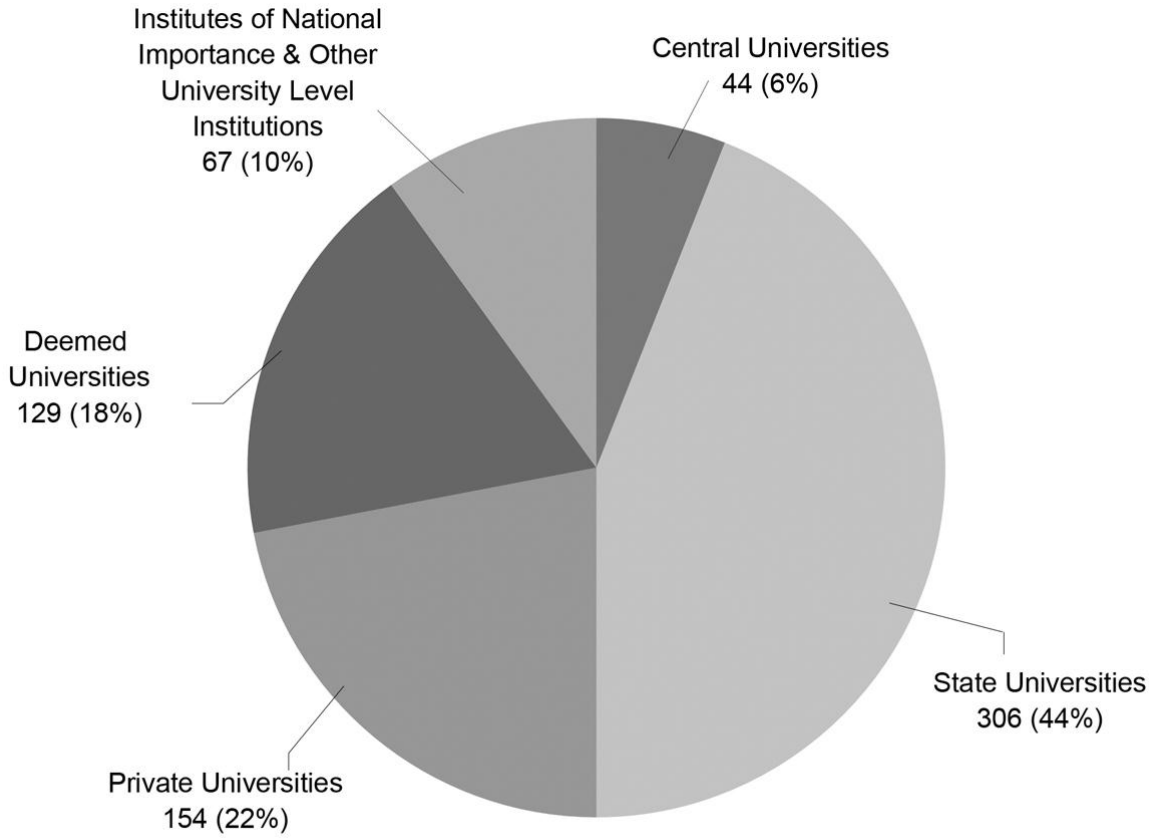


Figure 10: Type-wise Distribution of Degree awarding Universities/University Level Institutions in India: 2012-2013
(University Grants Commission of India, 2014a)

Figure 10 separates Institutes of National Importance and 'other' university level institutions from 'Central' universities, but institutions in both these groups are funded centrally by government, include the highly-regarded Institutes of Technology and are collectively considered the top institutions, even though there is no formal differentiation among the universities. State universities, which vary considerably in quality (a concern, given that most postgraduates are studying in these institutions) and are funded by the government of the state in which they are located, make up the largest overall percentage, with privately-funded universities (where 'student enrolment is overwhelmingly in the market-driven disciplines' (UGC, 2012)), growing in proportion annually, although they too vary in quality. While a few private universities are highly regarded, generally they do not have as good a reputation as the public universities; this is a concern, especially since one of our interviewees suggested that over 50% of higher education students in India are now studying in

private universities. Autonomous colleges may be minority institutions (e.g. for a particular religion or faith) and are not accredited to award their own degrees – they are affiliated to universities. Deemed universities on the other hand do award their own degrees and have some freedom in curriculum design. According to Agarwal (2009), the Indian higher education system is the third largest in the world yet out of over 20,000 institutions, only around 400 are degree-awarding. This is relevant to the variation in quality that characterises postgraduate degrees.

It is suggested that institutional structures in India 'have an imprint of the old British universities', but that newer institutions have 'adopted the organisational models' of US universities (Agarwal, 2009). Yet Agarwal also contends that 'While there appears to be a large institutional diversity, careful analysis shows that such diversity is in terms of origin of these institutions, but not in terms of offerings or differences in mission', and concludes that the Indian higher education system is structured to achieve uniformity and that it 'disregards' the country's social diversity and economic needs.

One of the problems identified for established universities is the burden of supervising the large numbers of affiliated colleges, which 'saps the energy and creativity of most universities' (Altbach, 2009). The UGC's intention is to lessen this burden. They also recognise that 'The toughest challenge of excellence lies in improving the quality … in a majority of non-elite universities…" (UGC, 2012), and it remains unclear whether it will be possible during the current planning period to address this task effectively, given some of the other challenges outlined elsewhere in this section.

Quality of postgraduate faculty

A qualifying examination administered by the UGC gives eligibility for a Junior Research Fellowship to prospective university teachers. The National Eligibility Test (NET) (the results of which are also used to select applicants for entry to PhD programmes) is operated by the UGC for a wide range of arts, humanities and social sciences subjects and includes many Asian and international languages and cultural studies. The test is also for social medicine (including community health), forensic science, computer science, electronic science and environmental sciences, but excludes biological and physical sciences and mathematics (UGC, 2014b). There is a separate, similar examination for science graduates organised by the Indian Council of Scientific and Industrial Research (CSIR). The NET is nationally accepted as a criterion for a first level faculty appointment, but may be replaced by a state test (SET) to accommodate regional subjects and languages other than English. Either a PhD or a pass in the NET, sometimes both, is required for any academic job in India.

Even though the NET has been in place for some years, many of the aspirations in the government's current strategic plan for higher education relate to improving the quality of teachers generally in higher education, including:

- reform of the Academic Staff College (ASC) System;
- additional requirements for continuing professional development; and
- lifting restrictions on the recruitment of faculty in areas where funding constraints have led to staff vacancies.

The plan does not overtly link these strategies to employing more faculty members with doctorates, or to increasing the capacity of institutions to offer more postgraduate, including research, programmes. It refers to 'quality faculty' without specifying any plans for growing critical mass of teachers with doctoral qualifications (UGC, 2012).

Doctoral candidates have student status in India, but may in parallel have a research fellowship, similar to UK practice. To address shortages in academic faculty, MPhil and PhD fellowship and scholarship schemes were provided for staff (Ernst and Young, 2012). These measures demonstrate recognition of the need to strengthen postgraduate provision in Indian universities, a strategy that continues in the current five-year plan.

University accreditation

The National Assessment and Accreditation Council (NAAC) is responsible for accrediting, at institution level, all higher education institutions in India. By March 2010, 62% of universities and 90% of colleges had been rated as average (B) or below average (C) against quality parameters laid down at national level. Overall, at national level, also by March 2010, only 159 (32%) of all Indian universities and 4,094 (13%) of colleges had received accreditation by the NAAC and therefore had met national requirements (Ernst and Young, 2012). In the current strategic plan for higher education, the UGC expresses some dissatisfaction with the current accreditation situation and, quoting practice in other countries, implies that a new National Accreditation Authority for 'specific disciplines' will in future be commissioned to carry out subject-specific accreditation to avoid the possibility that weaknesses at department level may be overlooked in an institution-level accreditation system and to identify the 50 top universities and the 50 top colleges suitable for special initiative funding.

We heard that in 2009 the UGC introduced new regulations for structured PhD programmes but that most institutions do not have the capacity to implement them and that, because there is no accreditation process for doctoral programmes in any subject across different institutions, high quality doctorates remain limited to elite institutions.

Even though there is currently no separate process in place to assess the quality of postgraduate education in India, the numbers of Indian graduates enrolled in postgraduate education in other countries, including the UK (7,420 (HEFCE, 2014)) and the United States (Allum, 2014), demonstrates international demand for these graduates at both masters and doctoral levels; specifically the next sub-section summarises current initiatives in the UK to attract Indian graduates to postgraduate programmes which suggest that Indian postgraduates are sought after in a variety of subjects (it has not been possible within the scope of this report to track the universities at which Indian entrants to UK postgraduate degrees completed their undergraduate degree).

Indian graduates studying abroad

Irrespective of the significant cost of studying overseas, international destinations are popular for Indian graduates seeking entry to postgraduate programmes. A contributory factor may be that other countries' postgraduate education is held in high regard, but Altbach suggests it is likely to be because the number of postgraduate places in elite universities is limited and that 'The growing middle class … can increasingly afford to send their children abroad. Growing numbers of … Indians will continue to go abroad for study' (Altbach, 2009). One particular advantage that Indian graduates have when applying for postgraduate study in other countries is that their facility in the English language is so good that it may exceed the capabilities of native English speakers, especially in grammar: 'I speak English better than the Americans. Actually most Indians do' (French, 2011, Pannikkar and Bhaskaran Nair, 2012). As identified by others, this is an advantage in the academic world: 'communication between [scholarly] networks is mostly done in English' (Nerad and Trzyna, 2008).

A recently published report on admissions and enrolments in US postgraduate programmes shows a 40% increase in enrolments from India in 2013 (CGS, 2014), whereas in England there was a 26% reduction in Indian postgraduate entrants in 2013 (HEFCE, 2014). It has been suggested to us that a combination of changes in UK Border Agency (UKBA) requirements and the cost of English higher education are contributing to the decline in Indian postgraduate entrants to English universities. Another consideration for Indian students investing in higher education abroad is post-degree job opportunities in their country of study; for example, if an Indian student were to take out a loan for a degree in the UK but cannot find a job there afterwards, s/he might find it difficult to repay the loan, a situation exacerbated by exchange rate differences between sterling and the rupee. By comparison, Germany and Australia are becoming the preferred choices for Indian students because of the employment possibilities after graduation, and we were told that in Australia, Indian postgraduates can work while studying.

One interviewee told us that a cohort of academically able Indian MSc students in a STEM subject who had been recruited by an agent on the university's behalf had assumed they would be able to work full-time to support themselves while undertaking their studies. When the university realised this group of students was having difficulty academically and that the underlying problem was the result of work commitments, they helped the students to improve their academic performance and to complete their studies. Our interviewee also suggested that, although the UKBA monitoring framework had placed a considerable resource burden on UK universities, it did have some positive outcomes in the form of alerting universities to potential problems such as this at an early stage.

The decline in applications from Indian graduates to UK postgraduate programmes, especially in engineering subjects, is thought to be predominantly affecting masters level study, with research degrees being less sensitive to the changes in immigration rules. Another potential contributory factor to the decline is that it is often a family decision to send a student to study overseas and the family home may well act as security against a loan to fund the student, which may in some cases constitute too high a risk.

Some countries with well-developed postgraduate education systems who are concerned about maintaining levels of international recruitment are working closely with India and organisations such as the British Council and others to establish higher education partnerships that will provide routes for continuing to recruit Indian students, either through bursaries to study overseas or by attempting to set up satellite campuses in India. The United States for example has a well-developed strategy around higher education partnerships in India (Institute of International Education, 2013).

Since 2006 the UK-India Education and Research Initiative (UKIERI), established to develop academic partnerships between India and the UK and funded by multiple government and HE sector organisations in both nations, has supported partnerships between higher education institutions in India and the UK. Initially a five-year initiative, in 2011 UKIERI was extended until 2016 and includes studentships, partnerships that offer 'professional and leadership development of schools, higher education institutions and vocational institutions'. It also supports inter-institution partnerships and has a remit to develop student mobility and facilitate skills development. In 2013-14, awards in the second strand of the initiative ('Innovation Partnerships' in STEM subjects), included 66 research partnerships currently being funded in a range of scientific, medical and technological fields, as well as a collaboration between DBIS and the other UK devolved administrations to establish partnerships between UK further education colleges and 25 Indian community colleges (UKIERI, 2013). Awards for the 'Skills Development' strand in 2013-14 have been made to colleges, universities and a few corporate partners (Heslop, 2014).

In parallel with this initiative, some UK institutions and the UK government have undertaken visits to India as part of a wider strategy to encourage collaboration between the two nations through a range of partnerships and exchanges (DBIS, 2013a; UUK, 2010). Most recently, a pilot scheme led by the UK Economic and Social Research Council (ESRC), UKIERI and the Indian Council of Social Science Research (ICSSR) has been launched to encourage PhD student mobility between ESRC's UK-based CDTs and centres of research excellence in India, with around 50 PhD researchers being involved in the initial phase. Topics include linguistics, health and wellbeing, history and culture (RCUK, 2014). One of our interviewees described India: UK higher education partnerships as being the 'best bet' for productive interaction, but also referred to some already successful partnerships between India and the US.

Perceptions that UKBA changes were discouraging international applicants are addressed in the UUK report, which emphasises that PhD graduates can stay in the UK for up to a year after completing their degree. Some UK universities are introducing or expanding postgraduate scholarship schemes specifically for Indian students which may be designed to address the decline in applications from Indian postgraduates, while attracting high quality international students who help to enrich the intellectual environment of the university. Among the institutions offering such scholarships are:

Edinburgh University
Twelve £3,000 'Principal's' scholarships for Indian entrants who have already been offered and have accepted a full-time place on a masters programme for 2014-15, based on academic merit. Applicants should have or expect 'the overseas equivalent of a UK first class honours degree'.

Imperial College, London
One full PhD studentship and two funded masters studentships for 2014, offered to 'academically outstanding' Indian students in a range of life and physical sciences and engineering subjects and related to the Imperial College India Foundation. Applicants must already have applied for an MSc or PhD and as well as displaying 'intellectual ability and leadership potential' must 'be committed to engaging with society and using their abilities to contribute to India on their return' (one of the eligibility criteria is an intention to return to India within three years of completion). The College specifies that applicants should have obtained at least 6.5 in IELTS. Each of the three scholarships covers: full tuition fees, maintenance allowance, some extra costs and a return airfare to India.
The Imperial College website notes that the first Indian student to be awarded an Imperial College India Foundation PhD scholarship, from Kanpur University (one of the elite institutions), is taking up his scholarship in mechanical engineering in 2014. Demonstrating the recognised value of India-UK higher education partnerships, the President and Rector (vice-chancellor) of Imperial College, Sir Keith O'Nions, visited India in January 2014 to meet alumni and representatives from universities, government and industry.

Newcastle University
Eight £3,000 scholarships for Indian entrants to taught postgraduate programmes in 2014, to be used towards the first year of tuition fees. Applicants must already have secured an offer place on a Newcastle University programme and have achieved, or be expected to achieve, an average of 65% or above in their undergraduate programme.

Sheffield University
Five scholarships (four undergraduate, in Business Management, Economics, Law and Mechanical Engineering and one MBA scholarship) as part of the British Council sponsored GREAT Britain scholarships programme for Indian students in 2014. The university is also offering a range of postgraduate scholarships (from £1,000 to £2,000) for taught masters programmes, based either on named degrees offered jointly with other universities or on the level of tuition fees being paid, plus

10 ‘merit’ postgraduate scholarships based on ‘academic merit’ for Indian students who have already been offered a place to start a taught masters degree in 2014. In addition, linked with centres for doctoral training, 10 Vice Chancellor’s Indian Scholarships are available for research degree candidates. They will cover the full cost of overseas tuition fees and a generous annual stipend for three to four years’ study.

As part of a recent article summarising an interview with the Vice-Chancellor of Cambridge University the Guardian suggests an ‘emerging perception, particularly in India, that Britain [is] not welcoming’, demonstrated by a fall of 38% in entrants from India to UK universities between 2011 and 2012 (Ward, 2014). In the article, the thrust of which highlights the value of bilingualism and language learning for all, not just an elite group, Professor Borysiewicz, who was a member of a UUK-sponsored higher education delegation to India led by Sir Steve Smith in 2010, criticises the current government’s stance on immigration and ‘crude’ numerical limits on migrants, arguing that ‘Britain’s plural society [is] one of its greatest strengths’ (Borysiewicz, 2014).

Postgraduate recruitment, training and funding

Entry qualifications and practices and postgraduate funding
In both universities’ and postgraduate colleges’ admissions processes vary in that some take into account performance at bachelors level, others conduct an admissions test, and some use both. In general, recruitment to postgraduate programmes in Indian universities is a systems-driven process and the UGC has rules and regulations for postgraduate training, whether in STEM, arts, commerce or allied subjects. To be eligible for postgraduate study, entrants must either hold an honours (four-year) degree (engineering, architecture and pharmacy) or have achieved an average mark of 60% in a three-year undergraduate programme. We heard that the length of undergraduate degrees is a contested issue in India at present (see below)

The NET, while originally intended to enable graduates to qualify to work as faculty in higher education institutions, also acts as one of several criteria used to select PhD candidates. As well as being required to have gained qualifications at bachelors and masters levels, and possibly also passed the NET, PhD applicants may be asked to take a test set by the university they are applying to. ‘Good’ institutions conduct an admissions test as well as taking account of prior academic background, and may also invite potential PhD candidates for an interview to assess their research interest before the decision about whether to accept them is made. Possibly because of the variability of programmes across Indian higher education institutions, more weight is given to the applicant’s performance in the relevant entrance test than to previous academic qualifications. We heard from one of our interviewees that only around 5-10% of bachelors graduates enter postgraduate study.

At undergraduate level, some of the ‘elite’ institutions operate national entrance examinations for applicants. Examples of these are the Joint Entrance Examination (JEE) used by the Institutes of Technology and the Common Admissions Tests (CAT) which are the graduate examinations for entry to the Institutes of Management. Results of these tests may also be taken into account at postgraduate level.

With the exception of a few elite central universities, including some select institutions which offer research masters degrees, the normal route to postgraduate education is to move without a break from a bachelors degree (three years) to a masters (two years), then to a PhD (three to four years). The UGC’s latest five-year plan announces the intention to introduce ‘integrated’ undergraduate/postgraduate (UG/PG programmes), potentially similar to the four-year UK integrated masters degrees in STEM subjects. Five-year programmes already exist in some elite

engineering institutions, where they are known as 'dual' degrees (Frisancho Robles and Krishna, 2012). For example, the Indian Institutes of Technology offer bachelors degrees in engineering or BTech degrees which last for four years, with an MSc or MTech awarded after five years. We heard that in India, academic opinion is divided between those favouring the '3+2' and the '4+1' route to a masters degree.

In 2013 the University of Delhi, a centrally-funded university, trialled admission to four-year undergraduate honours degrees in all subjects (distinct from the three-year bachelors degree which is the norm), designed to conform to 'international norms' and potentially to improve graduates' chances of entering research degree programmes. However, we understand that this initiative has recently been withdrawn, at least partly because of the preferences of the incoming government. Postgraduate colleges and state universities offer structured masters programmes that do not include a research project or dissertation. One of our contributors emphasised the greater importance and significance of masters degrees in India as a distinguishing and differentiating qualification, compared for example with the UK and the US, where the doctoral degree now fulfils this purpose.

We heard from our interviewees that 100% of doctoral candidates possess masters degrees. The point at which most postgraduates enter their programme varies depending on the subject and whether it is a masters or doctoral degree but on the whole there is a similar age pattern among masters and doctoral students, with PhD entrants becoming younger: current regulations, e.g. the NET, mean that qualifying for a postgraduate degree can be more difficult for older people.

At one of our interviewees' universities, between 80% and 90% of postgraduates study full-time, with 10% to 20% part-time. In arts and humanities subjects, the ratio is nearer to 50:50. There is probably a similar profile in other large, metropolitan universities.

Postgraduate training

As in other countries, postgraduate training is subject specific, in different sub-areas, either 'classical' (single-subject), or inter-disciplinary. Students can move from a single to a multiple discipline programme if they have enough broad understanding and background.

Some universities offer structured taught masters programmes and most of the 'central' universities have both MPhil and PhD programmes. Generally, universities have graduate schools which may include affiliated colleges associated with the university. Doctorates are offered at nationally accredited institutions, within a framework of national and local policy for doctoral training.

The first year of the PhD normally contains structured research training relevant to the subject area as well as courses in ethics and social issues. PhD candidates have to pass coursework exams before being permitted to submit their thesis, and must also have presented their work successfully at a public seminar and had the thesis outline approved by a selected PhD committee. Another feature of PhD eligibility is that candidates must have published a paper in a peer-reviewed journal (in some cases specified as an international journal), before submitting their thesis.

One of our interviewees emphasised the importance attributed by Indian universities to high quality training at doctoral level. This contributor also underlined the importance for successful research training of creating and sustaining strong collaborations with national and international institutions. One feature of the Indian research degree supervisory system is that there is no 'territorial' jurisdiction. Universities may appoint joint supervisors from other states or countries to ensure the student benefits from the most appropriate guidance available, whether in a single or inter-disciplinary subject area, although the resources needed to put such arrangements in place are only

available in central universities or some of the other elite institutions. These supervisors would not of course be the candidate's main supervisor, who is based at the home university.

Postgraduate funding arrangements

Tax-deductable, educational loans are available through 26 selected Indian banks, regulated by the Indian government with regard to the amount of interest that can be charged in repayment, which is graduated depending on the size of the loan. The loans are available to students on graduate and postgraduate programmes. They are repaid over five to seven years, with a 'grace' period of one year after completion of study

Postgraduate student scholarships are provided mainly at state level, with approximately 5% contributed by central government until very recently, and another 5% from private sources. Levels of funding for doctoral research provided by the Indian government have risen considerably in the recent past partly as a result of recognising the impact of doctoral graduates on society and the economy, and therefore are now rising above the 5% level.

Comprehensive details about the loans, including the list of approved banks, are available from the UGC website: http://www.ugc.ac.in/page/Educational-Loan.aspx The following text is extracted to provide a flavour of the rationale and purpose of the loans:

> 'Government of India in consultation with Reserve Bank of India (RBI) and Indian Banker's Association (IBA) has framed a Comprehensive Educational Loan Scheme to ensure that no deserving student in the Country is deprived of higher education for want of finances. The new scheme covers all type of courses including professional courses in schools and colleges in India and abroad.'
>
> 'Equitable Access to quality higher education has been a concern of the University Grants Commission. To this purpose the Commission, besides encouraging colleges and universities to provide for liberal financial support to the meritorious but needy students, has also been instrumental in educational loan scheme. The Reserve Bank of India (RBI) has issued guidelines in this regard to all commercial banks. A large number of banks have already launched educational loan schemes.'

One of our interviewees commented on the variation in the quality of masters and PhDs with respect to both programmes and outcomes. Given the diversity of institutions, funding and the uneven distribution of universities geographically, it is inevitable that postgraduate education lacks the consistency found in some other countries. Another contributor referred to the 'dire state of provincial universities' as a 'huge human tragedy and waste of talent'. This is juxtaposed with the high quality found in the 'top' institutions summarised earlier.

Access

We were told that postgraduate education is denied to many able students in India because of poverty; another interviewee suggested that 'Very important talent is coming out of universities that are not widely recognised'. These perspectives may indicate two different factors: i) that some able graduates cannot afford postgraduate education; and ii) that it may be difficult for graduates from institutions without a high reputation nationally to be accepted for postgraduate study in other institutions. Those who can and do undertake postgraduate study often have financial support from their families, but for some students 'debt is a problem'.

Agarwal (2009) devotes a whole chapter of his book to Access and Equity. As in other areas of higher education in India, this is a complex topic. According to Agarwal, equity ('the quality of being fair and impartial') in higher education is 'the ability of the brightest students to study in the best universities, regardless of their socio-economic backgrounds'. He contends that geographical location and family background both affect access to higher education, citing the differences in availability of higher education between rural and urban societies and the government's focus on inclusivity in recent strategic plans for higher education.

One of the government's major objectives for higher education, is to increase access to higher education overall, and a chapter of the current plan is dedicated to this topic. General strategies to widen access to higher education include: upgrading autonomous colleges to 'deemed universities' and awarding colleges that have been given an 'A' grade after NAAC accreditation for two consecutive periods the status of unitary universities; increasing the number of government-funded institutions, including affiliated colleges; and increasing the capacity of a range of higher education institutions through improved funding for staff, etc. One of the purposes of these strategies is to redress regional imbalances in enrolment in higher education: density in the north east of the country is much higher than in other states (Ernst and Young, 2012).

Affirmative action

Positive discrimination, as well as fair access, is a feature of Indian higher education. The Affirmative Action scheme, or 'reservation' policy, is based on a quota system that makes available to disadvantaged groups, in particular the Scheduled Castes and Tribes, entry to public jobs and higher education (The Economist, 2013). According to Tilak (2013a, 2013b), Affirmative Action has expanded in recent years. One example of an initiative broadly linked to this policy is a project to recruit lower caste Indian students into an elite engineering institution to study bachelors and five-year dual degrees (Frisancho Robles and Krishna, 2012). The authors of this study conclude that although 'minority admission preferences seem to be doing a reasonable job targeting poorer populations … there seems to be little evidence of catch up'. They also found evidence that minority students in 'more selective course units' (i.e. the more difficult courses) appeared to fall behind.

The caste system, while declining in influence because of modern developments, remains important in higher education in many ways (Béteille, 2007) and lower caste as well as disabled university applicants may be offered slightly lower entry grades to reflect their potential educational disadvantage. For example, a Brahmin would be required to obtain a higher score than applicants from disadvantaged communities, the variation in some cases being more than 25% (French, 2011). An example of this can be found in the NET scheme, where non-disadvantaged candidates are required to have obtained 'at least 55% marks (without rounding off) in Masters Degree OR equivalent examination from universities/institutions recognised by UGC…' but Scheduled Caste (SC), Scheduled Tribe (ST) or 'persons with disability' may apply with 50% (UGC, 2014b).

In state and central public institutions, admissions rules set by the UGC require a certain percentage of places to be reserved for Scheduled Castes, Scheduled Tribes and Other Backward Castes below the 'creamy layer'[20].

[20] The 'creamy layer' consists of individuals who have benefitted for several generations consecutively from positive discrimination policies and are considered to be at a 'middle level' of income. Some are of the opinion that such individuals should no longer be eligible for special funding as earlier opportunities should have enabled their families to change their status and strengthen their financial position. So-called 'creamy layer' individuals are often found in professional and civil service employment.

Rizvi and Gorur acknowledge that government policies relating to affirmative action have 'addressed gender inequality, regional imbalances and other patterns of disparity', also that 'Many barriers to access have been removed through scholarship schemes, relaxation of academic standards' and quotas ('reservation'). But they question the extent to which, on its own, increasing access can 'promote educational opportunity and social equity'. They conclude that while affirmative action may promote equity, it is costly and results in loss of efficiency and, arguably, also loss of excellence (Rizvi and Gorur, 2011). These concerns were also raised by Béteille in 2007, who prefers a system whereby universities have the flexibility to address the needs of socially disadvantaged groups by encouraging diversity through preferring candidates from disadvantaged communities who have either equivalent or almost equivalent academic ability to other candidates. He argues that numerical quotas are effective for increasing social inclusion but do not support academic discrimination (Béteille, 2007).

Access

Specific schemes at national, state and university level target groups who otherwise have little opportunity to take advantage of higher education, with several initiatives for addressing inequities in access to postgraduate education for minority groups. All Scheduled Castes, Scheduled Tribes and Other Backward Castes students are entitled to fee waivers and scholarships, yet we heard that most poor students of higher castes still may not have any financial support.

The increase in private higher education institutions in India as part of opening up the economy was expected to play a part in fair access strategies, but it is suggested that scepticism is needed in considering private institutions' claims to be contributing to diversity. The argument used by some is that because there are too few universities to cater for the demand for higher education, it is necessary to allow significant numbers of private providers to establish campuses (Tilak, 2013b). But with respect to fair access, it is claimed that so-called 'non-discriminatory' admissions processes in private institutions are exacerbating, not alleviating, the continuing low numbers of students from under-represented groups and leading to preferential treatment being given to those with the ability to pay (Nayak, 2014). Also, according to Nayak, the contention that student loans make private education more accessible does not, as is claimed, create 'a level playing field', with education becoming easily accessible to all, but discourages able students from poor backgrounds from accessing private universities. Instead, the system attracts middle to upper middle class entrants. Nayak describes this loan system as a 'filter' that, because it allows only certain types of student to attend private institutions, leads to 'the subversion of democratic goals' (Nayak, 2014). Added to this, it is claimed that, contrary to expectations, there is no evidence that the private sector is better placed to respond to changing labour market needs, or able to address skills shortages. Rather, private institutions are known for offering low quality programmes and failing to invest in infrastructure and facilities, even though they do provide access to students who cannot gain entry to professional programmes in the public institutions (Rizvi and Gorur, 2011).

Fees for postgraduate programmes are very low in public institutions in India. One of our interviewees described them as 'as good as free' and added that universities are reluctant to raise them in case of incurring student protests. Our contributors claimed that achieving fair access is a government priority. Individual universities, especially the larger, city-based institutions, are committed to fair access – one of our interviewees described this as one of the most important policies in their university – and take steps to keep fees low, so are dependent on high levels of subsidy from both states and the Indian government. Some universities are diversifying funding to meet different needs, for example, offering pre-studentships and half-fee studentships on the basis of a variety of needs criteria, as well as scholarships, based on merit and means testing.

Internships are a feature of postgraduate education in India in some subjects in some of the bigger universities which, we heard, recruit masters and PhD interns from many countries, especially from South Asia, who take up placements for around two months at a time. The internships are organised through inter-university collaborations (teaching and research), based on complementarity between a student's interests and the academic environment at the host university, where potential interns are interviewed by faculty before taking up their placement. This enables the Indian universities participating in internships to benefit from diverse postgraduate talent for short periods. We also heard about a scheme whereby Indian students are sponsored by private trusts to undertake short-term study abroad, for a few months. In one such example, the scheme has been running for five or six years and after a slow start, supports around 20 students per year. In the view of one of our contributors, this is an effective scheme that illustrates the divide between Indian students who have the confidence to study abroad and those who are 'so demoralised they have written themselves off' – one of the consequences of the general weakness of Indian PhDs. This interviewee suggested that greater international exposure beginning at masters level would strengthen doctoral degrees generally.

As in most countries, the time in their lives at which Indian graduates enter postgraduate study depends to a great extent on their subject and life situation. We heard that masters and doctoral students have similar age profiles in general and that PhD entrants are, on the whole, becoming younger, partly because older students find it difficult to qualify under current entry requirements, e.g. passing the NET. Another of our interviewees suggested it is rare for graduates to return to postgraduate study after an interval away from higher education; this is unsurprising given economic constraints and the difficulties in accessing relevant programmes in some regions.

Discussing the loss of confidence of and shortage of funds for Indian universities, Béteille (2007), suggests institutions are being attacked, both for 'allowing academic standards to decline' and for failing to be socially responsible by not sufficiently promoting equity and social justice. He argues that the challenge they face is to apply 'strict standards of academic discrimination … without consideration of caste, creed and gender'. This is an admirable objective but difficult for universities to achieve in the complex higher education system that exists in India, especially given that many potential students with the ability to succeed at postgraduate level and in employment may originate from a region where they cannot access even elementary education (Patnaik, 2007). More positively, the bias that previously existed against women as students and academics in Indian universities has largely been overcome. However, Béteille demonstrates that women from the middle classes in cities are most likely to succeed in higher education and that in rural areas there is much pressure on girls to marry early; also good schools are rare outside cities and rural families are more likely to use their limited resources to educate boys rather than girls.

Employment outcomes

Comparing higher education systems in India and China – countries described as 'awakening giants' – in the light of the more sophisticated economies that are emerging, Altbach (2009) suggests that in India problems of quality and preparation of graduates for employment may remain, with significant reform overall unlikely in the short to medium term. Altbach also predicts that the current stratification demonstrated by a small number of research intensive universities at the top and a larger number of relatively unselective universities and colleges at the bottom, will intensify.

As well as affecting a graduate's chance of entering postgraduate education, a degree from a 'good central university' strongly affects their chance of entering employment. Importantly, in order to obtain an academic position in an Indian university, prospective lecturers must have passed the NET (used to select entrants to postgraduate programmes), and/or possess a PhD. For many graduates,

for example in rural areas of northern India, a degree may be meaningless in the context of employment. Jeffery (2014) describes meeting graduates in Uttar Pradesh who in 2004 started a club named 'Generation Nowhere' 'to discuss the hopelessness of their position as educated young men from provincial backgrounds. They had little hope of getting government jobs and their degrees were worth little in the nearby metropolis of Delhi'. Graduates in this situation often refer to what they are doing as 'timepass', or passing the time. Jeffery suggests that in just one Indian city there are tens of thousands of such people and that 'India is now the country of the MA manual labourer'. Yet, as described below, these graduates may also fulfil important roles in their communities, and may in parallel be preparing to enter the civil service or other government employment. They also take advantage of institutional housing, libraries and engage in scholarship, sometimes studying for masters degrees or PhDs while not formally enrolled in higher education.

More than one of our interviewees emphasised the wider purposes of higher, and particularly postgraduate, education. They emphasised that postgraduates generally are sought after by employers and preferred to first degree graduates because of their higher level skills, and that on average postgraduates earn more during their careers than first degree graduates, although they also referred to examples where the reverse may be true because of the subject area. One of our interviewees suggested that masters programmes from a large number of institutions 'serve no purpose'.

Our interviewees underlined the value of vocational qualifications, particularly at masters level, designed to enable direct entry to professions. We heard that technical skills are becoming more important in the job market and that for many jobs employers are looking much more carefully at the nature of technical skills acquired during a masters degree, rather than 'soft' skills. This is recognised in the increasing emphasis on the value of professional masters degrees, evidenced in some of the postgraduate scholarships available. For students and parents alike, priority career preferences remain in engineering, medicine and other professions and only if applicants fail to gain admission in these areas do they turn to pure sciences, humanities or social sciences. This situation has contributed to the decline in study of pure sciences in India and to address this Institutes of Science Education and Research (ISER) have been established at Pune, Bhuneshwar, Kilkata and Mohali offering five-year integrated masters degrees.

In India, as in the UK and elsewhere, many STEM PhD graduates either enter academic careers or undertake research and development in industry or other settings. By contrast, PhD graduates in non-STEM subjects often work as teachers in schools or colleges, as well as entering prized employment in the national or regional civil service, the latter described as 'the holy grail' by one of our interviewees.

Employment for some postgraduates is difficult to secure. One of our interviewees spoke about the 'under-employed' graduates who return to their rural homes after graduation and for example may undertake voluntary work in the community and/or be eligible for a grant under the National Rural Employment Guarantee scheme (also available to non-graduates, including the unskilled), established through an act of parliament in September 2005 (Sjoblom and Farrington, 2008). These postgraduates are contributing to the fast pace of social change in India, acting as mentors and intermediaries in rural environments and giving advice on a wide range of topics, including marriage and relationship advice. As educated people, they are becoming important as role models and guides for school students, providing advice and motivation. This situation reflects the long-standing Indian tradition of valuing knowledge – the 'guru under the tree' as one of our interviewees put it – and the deep respect shown for education and knowledge for knowledge's sake. This is considered by several of our sources to be one of India's great strengths. The point was made by one interviewee that sometimes knowledge which may appear irrelevant in the short term is often

valuable longer term, especially in providing benefits to society and that it is important not just for employment but for 'making good citizens'. For instance, postgraduates providing general advice and becoming respected for their knowledge in rural societies are developing social skills, becoming politically informed and providing valuable services for their communities.

One interviewee alluded to the 'subordination of skills and knowledge' in favour of the subject of some degrees because they are considered important in the marriage market, and the status of these degrees as a primary driver for women's education in rural northern India.
Some contributors expressed concern about the pressure on universities to link knowledge acquisition directly to employment in all subjects, because of the potential for this objective to compromise the quality of postgraduate education by creating a misunderstanding about what university education is for. This perspective is also explored by Agarwal (2009), who, in discussing 'human capital as an agent of growth', criticises 'the serious limitations' of the 'limited view of higher education that human capital theory advocates' and supports the UNESCO classifications of the four pillars of knowledge: learning to know, learning to do, learning to live together and learning to be (UNESCO, 1996, in Agarwal, 2009). One interviewee passionately defended the purpose of a university not simply to 'educate for employment' but to ensure that students acquire 'the best knowledge in that subject' citing the primary role of a university as being 'to advance learning'. The same interviewee emphasised the value of postgraduate education to the individual, referring to the commitment and strength of character needed to complete the degree successfully, qualities that are also valued by employers.

Summary

Our research indicates a complex and burgeoning higher education system in India, yet with much scope for improvement, including strengthening and expanding the postgraduate sector. From the circumstances outlined above we can see overall that there is range of quality of postgraduate outcomes in India and that it is a country that produces large numbers of talented graduates, some of whom migrate overseas to postgraduate study or employment, with only a small proportion undertaking doctoral study in India. The many challenges faced by Indian higher education mean that a significant amount of intellectual talent is currently not exploited, to the detriment of the individual, society and the country (Tilak, 2013b).

Indian higher and postgraduate education can be characterised using certain descriptors.

It is *particular*: Indian postgraduate programmes are offered in a unique, often challenging and diverse context unlike any other. India is vast geographically and, as anyone who has visited India appreciates, it is a country of contrasts, yet ancient traditions and modern developments combine to form multicultural communities that co-exist and thrive. This is the environment in which postgraduate education takes place.

India is *polarised*: the developing economy offers opportunities for many but there remains a gulf between the haves and the have nots, particularly regarding access to higher education and postgraduate study. This polarisation extends to the quality of higher education and institutions, which ranges from very high to poor. One of our interviewees claimed that in the best Indian universities, undergraduate education is as good as any in the world; however, the challenge is to extend that excellence further into a larger number of institutions.

It has *potential*: India has enormous potential as a country, and individuals who have the chance to succeed have many options for fulfilling their personal potential. However, equal opportunities are not available to all. The challenge is to optimise capacity at national and individual level, given the

vastness of the country and the variable infrastructure, without compromising the essence and identity of India as a whole.

Poverty continues to hold back progress, especially fair access and particularly with respect to accessing higher and postgraduate education. In some areas lack of material wealth affects gender equality at an early age, such as families in poor households preferring boys over girls for educational opportunities.

In 2009, Agarwal suggested that 'The status of doctoral education in India is disturbing. Its numbers are not increasing to meet the growing demand from the public sector research labs and higher education institutions'. Even while acknowledging that a small number of universities do produce a reasonable number of doctoral graduates, Agarwal refers to a 'suspicion about the quality of doctoral education' and the 'serious and growing concern about the quality of PhDs in the country'. Five years on from these comments, we did not detect a significant change in this situation, nor has there been an increase in the very small number of Indian universities that can compete favourably with those considered to be the highest ranking universities worldwide. However, it is possible that the renewed emphasis on vocational masters degrees and more widely, the aspirations in the UGC's 12th five-year plan, currently in the process of implementation and supported by significant financial commitment, will have an impact on the bigger picture of postgraduate education in India.

However, until some of the socio-economic factors mentioned above have been addressed, even partially, it is difficult to imagine how, for example, an increase in the PhDs offered in Indian universities can be achieved, especially given the uneven quality that exists across the different higher education sectors. However, the growth in masters programmes, particularly in preparation for entering the professions, gives rise to optimism that there is increasing recognition among individuals and employers of the value of higher education qualifications and that a growing proportion of the population will benefit from postgraduate education. One of our contributors summarized the postgraduate context in India as follows: 'The quality of masters and doctoral programmes must be improved to sustain the supply of good faculty and save higher education in India. [This] will have spiral positive effects. At present this effect is in reverse order'.

Annex D - Norway

Norway

Context

Norway is a small country with a population of about five million and around 50 institutions of higher education. It is the least densely populated country in Europe, with three quarters of the population living within 10 miles of its very long coastline. The long coast line and the mountainous terrain result in a decentralised population of small isolated communities, many of them rural or coastal, with a strong commitment to local and regional governance and provision.

Similar to the other Nordic countries, Norway has a strong social-democratic tradition with a well-developed welfare state, with a commitment to access to universal welfare rights by all citizens regardless of background and status. According to Aamodt and Kyvik (2005) 'in all four (Nordic) countries, a guiding policy principle has been to give access to those who are qualified for entry into higher education' (p. 125). The five Nordic countries 'build on a strong relationship between higher education and the state (where) universities and colleges are essentially state-owned and funded' (Vabø and Aamodt, 2009, p. 58). Thus, in Norway the vast majority of higher education is state-funded and organised and consists of eight universities, nine specialised university institutions (six state and three private) and 28 university colleges. Until the early years of the 21st century Norway had four universities (University of Oslo founded in 1811, Bergen in 1948, Trondheim in 1968, Tromsø in 1972). These are often referred to as the 'old universities' and were established before 2002; four 'new universities' were established after 2002 when any higher education institution offering at least five masters programmes and four doctoral programmes was able to apply for university status[21], resulting in eight universities. The specialised university institutions have a specific discipline focus (e.g. sports sciences, music, veterinary science, economics) and are frequently vocational/professional.

As part of the expansion of tertiary education in the 1970s, regional or district colleges characterized by more vocationally oriented studies were established to meet local needs and as regional provision, initially in fields such as education (for teachers), social work, nursing and management training. This led to a binary system with four universities and a large number of small district colleges; in 1994 the 98 district colleges were merged into 26 (later 28) university colleges when the latter were upgraded to higher education institutions to form the regional college sector (and see Kyvik 2002). They have recently begun to offer masters degrees, and a small number now offer PhDs. In addition there is a small, but growing, number of small private institutions of higher education.

The development of higher education in Norway, and the large number of relatively small university colleges intended to meet local needs, reflects the country's widely dispersed population and a commitment to regional provision. In general Norway's educational governance, particularly at compulsory school level, is highly decentralised through its 428 municipalities and 19 counties, and

[21] The Mjøs Commission of 2000 recommended that in order to be designated as a university, a higher education institution should have:

- lower and higher degree courses and research of a high academic standard;
- stable research activities and research in a number of fields;
- sound organization and infrastructure for teaching and research;
- national and international networks and contacts;
- an academic organization and staff to offer research training and doctorates in some fields;
- an academic culture with capacity for independent and critical reflection;
- a capacity for dissemination of knowledge.

this commitment is reflected in the regional expansion of higher education through university colleges.

All education (including higher education) is free, and is the responsibility of the Norwegian Ministry of Education and Research. Higher education is regulated under the Act Relating to Universities and University colleges (*Universitets og høyskole loven, Lov* 2005-04-01 nr 15) of 2005.

The country has a well-resourced education system, and allocates substantial resources to education at all phases. According to OECD (2013) Norway devotes an annual expenditure of USD 14,081 per student from primary to tertiary education, the third largest within the OECD (OECD average of USD 9,300); this represents 9% of its GDP to education at all levels, and is one of the highest percentages across OECD countries. At tertiary level, 96% of total spending comes from public sources, which is much higher than elsewhere (OECD average is 68%). It therefore came as a major shock when the PISA results of the 2000 and 2003 evaluations placed Norway below OECD average and below other Nordic countries. In Norway, as in Germany, this was widely described as the 'PISA shock' and led to substantial efforts by the Ministry of Education and the Norwegian Research Council to find ways to improve the quality of education through school and tertiary education.

Quality Reform and the Bologna Process

As part of a drive to improve quality in higher education, Norway implemented a major reform process, the 'Higher Education Quality Reform' at the start of the 2003 academic year. This followed the report of a National Commission (the Mjøs Commission, see above) on higher education which reported in 2000, and led to the White Paper on higher education which was submitted to the Norwegian Parliament in March 2001 (Nyborg, 2002), and culminated in the Quality Reform of 2002. The date of the Mjøs Commission report of 2000 coincided with the decision to end Norway's previous binary system of universities and colleges, with an awareness of 'the need for a plurality of institutions and the importance of focusing on quality in higher education and research' (Nyborg, 2002, p.2). It also coincided with the period of the Bologna Declaration, and Norway took the opportunity presented by Bologna to replace its old structure of higher education with a degree system more suited to dealing with the needs of a mass system of higher education. The Higher Education Quality Reform was a comprehensive large-scale reform effort with the overarching goals to improve the quality of education and research, to strengthen the process of internationalisation, and to implement the Bologna Process requirements. Specifically, according to Vabø and Aamodt, 'the reform represented an attempt to achieve a higher degree of efficiency through the devolution of authority to the higher education institutions, the provision of stronger leadership, increased emphasis on internationalization, the formation of a central organisation for quality assurance and accreditation as well as the development of criteria for institutional audit, new pedagogical designs along with a new funding model … supposed to provide stronger incentives for institutions to make improvements' (p. 62).

Norway was one of the earliest countries to implement the Bologna reforms introducing a new degree structure, grading system and quality assurance system in line with the Bologna Process. This resulted in a predominantly 3+2+3 year (bachelors, masters, doctorate) structure for most subjects. However, it retains as exceptions its former structure of integrated one-tier degrees of five years for the professional programmes of architecture, dentistry and law, and one-tier six year degrees for professional programmes such as medicine (cand.med.), veterinarians (cand.med.vet.), professional psychology (cand.psychol.) and theologians (cand.theol.), and four year bachelors degrees in performing arts and teacher education. The traditional academic degrees of cadidatus medicinae (and similar Latin titles, which are abbreviated to cand.med., cand.psychol. etc.) are the academic

degrees awarded after a six year professional medical (psychology) education in the Nordic countries.

The Norwegian Ministry of Education and Research

The Norwegian Ministry of Education and Research has overall responsibility for all phases of education (and kindergarten) and research in Norway. Its departments include:

- early childhood and care;
- education and training;
- higher education;
- policy analysis, lifelong learning and international affairs.

According to its website, 'the Ministry seeks to ensure that *everyone has the opportunity* to participate and influence development in the knowledge society. An important condition for achieving this goal is the existence of a knowledge sector that is able to develop, communicate and exploit new knowledge' (Norwegian Ministry of Education and Research, 2014)(authors' italics).

In 2010, as part of its drive to improve quality, the Ministry established a programme of 'Centres of Excellence in Higher Education' (*Sentre for Fremragende Utdanning* or SFU) to be awarded through a process of competitive bidding. These centres were intended to stimulate the development of teaching and learning methods at bachelors and masters level and to highlight the fact that education and research are equally important activities for higher education institutions. Through this initiative substantial top-funding is awarded to successful institutions for a period of five years in order to:

- stimulate universities and colleges to establish and develop academic communities that provide excellent education;
- contribute towards knowledge-based analysis and development of teaching and learning work as a tool for quality improvement and innovation in higher education institutions;
- contribute towards good relations between the educational and other relevant societal and professional fields;
- contribute towards the development and dissemination of knowledge.

The SFU programme is managed by the Norwegian Agency for Quality Assurance in Education and Training (*Nasjonalt organ for kvalitet I utdanninga* or NOKUT), which is an autonomous governmental agency which provides external supervision and control of quality of higher education, accredits new study programmes, and provides a cyclic evaluation of the institutions' QA systems.

As part of the Division for Society and Health of the Research Council of Norway, the Norwegian Knowledge Centre for Education has been charged by the Ministry of Education and Research with providing an easily accessible knowledge database to present and disseminate results of Norwegian and international research. This centre works in collaboration with NOKUT, and with universities, university colleges and other agencies, with the goal of co-ordinating and disseminating educational research.

Quality

Government goals to improve quality

Early in 2014 the new government presented its goals for the improvement of quality in higher education and research over the next four year period through seven measures:

- an expert group to examine the funding of universities and university colleges;
- a White Paper on the structures of higher education to be presented in spring 2015;
- presentation of a long-term plan for higher education and research;
- identification and investment in relevant research environments and institutions that can contribute to breakthrough research in the world;
- ensure success in EU programme Horizon 2020;
- examine recruitment, employment and career structure to ensure optimum working conditions;
- ensure high quality teacher education 'good teachers are the foundation of the knowledge society'.

(Press Release 14.01.2014 Ministry of Education and Research)

The announcement was accompanied by a commitment to additional spending on higher education, through an increase in basic funding for institutions, and allocations to improve infrastructure in institutions of engineering and STEM subjects.

What is clear is the commitment of the Norwegian government to improving the quality of higher education, to significant investment in higher education, and to ensuring that Norway plays a leading role in research. It should be noted that the Ministry of Education and Research has responsibility for all education, from kindergarten through compulsory schooling, to tertiary and higher education. It also has overall responsibility for education and research, and makes explicit the strong link between these.

Quality assurance

NOKUT was established by the Norwegian Parliament in 2002 and took on responsibility for QA of education at all universities and higher education institutions in Norway in 2003 as part of the Quality Reform legislation. The 2005 Act states that:

> 'NOKUT shall be a professionally autonomous state body which, by means of accreditation and evaluation, shall monitor the quality of Norwegian institutions that provide higher education and recognize qualifications awarded by institutions not subject to this Act. Accreditation and evaluation activities shall be designed in such a way that the institutions can benefit from them in the course of their quality assurance and development work.'

NOKUT has responsibility for the following tasks:

- accreditation of higher education institutions;
- accreditation of study programmes at higher education institutions;
- revision of earlier accreditations;
- evaluations to assess quality in higher education;

- accreditation of tertiary vocational education;
- recognition of foreign education.

A comprehensive international evaluation of NOKUT carried out in 2007-2008 (Langfeldt et al, 2008) concluded that NOKUT 'has managed to put quality on the agenda in Norwegian tertiary education' (p. 50), although the evaluation team also recommended that 'NOKUT finds a better balance between control and improvement for the future' (p. 52), i.e. the balance between quality assurance and quality enhancement. The evaluation report provides detailed evidence of a robust system of quality assurance which fits the ENQA framework and criteria.

As summarised in Table 2, p.34, the NQF has seven levels which correspond to the EQF, and define learning outcomes using knowledge, skills and general competences. Postgraduate degrees are defined at levels 7 and 8 as follows and are intended to facilitate comparison between Norwegian and other European qualifications and to create greater transparency in qualifications.

Postgraduate degrees

As already mentioned, improving the quality of higher education has been a major priority for the government and its Ministry for at least the past decade, and it has used reforms and resources in its efforts to enhance quality. One of the ways in which Norway aims to improve quality, and competitiveness, is through incentives such as the additional funds available from the Centres of Excellence in Higher Education initiative.

Postgraduate degrees are offered at the eight universities, at some of the specialised higher education institutions, and increasingly at university colleges. Although the university colleges were originally set up to provide bachelors level education in fields such as education (teaching), social work, nursing, business management etc. at regional level they are now increasingly offering masters degrees, and in a small number of cases doctoral degrees.

Masters degrees
The masters degree is a two-year programme including a research-based dissertation. There are also a few integrated (one-tier) five-year programmes in some fields resulting in a masters degree with no intermediate bachelors degree (see above).

Progression from bachelors to masters programmes depends a) on completion of the bachelors degree and b) achievement of a satisfactory grade (the grade score required varies between subjects and institutions). With the expansion in numbers of masters degrees offered, the range in quality of institutions offering them and the growth in student numbers, there is an increasing concern about quality, and the wide range of quality across institutions. One manifestation of this is the issue of possible grade inflation. Norway changed its university grading system from a numeric system to an A-F grading in 2006, and there is concern that institutions are not all using comparable criteria and using the full range of grades. It has been said that for some of the smaller institutions there are clear reasons not to fail students, since they lose students and therefore funding.

As a country, Norway is strongly committed to international development; in higher education this commitment is manifested through, for example, the Norwegian Agency for Development Co-operation (NORAD) programme for master studies (NOMA). This was established in 2006 and provides financial support for the development of masters degree programmes in developing countries between local and Norwegian higher education institutions as part of local capacity building. The Norwegian government also provides scholarships for students from developing countries in the south, and from Central and Eastern Europe, and Central Asia through its 'Quota

Scheme' which is normally targeted at masters and PhD level study. The scheme currently provides full scholarships for 1,100 students, of which 800 are from developing countries, and 300 from Eastern Europe and Central Asia.

Doctoral degrees
As of 2011, doctorates are offered by 23 higher education institutions which have the right to confer the PhD. These include the eight universities, nine specialised university institutions, and an increasing number (six in 2011) of university colleges. Numbers of PhD students are concentrated in the eight universities, in particular the 'old universities', with smaller numbers in other institutions.

Recent years have seen the development of research schools and research training networks which bring together faculty researchers and doctoral researchers, led by a senior researcher, across several institutions, aiming to achieve critical mass, and thematic focus. A major purpose of these networks has been to provide a thematic focus for research, and to avoid the potential isolation created by the small numbers of PhD students at regional university colleges.

Progression to a doctoral programme depends on a) completion of the masters degree and b) admission to a doctoral programme/position. As is the case in most countries, the number of students undertaking doctoral degrees has increased significantly, in particular over the past 10-15 years. Thus the number of doctoral degrees awarded in Norway more than doubled from 647 in 2000 to 1329 in 2011, while the total number of doctoral candidates showed a significant increase across all fields of research between 2002 and 2011 (Table 13).

Field	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Humanities	615	657	619	726	714	751	815	826	932	950
Soc Sci	858	934	1033	1330	1480	1652	1802	1877	1946	1963
Natural Sci	1148	1213	1370	1572	1725	1785	2007	2203	2327	2300
Technology	781	896	980	1093	1118	1234	1340	1417	1484	1444
Med and health science	722	776	1031	1313	1441	1669	1919	2054	2206	2384
Total	4124	4476	5033	6034	6478	7091	7883	8377	8895	9041

Table 13: Number of doctoral candidates 2002-2011 by field (Database on Higher Education in NIFU, 2012)

This can also be seen from Figure 11 below:

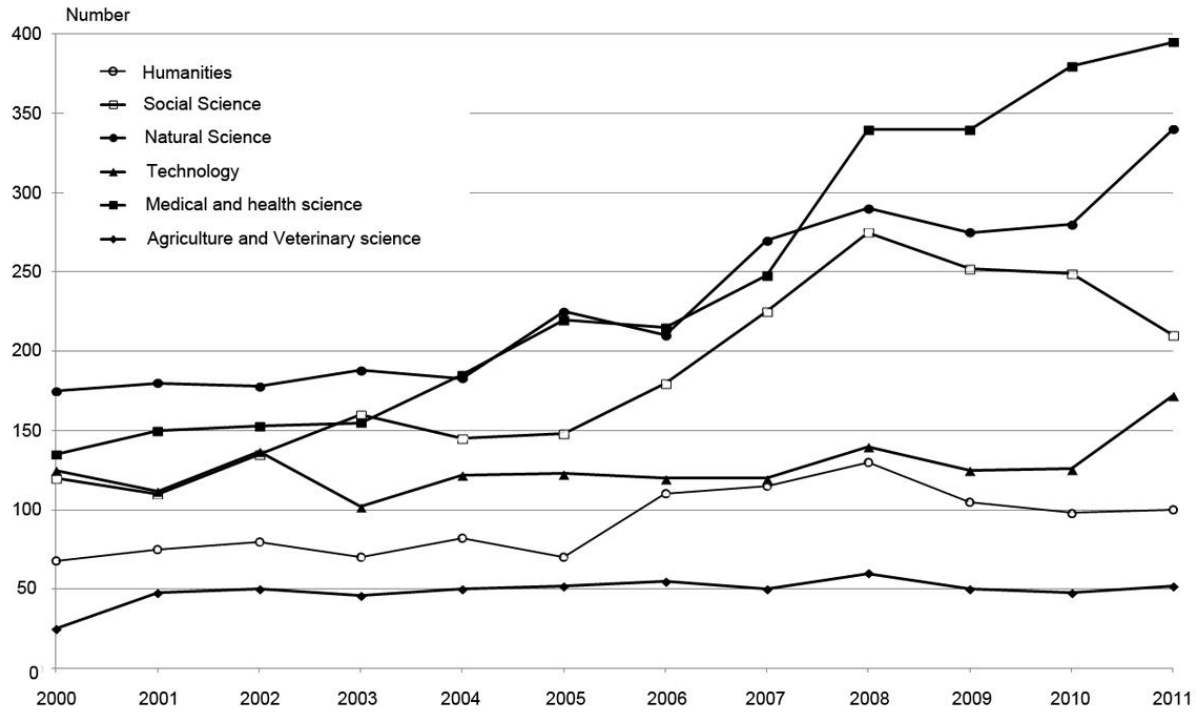


Figure 11: Number of doctoral candidates 2002-2011 by field (DBH in NIFU, 2012)

Figure 12 shows the number of PhD candidates in the Nordic countries, with a doubling of numbers in Norway over the 11-year period.

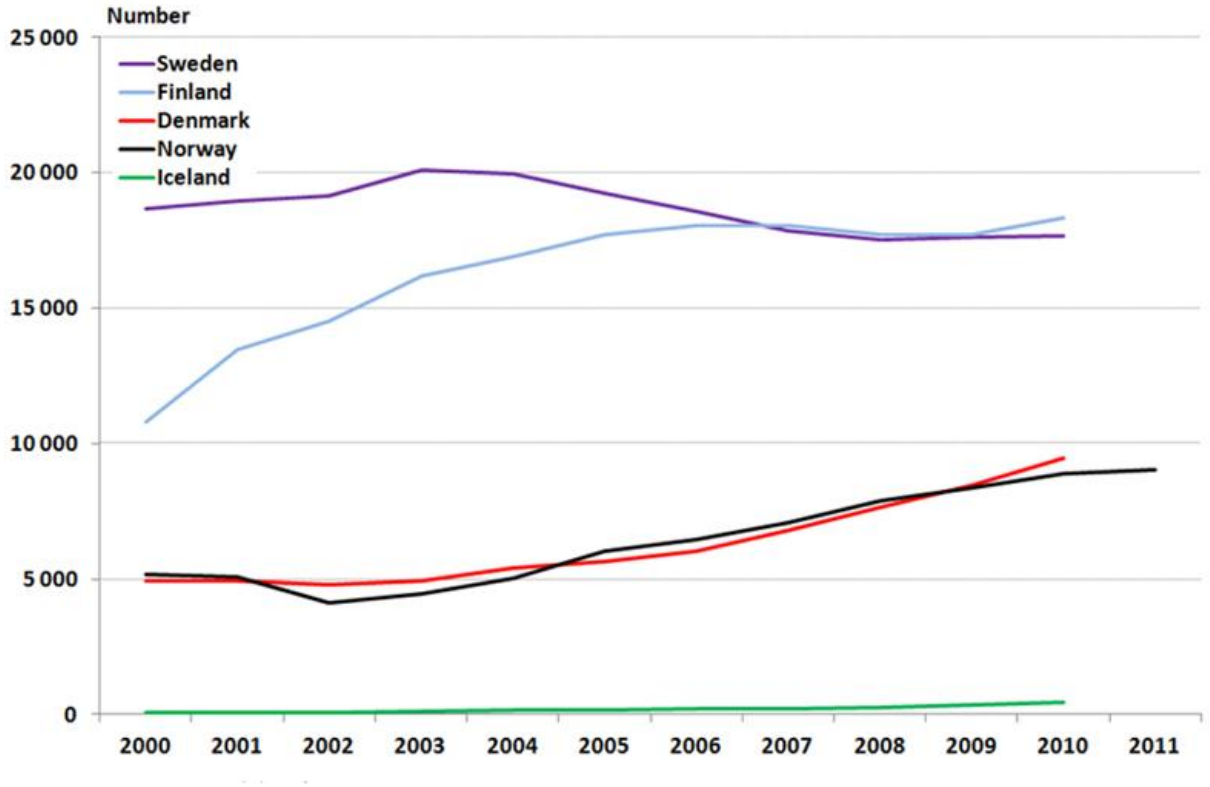


Figure 12: Number of PhD candidates in the Nordic countries 2000 to 2011 (DBH in NIFU, 2012)

The year 2013 saw 1524 thesis examinations, an increase of 63 (4%) on figures for 2012. Of these 36% were by international students.

In 2012 a major evaluation of PhD education, commissioned by the Research Council of Norway on behalf of the Ministry of Education and Research, concluded that the Norwegian PhD is of high quality. This evaluation followed a similar evaluation undertaken in 2002 and carried out by the Norwegian Institute for Studies in Innovation, Research and Education (*Nordisk Institutt for studier av Innovasjon, Forskning og Utdanning* or NIFU). It was designed to provide an answer to the following question:

How does the current system of doctoral education in Norway perform in terms of

- quality – with regard to whether Norwegian doctoral training maintains high international standards;
- efficiency – with regard to whether Norwegian doctoral training is adequately organised and the extent to which resources are used efficiently;
- relevance – with regard to whether society receives appropriate and necessary competencies?

Under 'quality', the research team looked at quality of input, research/training process, and output. Evaluation of 'efficiency' included a consideration of the efficiency of production and organisational efficiency. Consideration of 'relevance' included the relevance of competences acquired for successful PhD training and relevance of qualifications for post-PhD work.

Since the 2002 evaluation, a number of changes had occurred in Norwegian doctoral education: the introduction of the so-called 'common PhD' (as distinct from the traditional dr.philos. degree, see Kyvik and Tvede 1998), a doubling in the number of PhD candidates, a growth in the number and diversity of higher education institutions offering the PhD, and major efforts to professionalise and standardise the provision of doctoral education across the country. However, Norway faces a widespread challenge over doctoral completion rates (see Figure 13 below).

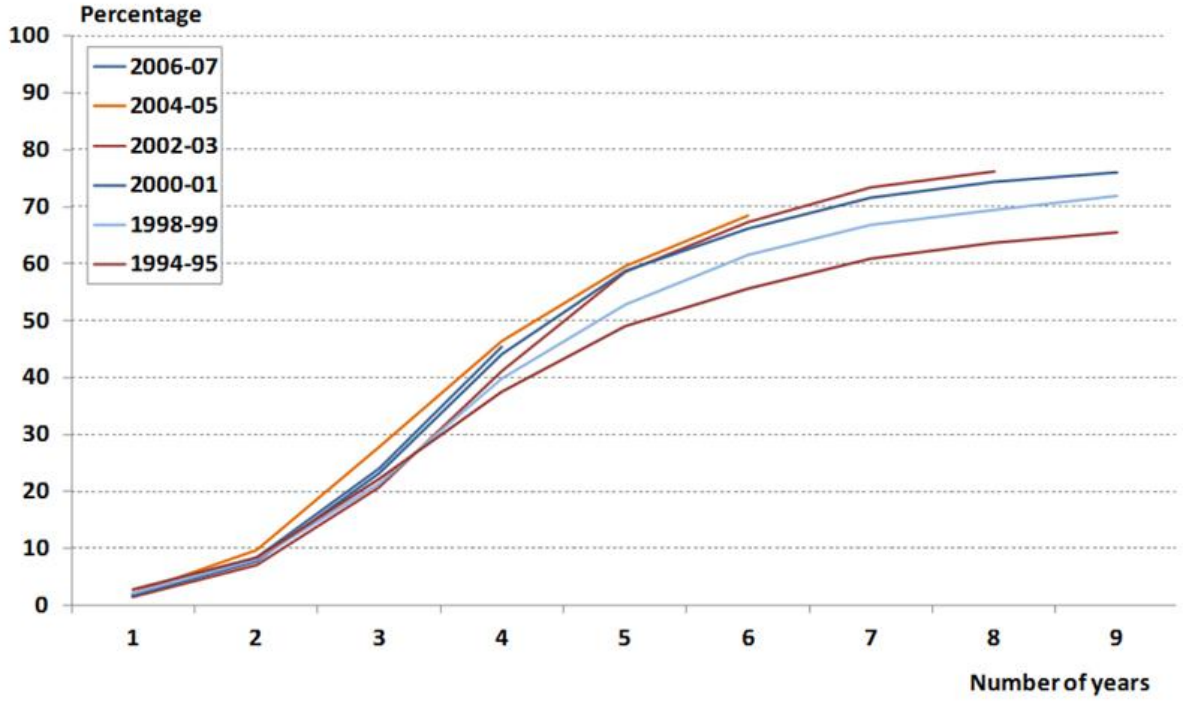


Figure 13: Cumulative completion rates among doctoral scholarship holders in Norway, by year of being awarded a scholarship (NIFU, 2012)

The conclusion of the 2012 evaluation suggested that the PhD system in Norway is 'well-funded, well-organised and offers very good working and learning conditions for PhD candidates, as well as good career prospects for PhD graduates' (Thune et al, 2012, p.7).

However, the 2012 report also identified a number of challenges for the Norwegian doctorate which include:

- completion rates in some fields, particularly for those students who do not have scholarship funding;
- the relatively high age of PhD graduates;
- issue of critical mass and critical diversity, given the many small PhD programmes and institutions;
- access to high quality PhD supervision;
- the nature and timing of 'research training';
- the relevance of the competences acquired during the PhD period.

As a result of the 2012 report and other initiatives, there have been a number of changes to the PhD in Norway. These include a more standardised and structured programme which includes a certain number of courses of training (normally 30-60 credits), the introduction of training in generic skills and a greater focus on employability and a realisation that the PhD is no longer to be seen only as an entry to an academic career, but rather a qualification for an increasingly diverse range of career destinations. Due to concerns about completion rates, there has also been a move to introduce the concept of milestones within the PhD programme (along the lines of the upgrade or equivalent process in UK).

In summary, Norway has seen a substantial expansion in numbers (and programmes) at both masters and doctoral level. At masters level there is some concern at the rapid expansion across a wide range of institutions which may have an impact on the quality of the student experience and the qualification. At doctoral level there have been major initiatives and efforts to ensure and to improve quality.

Access

No tuition fees

Norway has a highly inclusive education system whose explicit aim is to ensure equal opportunities for all students irrespective of gender, ethnicity, geographic location, and socio-economic background (Eurydice, 2013). Thus Aamodt and Kyvik (2005) emphasise the 'political objective of enhancing equality of educational opportunity'. They continue as follows: 'In these social democratic countries, higher education is regarded as a right for all (though not in strict legal terms). Equality of opportunity by gender, geography and socio-economic status is an important goal and there are no tuition fees' (p.121). This means that tuition is free for all bachelors, masters and doctorate programmes in state-funded institutions; this covers over 85% of all students in Norway. Private higher education institutions may charge tuition fees; however, fewer than 15% of all students attend private universities.

To cover living costs, the Norwegian State Educational Loan Fund (*Statens Lånekasse for Utdanning*) aims to make higher education available to everyone, enabling students to take out loans which are interest free for the period of student status, and at a very low rate of interest (approx. 2%) after

graduation.

The basic support is a maximum of NOK 94,400 per academic year (10 months) (about £10,500). This is initially given as a loan; however 40% of the loan may be converted to a grant for students who live away from their parents and pass all exams. The maximum amount awarded as a grant is NOK 37,760 (about £4,200). The grant is reduced if the student's income or assets exceed certain limits (Eurydice 2013).

The objectives of the educational support from *Lånekassen* are:

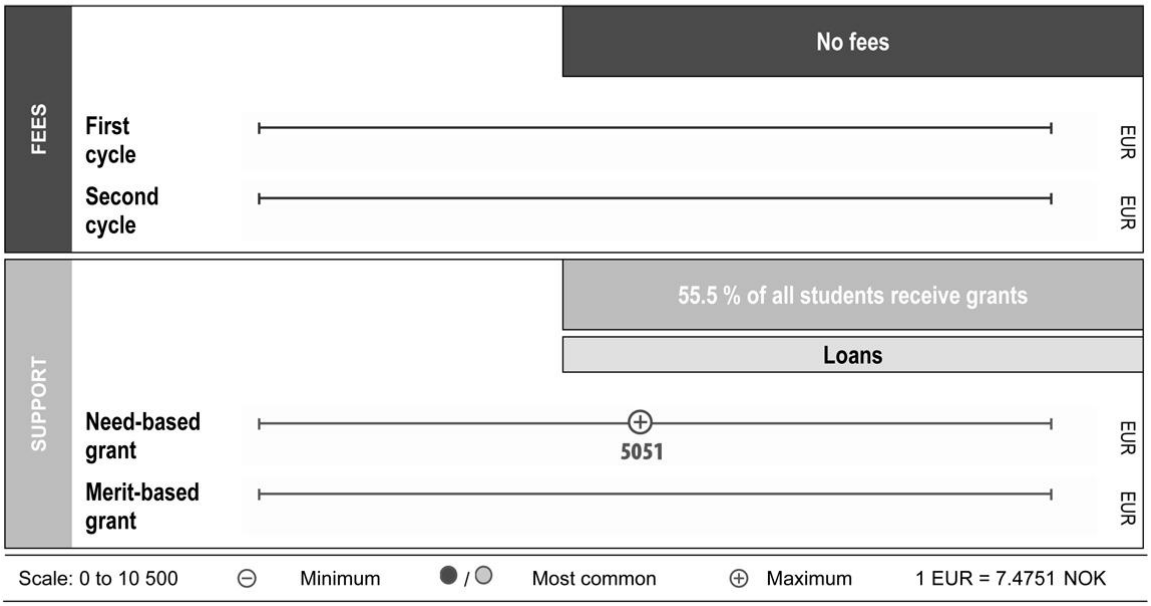
- to remove inequality and to promote equal opportunities so that the pursuit of education is possible regardless of geographical conditions, age, sex and economical and social positions;
- to ensure that the work environment for students is satisfactory so that the students may work effectively;
- to ensure a steady supply of educated labour.

There are a number of additional provisions which focus on enhancing equal opportunity. These include grants for each child under the age of 16 for students who are taking care of children, students on parental leave may be given a grant for up to 44 weeks, and grants for physically disabled students and for students whose study is impeded through illness.

Table 14 summarises sources of funding and support for first and second cycle degree students.

NORWAY

MAIN CHARACTERISTICS



Key points

Fees (2013/14)

• No fees at public higher education institutions, catering for over 85 % of all students in Norway.

• Government-dependent private higher education institutions may on certain conditions charge tuition fees.

• International students do not pay fees at public higher education institutions.

Support (2013/14)

• Norwegian students are entitled to **loans** and **grants** from the State Educational Loan Fund (NSELF). The basic support is at most NOK 94 400 per academic year (10 months). The basic support is initially given as a loan, however, 40 % of the loan may be converted to a grant for students who live away from their parents and pass all exams. The grant will be reduced if student's income or assets exceed certain limits. The amounts are universal for all students who are eligible for financial support. The maximum amount of grant is NOK 37 760.

• Students under 25 years of age may also receive a grant for travel costs.

• Financial support is also given for study abroad as there is full portability of NSELF loans and grants. Exchange students and full degree students qualify for support.

• Students taking care of children may receive a grant for each child under the age of 16.

• Students on parental leave can be given a grant for up to 44 weeks, and students who cannot study because of illness may have the loan converted into a grant for up to four months and two weeks a term. Physically disabled students can get an extra grant if they are unable to work during their studies, and they may also receive basic support for twelve months per year.

• Tax benefits for parents and family allowances play no role in the student support system.

Table 14: Main characteristics of HE student fees and support – Norway 2013-14
(Eurydice, 2013)

Funding for doctoral candidates

Doctoral candidates are funded from one of three sources: higher education institutions, the Research Council of Norway, or other sources such as external funding by employer etc. Scholarships are generous and are commensurate with public sector salaries for those with a masters degree. The average age of doctoral graduates remains high (currently 36 yrs), and has not shown much reduction over recent years, although this varies considerably across the different fields of study (and see Gudmundsson, 2008; Kyvik and Olsen, 2013). This means that although Norwegian PhD graduates have favourable conditions while undertaking the PhD, they may have less time to establish themselves in academia and may be less attractive to employers on the grounds of age.

A usual practice is for doctoral positions to be openly advertised in the same way as a job. Although this varies across subjects, it was reported that there will often be 10-20 applicants for each position. The result of this arrangement is that doctoral candidates are treated as temporary staff, and are provided with generous funds to support their socialisation into the wider academic community (for example, conference and travel expenses). The appointment is normally for a period of up to four years full-time (with 25% of time devoted to required duties usually in the form of teaching activities). Salaries are generous, and remuneration includes pension arrangements and 'attractive welfare arrangements'. We note the following from a recent advertisement for a Doctoral Research Fellowship:

> (i) Positions as research fellows are fixed-term educational posts where the aim is that the research fellow completes a doctoral degree during the period of employment;
> (ii) Research fellowship positions are defined as recruitment posts and represent an important instrument in the sector's work of generating qualified applicants for other academic posts at universities and university colleges in the long-term perspective;
> (iii) the University aims to recruit more individuals with an immigrant background to academic positions. Candidates with an academic background are encouraged to apply.

The advertisement reflects the general Norwegian policy towards recruitment of doctoral candidates, including its commitment to widening participation at this level.

From Table 15 below which describes the different sources of funding for PhD candidates over the period 2002-2011 we note that funding from the Research Council has remained stable over the period at around 20-26% of the candidates, while funding from higher education institutions themselves (through their grant) has increased steadily.

Source of funding	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
HEIs	904 (22%)	1466 (33%)	1779 (35%)	2100 (35%)	2275 (35%)	2502 (35)	2793 (35)	3047 (36)	3390 (38)	3550 (39)
Research Council of Norway	972 (24%)	1273 (28%)	1330 (26%)	1468 (24%)	1519 (23%)	1566 (22)	1817 (23)	1852 (22)	1905 (21)	1770 (20)
Other sources*	2248 (55%)	1737 (39%)	1924 (38%)	2466 (41%)	2684 (41)	3023 (43)	3273 (42)	3478 (42)	3600 (40)	3721 (41)

* Other sources include funding from health trusts, medical funds, private funds, and employers.

Table 15: Funding for doctoral candidates 2002-2011 (Source DBH in NIFU 2012)

Recruitment to masters and to doctoral programmes is on the basis of merit, and the free tuition and the favourable loan arrangements mean that postgraduate study is available to any student who meets the admission criteria.

However, with expansion of postgraduate provision, there appear to be a number of tensions. The large number of university colleges ensures local and regional provision, which is a major political commitment. Yet the increased focus on quality leads some to question whether there are too many universities able to offer postgraduate (masters) degrees, resulting in a tension between high quality (a more elite postgraduate system) and democratic and regional access (access for all).

Employment outcomes

There has been considerable debate in Norway over the value of masters degrees. The industry body (*Naeringslivets Hovedorganisasjon* or NHO) carries out an annual survey of companies in relation to skills (the *Kompetanse barometeret*). According to the 2013 survey, 20% of companies were concerned at the lack of relevant skills (particularly in the field of engineering), while only 10% stated that they had a need for masters level graduates, with 53% of the companies saying that they considered that a bachelors graduate could have carried out the job as well as or even better than a masters graduate. According to this organisation, '2 years additional education (for the Masters) is expensive, both for the individual and for state education support' (NHO 2013). This raises questions in relation to the rapid expansion of provision at masters level.

On the other hand, according to the report of Thune et al (2012) cited above, 'the general picture of the labour market for people with a doctoral degree is positive: there is virtually no unemployment and the large majority of PhD holders find relevant work' (p.8). However, as is the case in most countries, increasing numbers of PhD holders will work outside academia, in a range of clinical, advisory, administrative and managerial jobs which require sophisticated knowledge and analytical skills. This emphasises the need for higher education institutions to 'strengthen their focus on the increasingly diverse career trajectories of their PhD holders, and consider how PhD qualifications are used in different occupations and sectors' (Thune et al, (2012).

According to TEKNA (the Norwegian Society of Graduate Technical and Scientific Professionals which serves as a trade union and negotiates salaries) in the private sector the wage premium for having a

PhD is generally lower than in the public sector, with only 2-4% wage increase compared to having a Masters degree (TEKNA, 2012). However, according to our interviewees, with low unemployment in the country as a whole, PhD graduates are normally able to find employment commensurate with their skills and qualifications provided that they are prepared to travel to less populated areas of the country. Figure 14 below shows the proportion of career destinations for PhD graduates.

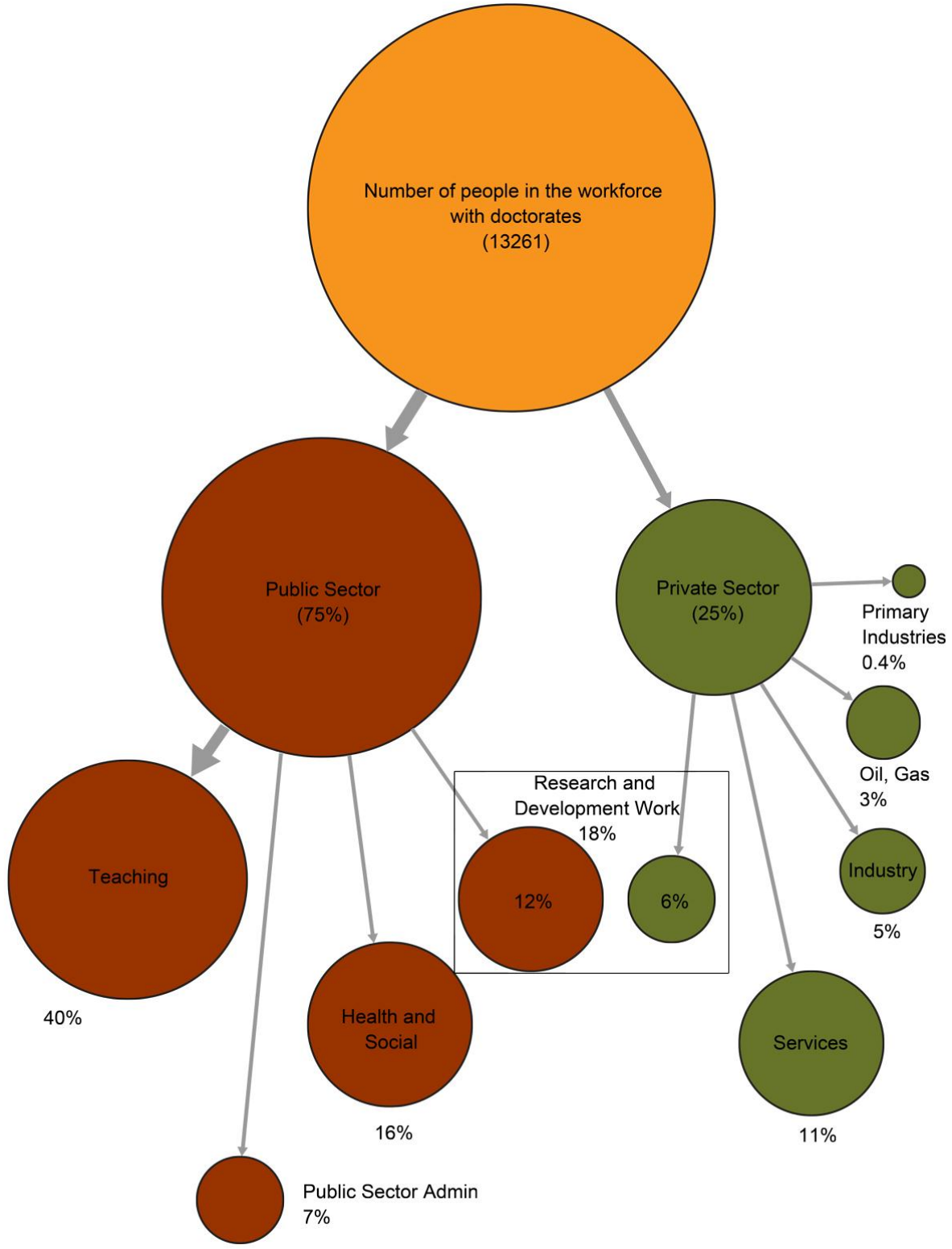


Figure 14: Career destinations of PhD graduates (TEKNA, 2012)

Summary

As a country Norway invests substantially in education, and has a strong political commitment to fair access to higher education. Education at all levels is free, including no tuition fees for higher education at all levels. The country is committed to improving the quality of its higher education, and has undertaken major quality reforms and initiatives to effect this ambition. A particular initiative, the creation of Centres of Excellence in Higher Education provides financial incentives for universities to develop innovative practices, particularly in teaching and learning. The major evaluation of doctoral education carried out in 2012 has provided a clear framework and benchmark for higher education institutions in relation to the provision of PhD education.

Annex E - Scotland

Scotland

The information sources for this section involved analysis of literature and the input of a focus group rather than individual interviews.

Context

According to the latest figures, Scotland's population is around 5.2 million, with Glasgow and Edinburgh having a combined population of over one million. The workforce comprises just below 2.5 million. The geographical size of Scotland belies the strength of its universities; the concentration of higher education campuses found in Scotland is greater than in some other small countries. For example in Wales there are nine universities, spread over 12 campuses, whereas in Scotland there are 19 universities, including the Open University in Scotland, extending over 41 campuses.

Scottish higher education is considered highly successful on several levels, in both teaching and research (Diamond, 2011). A 2013 study conducted by RCUK on behalf of the government, notes that the UK has 31 institutions in the world's top 200 universities and that five (16% of the UK's representation) are in Scotland (DBIS, 2013b). The report confirms the research strength that exists in Scottish universities, citing £257 million of UK Research Council grants awarded in Scotland in 2012-13, as well as 13% of the UK's research funding from medical charities (total £1.1 billion per year), and £34 million from Cancer Research UK in 2012-13.

Postgraduate student numbers in Scotland have grown steadily over the last decade, with numbers of research postgraduates rising from 8,565 in 2003-04 to 11,660 in 2012-13, and taught postgraduates increasing from 35,125 in 2003-04 to 43,280 in 2012-13. Table 16 provides a detailed view of student numbers at different levels from 2003-04 to 2012-13 (Scottish Funding Council (SFC), 2014a). Figure 15 summarises the number of qualifiers at three levels (postgraduate, first degree and sub-degree) for the same period (SFC, 2014a), showing the overall growth in postgraduate numbers by around 10,000 between 2003-04 and 2012-13.

Institution Type / Academic Session	Level of Study					
	All Levels	Postgraduate		First Degree	Sub-degree	
		Research Postgraduate (1)	Taught Postgraduate		HNC/HND	Other sub-degree
Total						
2003-04	**269,120**	8,565	35,125	133,740	44,275	47,420
2004-05	**270,260**	8,420	35,100	133,105	41,800	51,825
2005-06	**273,050**	8,650	38,675	136,105	41,550	48,070
2006-07	**279,560**	9,360	43,035	133,740	39,265	54,160
2007-08	**272,625**	9,615	42,265	132,260	38,755	49,730
2008-09	**279,615**	9,935	42,760	137,720	39,105	50,095
2009-10	**287,565**	10,665	44,285	146,175	41,230	45,205
2010-11	**290,000**	11,325	45,255	149,715	42,315	41,390
2011-12	**281,630**	11,660	43,280	149,350	41,345	35,990
2012-13	**278,765**	**11,980**	**41,530**	**150,940**	**39,745**	**34,565**
All students at HEIs						
2003-04	**213,510**	8,565	34,925	132,580	5,085	32,355
2004-05	**217,945**	8,420	34,930	132,595	4,780	37,215
2005-06	**222,090**	8,650	38,535	135,470	4,445	34,990
2006-07	**230,100**	9,360	42,880	133,180	4,345	40,330
2007-08	**224,855**	9,615	42,115	131,645	5,085	36,395
2008-09	**231,260**	9,935	42,660	137,040	4,745	36,875
2009-10	**237,765**	10,665	44,165	145,535	4,540	32,855
2010-11	**238,645**	11,325	45,155	148,770	4,120	29,275
2011-12	**233,010**	11,660	43,245	148,425	3,875	25,800
2012-13 (2)	**230,970**	**11,980**	**41,515**	**149,860**	**3,605**	**24,005**
All students at colleges						
2003-04	**55,610**	-	205	1,155	39,185	15,065
2004-05	**52,315**	-	170	510	37,015	14,610
2005-06	**50,960**	-	140	635	37,105	13,075
2006-07	**49,460**	-	155	555	34,920	13,830
2007-08	**47,770**	-	150	615	33,670	13,335
2008-09	**48,355**	-	100	680	34,360	13,175
2009-10	**49,800**	-	120	640	36,690	12,355
2010-11	**51,355**	-	100	945	38,195	12,115
2011-12	**48,620**	-	35	925	37,465	10,190
2012-13 (2)	**47,795**	**-**	**15**	**1,075**	**36,140**	**10,560**

Table 16: Student numbers by level of study 2003-04 to 2011-12 (SFC, 2014a)

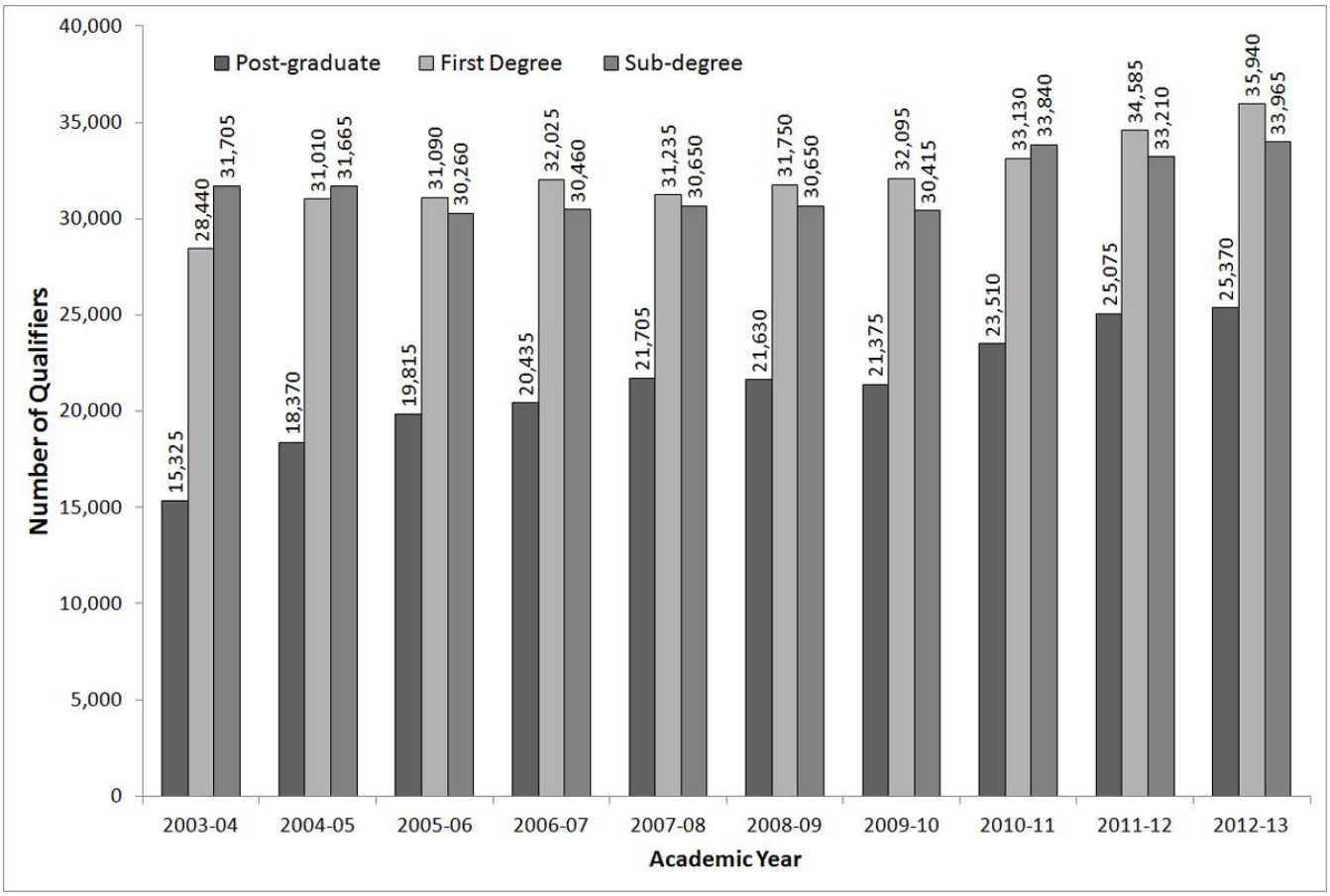


Figure 15: Number of qualifiers 2003-04 by level: postgraduate, first degree and sub-degree (SFC, 2014a)

As in other countries, 'taught' (masters degrees and other non-research postgraduate degrees) postgraduate numbers exceed research postgraduate numbers: in 2012-13 research students represented 22% of current postgraduate numbers and taught postgraduates 78% (SFC, 2014a). In 2012-13, research postgraduate numbers rose by 320 (2.7%), with a fall in taught postgraduate numbers between 2011-12 and 2012-13 of 1,730, representing low recruitment in previous years (the number of entrants in this period only decreasing by 45). Compared with their peers in the rest of the UK Scottish graduates are more likely to enter research degrees and less likely to enter taught higher degrees (Wakeling and Hampden-Thompson, 2013).

The next two figures (16 and 17) show for 2012-13 the most recent breakdown of Scottish higher education students by level of study, and the numbers of students qualifying, by level.

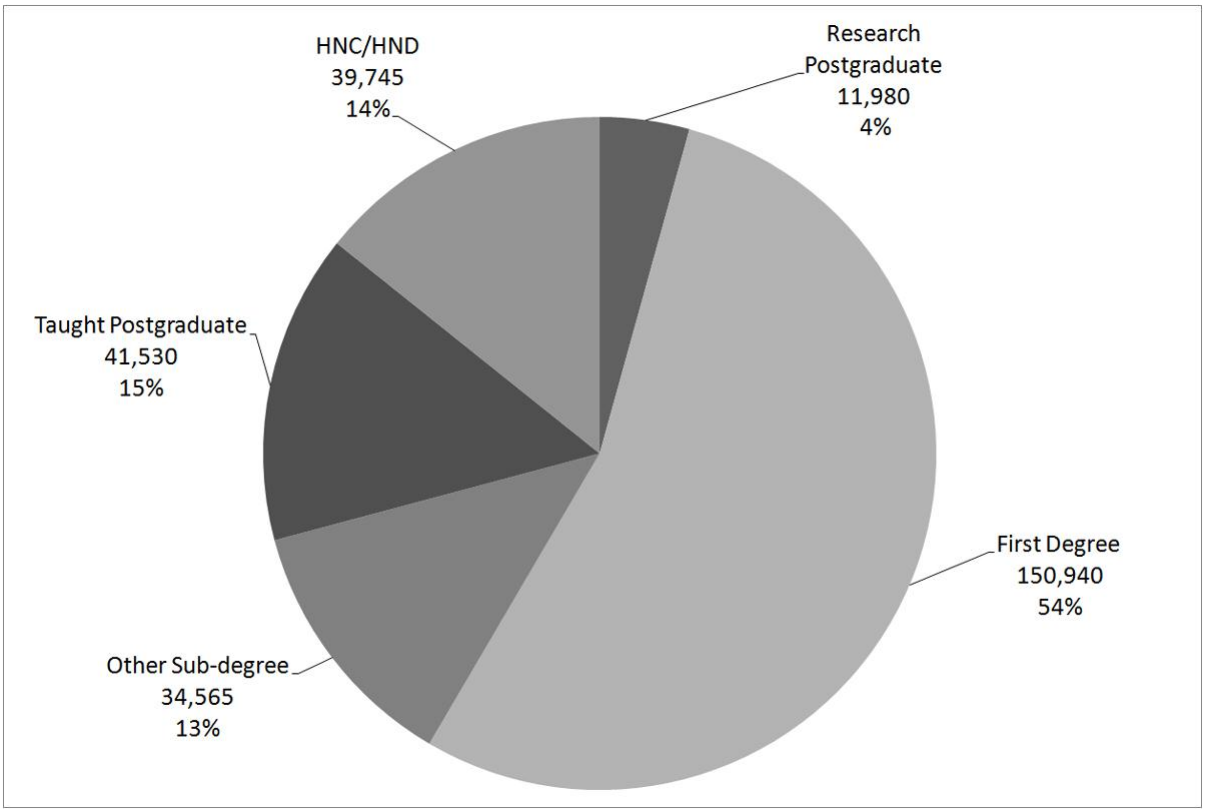


Figure 16: Students in higher education at Scottish higher education institutions and colleges by level of study, 2012-13
(SFC, 2014b)

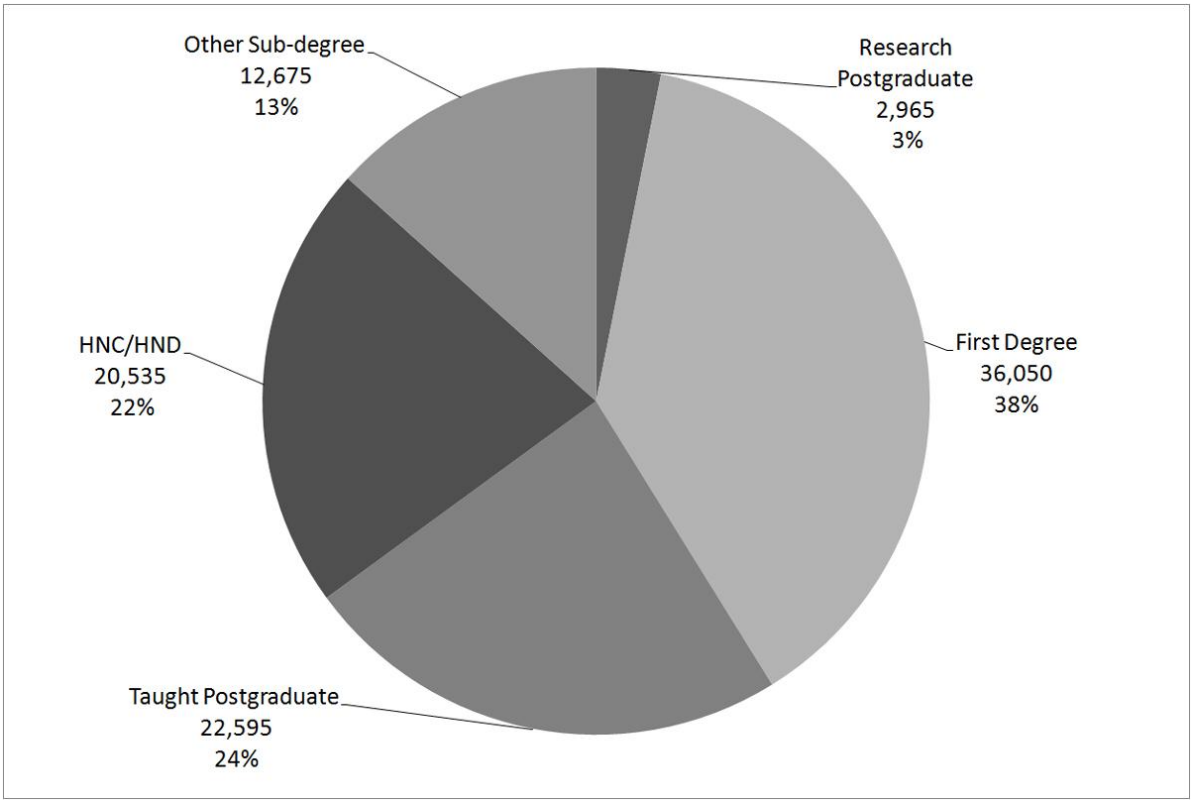


Figure 17: Qualifiers from higher education at Scottish higher education institutions and colleges by level of study, 2012-13
(SFC, 2014b)

Research funding

Compared with other parts of the UK, Scottish universities are awarded a higher than average population share of research funding from the Research Councils (Bell, 2011), and figures from DBIS show just over £300 million in research funding flowing to Scotland from the UK Research Councils in 2012-13:

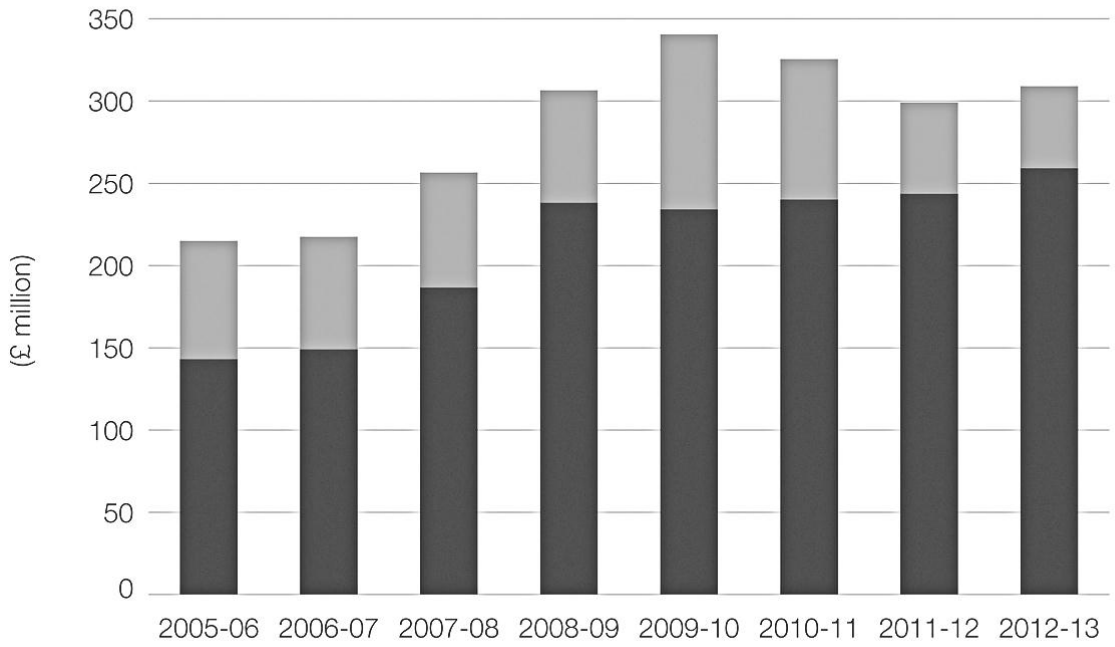


Figure 18: Total UK Research Councils Funding to Scottish organisations 2006-2013 (£millions) (DBIS, 2013b, Figure 1.2)

Figure 18 demonstrates that the amount of funding received by Scottish organisations from RCUK has increased by around 50% since 2005-06. Research Council funding is particularly valuable for research intensive universities. For example, the University of Edinburgh received over £80 million in 2012-13, including a share of £32 million from EPSRC (DBIS, 2013b, Fig. 1.3).

The data in Table 17 below were provided by RCUK to support the DBIS 2013b report and should be read in conjunction with the accompanying notes which can be found on the RCUK website. The data show the historical distribution of Research Council funding by country, 2005-06 to 2012-13.

Research funding to higher education institutions including grants, studentships, fellowships (Research Council expenditure) (£k)								
	2012-13	**2011-12**	**2010-11**	**2009-10**	**2008-09**	**2007-08**	**2006-07**	**2005-06**
Total England	1,629,027	1,658,660	1,555,192	1,570,628	1,482,350	1,298,748	1,174,432	1,046,230
Total Wales	49,177	5,5540	54,471	53,955	52,941	48,040	42,619	37,729

Total Scotland	256,791	243,217	239,101	233,314	236,794	186,430	149,209	142,395
Total Northern Ireland	18,833	18,947	17,491	18,328	16,050	12,596	9,163	7,154
Total all Countries	1,953,829	1,976,363	1,866,254	1,876,225	1,788,135	1,545,815	1,375,423	1,233,508
Research funding to Research Council Institutes, independent research organisations (IROs), infrastructure funding (Research Council expenditure) (£k)								
	2012-13	**2011-12**	**2010-11**	**2009-10**	**2008-09**	**2007-08**	**2006-07**	**2005-06**
Total England	866,478	935,930	906,385	890,107	865,008	840,386	796,774	773,850
Total Wales	9,597	9,780	19,127	20,771	13,757	14,069	11,879	12,045
Total Scotland	50,080	54,668	85,763	106,141	67,986	69,519	67,741	72,365
Total Northern Ireland	379	482	3,145	3,610	3,857	2,682	3,020	3,926
Total all Countries	926,534	1,000,861	1,014,420	1,020,629	950,609	926,656	879,415	862,185
% of expenditure against UK total								
	2012-13	**2011-12**	**2010-11**	**2009-10**	**2008-09**	**2007-08**	**2006-07**	**2005-06**
Total UK spend	2,880,363	2,977,225	2,88,0674	2,896,854	2,738,743	2,472,471	2,254,838	2,095,693
Total England	2,495,505	2,594,590	2,461,577	2,460,735	2,347,358	2,139,134	1,971,206	1,820,080
% of total in England	86.6%	87.1%	85.5%	84.9%	85.7%	86.5%	87.4%	86.8%
Total Wales	58,774	65,321	73,598	74,725	66,698	62,109	54,498	49,774
% of total in Wales	2.0%	2.2%	2.6%	2.6%	2.4%	2.5%	2.4%	2.4%
Total	306,872	297,885	324,864	339,455	304,780	255,949	216,950	214,760

Scotland								
% of total in Scotland	10.7%	10.0%	11.3%	11.7%	11.1%	10.4%	9.6%	10.2%
Total Northern Ireland	19,212	19,429	20,635	21,938	19,907	15,278	12,184	11,079
% of total in Northern Ireland	0.7%	0.7%	0.7%	0.8%	0.7%	0.6%	0.5%	0.5%

Table 17: Research funding to higher education institutions including grants, studentships, fellowships (Research Council expenditure) (£k) (RCUK, 2013b)[22]

General spend on higher education and tuition fees

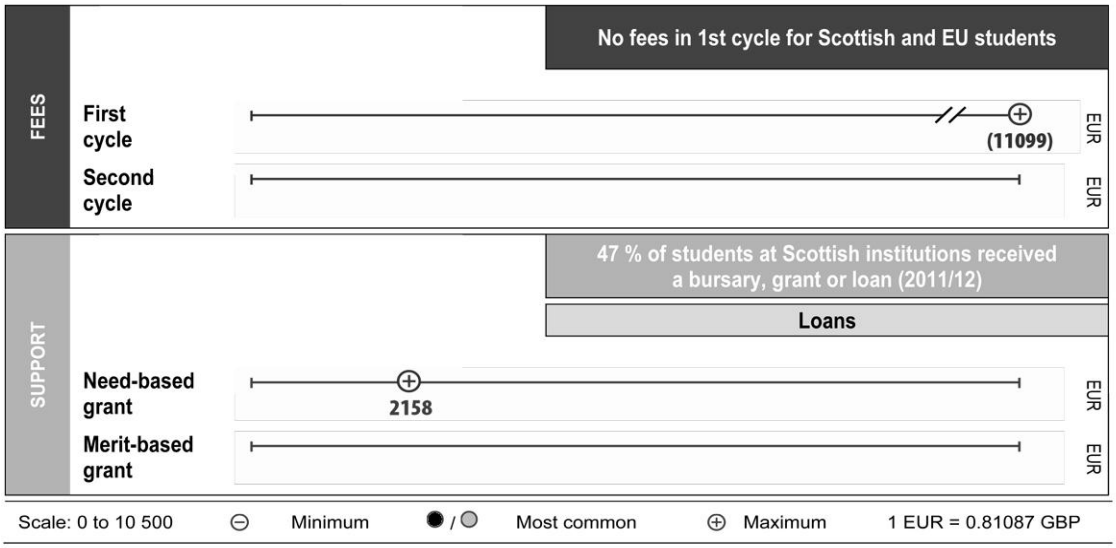
Overall, spending on higher education in Scotland has been declining (from 7.6% of Scotland's total managed expenditure in 2001-02 to 6.2% in 2011-12), suggesting that 'Scottish colleges and universities have slipped down the list of priorities' (Bell, 2011). Also declining are participation rates, with Scotland having a less good record than other UK countries in recruiting students from lower socio-economic backgrounds to higher education, even though around 50% of school leavers go on to university.

As demonstrated by the Eurydice data in Table 18 below, Scottish bachelors and masters students do not pay tuition fees. Some believe that Scottish institutions should be permitted to introduce fees because of the likely decrease in public funding and the related fear that some 'will fall behind their peers in England, Wales and Northern Ireland' if they do not (Bell, 2011), particularly given the imbalance in home and fee-paying students across the Scottish universities (McCrone, 2011). Currently tuition fees in Scottish higher education only apply to students from England, Wales and Northern Ireland and to international students from outside the EU.

[22] *Note on Table 17*
The RCUK 2013c publication contains 17 'caveats' on the data in the table, explaining how the spending by each Research Council has been calculated and which reflect the complexity of the funding profile. Please refer to the main publication for further details of the background information contributing to these numbers.

UNITED KINGDOM – SCOTLAND

MAIN CHARACTERISTICS



Key Points

Fees (2013-14)

- For the first cycle, the Scottish Government pays the tuition fees for Scottish and EU students. For 2013-14, fees are set at GBP 1,820.

- Scottish (and non-UK EU) students do not pay tuition fees to study at Scottish universities, but must pay full fees to study at universities in other parts of the UK. Students from England, Wales and Northern Ireland are required to pay fees to study at universities in Scotland.

- Fees are charged to students from the rest of the UK at a level of up to a maximum of GBP 9,000. The GBP 9,000 cap on fees for students from the rest of the UK is set by the sector as part of a voluntary agreement. This will, going forward, be set in legislation through the Post 16 Education (Scotland) Bill which is due to come into force in November 2013.

- Fees for international (non-EU) students are unregulated and set by the higher education institutions.

- The fee and support system has been developed for students in the first cycle. In the second cycle, fees are unregulated, differing by field of study and mode of attendance (i.e. full- or part-time).

Support (2013-14)

- Both grants and loans are available to students depending on circumstances. The 'Young Student's Bursary' of up to GBP 1,750 per year is available to students from low income backgrounds. The 'Independent Students' Bursary' of up to GBP 750 per year is available to students over the age of 25 or who are living with a partner. Other grants also exist for students with disabilities.

- Many students take out loans. Depending on household income, young students can borrow a maximum of GBP 5,500 per year. Likewise, independent students can borrow a maximum of GBP 6,500 per year. All students can borrow GBP 4,500 per year irrespective of household income.

- Tax benefits for parents and family allowances do not play a role in the student support system.

Table 18: Main characteristics of higher education student fees and support – UK Scotland 2013-14 (Eurydice, 2013)

Quality

The Scottish higher education sector 'has consistently "punched above its weight" internationally in terms of its teaching research', but there are also concerns that reform of higher education in Scotland is needed and that quality is at risk as a result of funding changes in other parts of the UK (Brown and Peat, 2011).

In many respects, postgraduate education in Scotland mirrors the system in England and other UK countries: UK-wide norms such as those enshrined in policy and guidance including qualifications and credit frameworks and codes of practice are designed to achieve consistent expectations about the structure and outcomes of masters and doctoral programmes and align with Europe-wide expectations for postgraduate programme structures and standards.

Important differences exist between Scotland and the rest of the UK, for example, entrants to postgraduate study who have completed their undergraduate degree in Scotland have typically completed a four-year bachelors degree with honours, rather than a three-year honours degree as in the rest of the UK (three-year non-honours bachelors programmes are also available in Scotland). According to Kemp and Lawton (2013), although the four-year degree offers students the opportunity for breadth, it is not so attractive to international students who, rather than recognising the benefits of four-year programmes may see them as more expensive than undergraduate degrees in other parts of the UK.

Scottish and UK qualifications frameworks

As indicated in the title 'Framework for higher education qualifications in England, Wales and Northern Ireland' (FHEQ) (QAA, 2008a) is shared by the other three UK countries, with a separate 'Framework for qualifications of higher education institutions in Scotland' (FQHEIS) (QAA Scotland, 2014a)[23].

The FQHEIS is complementary to the Scottish Credit and Qualifications Framework (SCQF, 2014) which combines detailed qualification descriptions (revised in 2012), with expectations about the volume and level of credit attached to each award. No credit values are included in the FHEQ. The SCQF includes descriptions for each of its 12 levels using five characteristics:

- knowledge and understanding;
- practice applied knowledge and understanding;
- generic cognitive skills;
- communication, numeracy and ICT skills; and
- autonomy, accountability and working with others.

The qualification levels included in the SCQF differ from those in the FQHEIS, although are intended to have equivalence: a comparison is provided in Table 2, p.34. The descriptors, however, are different. Whereas in the FHEQ and the FQHEIS, the qualification descriptors for masters and

[23] The essence of the qualification descriptors at doctoral and masters levels in the FHEQ (introduced in 2001, revised in 2008) and the FQHEIS (also introduced in 2001, revised in 2014) is the same, i.e. the expectations of graduate outcomes are identical, but the accompanying text at the beginning / end of the descriptors is different, with the FHEQ doctoral descriptor including some explanatory text about different forms of doctoral degree at the end, and the FQHEIS including at the beginning credit information linked with the SCQF and a short explanatory paragraph. Similar distinctions pertain for the descriptors at masters level.

doctoral levels are very similar (see Footnote 23), they differ considerably from their equivalent descriptions in the SCQF, which is designed to encompass all levels of qualification, not just those at HE level. The SCQF descriptions appear outward-facing, with a primary focus on applying academic knowledge and understanding in a professional context, whereas the emphasis in the FHEQ and FQHEIS descriptors is primarily on academic attributes, but with professional characteristics implicit, particularly at doctoral level.

The 2014 revision of the FQHEIS has helped to clarify Scottish qualification levels for those not familiar with the Scottish system. However, the SQF suggests credit values for doctorates, which are not commonly used in many UK universities. The UK-wide Doctoral degree characteristics document suggests that 'Credit is not normally assigned to doctoral degrees because of the importance and diversity of the individual research project which is at the heart of all doctorates. However, credit may be awarded to candidates for successful completion of assessed structured elements as part of research training; in some cases the volume of such credit may contribute to a postgraduate certificate or diploma' (QAA, 2011). As this report is being completed, QAA is undertaking a project to merge the FHEQ and the SCQF in a single document that will incorporate a single set of qualification descriptors, highlighting commonalities and explaining differences.

The international perspective that characterises Scottish higher education is evidenced in Scotland's commitment to the objectives of the EHEA, including the Dublin/EHEA qualification descriptors (Bologna Working Group on Qualifications Frameworks, 2005). Scotland is actively involved in the EHEA, for instance through membership of the Bologna Follow-Up Group and the Scottish Bologna Stakeholders Group.

Quality assurance and enhancement

The concentration of universities in Scotland, combined with the relatively small size of the country, has enabled close relationships to develop among the universities themselves, and between the universities and their main funder, the SFC. Regarding the latter, we are not suggesting an inappropriate closeness, but that in this case size does matter and the number of universities combined with the size of the country has enabled funders to become conversant with the character, mission and values of the universities they support, enabling them to target resources at areas identified as being of importance by both the funders and the universities. For example, the QA regime for higher education in Scotland has developed from an enhancement perspective, as is clear from its title: Enhancement-led Institutional Review (ELIR), whereas the approach in other UK countries has emphasised QA, with enhancement treated separately. According to Kemp and Lawton (2013), the Scottish approach 'lean[s] more towards partnership buy-in rather than compliance alone'.

Scotland's could be considered a progressive approach to evaluating quality, compared to some of the other countries included in this study, for instance, Australia, England, Germany, Norway, Spain and the United States. In the latter six countries, at national level, QA has dominated the higher education 'accountability' landscape through the processes of 'accreditation, assessment and audit' (Nicholson, 2011), whereas in Scotland the national emphasis has been on identifying what needs to be improved and then introducing strategies for achieving it through an enhancement agenda. Even though the enhancement approach is welcomed by many, it was also suggested that the current ELIR process is bureaucratic and could be streamlined. Under the aegis of the Scottish Higher Education Enhancement Committee, some long-term higher education projects have been and continue to be supported through the Scottish enhancement theme, including: the Taught Postgraduate Student Experience (see also below); Developing and Supporting the Curriculum; and Student Engagement (QAA Scotland, 2014b). The Enhancement Themes, which have an

'international benchmarking' focus, are chosen collectively by Scottish institutions. Each theme is intended to enable sharing and learning from both national and international practice in parallel with developing new ideas. Scotland's integration in the EU higher education sector and more widely demonstrates a clear international emphasis. Our contributors judge that the commitment to situating Scottish higher education in a global context has resulted in greater awareness of multicultural nuances and that the research and teaching interaction with international academics helps Scotland to meet international standards and expectations in higher education.

Nicholson (2011) argues that the assurance and enhancement approaches are incompatible, yet some believe that at institution rather than national level, QA processes are only valuable and worth the investment of academic time they require if they lead to tangible improvements for both students and staff, i.e. at grass-roots QA and enhancement are inextricably linked. This perspective is supported by the outcomes of an ENQA workshop which suggested that 'quality assurance does provide comprehensive information about strengths and weaknesses and thus, a holistic view on the quality of a programme or an institution. It also draws attention to potential future enhancement'. (Costes et al, 2010)

This focus on enhancement has characterised Scotland's approach to all levels of higher education and is evident in recent initiatives on postgraduate education: Shaping the Twenty-First Century Doctorate: Learning from international Practice (QAA Scotland, 2012); and the Taught Postgraduate Student Experience, one strand of which is the 'Facets of Mastersness' project (Scottish Higher Education Enhancement Committee (SHEEC), 2014), discussed further below.

Research pools and their relationship with doctoral education

We heard that the research pools initiative, which began in 2003 and is funded by the SFC in partnership with the universities, has grown into a large enterprise. The pools are diverse, from those comprising a large number of university partners, to single-institution schools. For example, chemistry, life sciences, marine science and physics are some of the subjects where the largest research pools have emerged, including the Marine Alliance for Science and Technology for Scotland (MASTS),the Scottish Universities Life Sciences Alliance (SULSA), ScotCHEM – the umbrella organisation for EastCHEM and WestCHEM, two chemistry pools in their own right involving a total of seven institutions, SINAPSE, a medical imaging research partnership of six universities and SUPA, the physics research pool, involving eight universities.

The research pools are an innovative initiative and bring together research and doctoral training in each subject (sometimes also including masters level programmes), often through inter-disciplinary alliances. The pools are dominated by sciences and engineering, although there is one for economics (Scottish Institute for Research in Economics – SIRE) and one for Gaelic language and culture (Soillse). The pools have distinct identities and their characteristics are broadly based on subject research priorities.

Stated advantages of the collaborations include:

- greater ability to draw in non-university partners and related funding;
- critical mass of staff and students;
- integration of doctoral education with the research enterprise;
- more opportunities for inter-disciplinary research;
- shared resources that enable wider access to state of the art facilities; and
- strategic collaboration in research, teaching and doctoral training.

Research pools are described as 'A unique added dimension for Scotland' but it is also acknowledged that they add a 'layer of complexity' (QAA Scotland, 2012). For example, some of the pools, e.g. MASTS, the Northern Research Partnership, and SINAPSE have their own graduate schools and it is not clear the extent to which they connect with any of the Research Council-funded centres for doctoral training in related subjects. In 2012 there were 'potentially' 120 graduate schools in Scotland, with around 10 in research pools, 20 in institutions, 30 in faculties/colleges and 60 in schools/departments (QAA Scotland, 2012). A further complication is that some of the professional subject associations also offer doctoral training in their discipline.

We heard that generally there is some overlap between research masters and doctoral training in the graduate schools attached to the research pools, often with little or no differentiation between training opportunities. However, not all research pools include masters students.

In the UK the management of doctoral education at institution level is sometimes already complicated by existing structures, for instance graduate schools at institution, school/faculty or department level, often depending on the size of the institution and the number of candidates in different subjects. While the introduction of doctoral training partnerships and centres for doctoral training have contributed to the development of doctoral education during the last decade by encouraging cohort learning, inter-disciplinarity and critical mass and are thought by many to have had a highly positive effect, they have introduced potentially more complexity, and we heard that the Scottish research pools have had a similar impact, leading to 'significant conflict between the pool and the local universities' graduate schools'. To ameliorate this situation and avoid competing interests, some pools use technology, for example, video-conferencing to provide discipline-specific training, with the student's home university providing general professional skills development.

The question of competition also arises when there is continuing encouragement to universities to work collaboratively. Among our contributors was the view that if the funding that underpins much of the current networks were to dry up, universities would be less enthusiastic about some of the existing partnerships, especially because individual institutions want to maintain their status and identity. Some of our contributors were not convinced of the long-term future of the pools or graduate schools.

Another perspective on Scotland-wide collaboration is that pooling can ensure breadth of coverage in a subject, for example, physics, that a single university could not hope to achieve because of the cost involved and this in turn broadens the scope of research for the individual candidate. However, our contributors also made the point that some subjects, for instance psychology, do not require inter-institution collaboration in order to ensure that doctoral students are exposed to the full breadth of training in their subject as this can be achieved in a single institution, and therefore universities are not competing with one another in these disciplines.

Also from our focus group we heard the view that research pools are potentially contributing to the stratification of training that is a concern in other parts of the UK (a possible 'two-tier' system), with some students having access to all the positive features described above, and others having no research pool, and not being part of a doctoral training centre or critical mass of students.

But even some of the most advantaged students with access to a wide range of pool-related development opportunities across Scotland (often combining discipline-specific and professional skills development, e.g. presenting posters or papers at conferences) were not thought to have a wholly positive experience as a result of being part of a research pool. We heard that some had experienced 'overload', including frequent travelling to events, and might benefit from engaging in

professional skills training provided at their home institution, with their own doctoral cohort, only needing to travel for some subject-specific training.

Some of the perceived benefits and disadvantages emanating from the research pooling system are shared with other structured training initiatives elsewhere in the UK. However, the research pools seem to have begun from an idea for strengthening the research base generally in Scotland, rather than being conceived initially as a way of influencing doctoral researcher development, even though they now have a dual role. This is confirmed by the International Benchmarking Working Group that undertook the research for the Shaping the 21st Century Doctorate publication:

> 'The research pooling initiative was created by the Scottish Funding Council (SFC) in 2003 to encourage researchers across Scottish higher education to pool their resources and respond to international competition. The concept behind these research pools is that dynamic collaborations between research departments can provide Scotland's universities with a competitive advantage which other countries would find difficult to replicate.'
>
> (QAA Scotland, 2012)

Doctoral training partnerships/centres and management structures

One of the questions that arise in Scotland, as well as in the rest of the UK, with respect to postgraduate education is whether masters and doctoral training is combined and how postgraduate education generally is managed within institutions. As noted above, some of the graduate schools embedded in research pools in Scotland admit masters students, but others do not. While acknowledging wide use of the word 'training' in postgraduate education, our Scottish contributors conveyed their reluctance to use this term because it does not sit comfortably with the maturity associated with being part of a graduate school and the professional development opportunities students access.

Our Scottish contributors made the point that, at institutional level, responsibility for graduate education varies and that this is likely to affect several areas. For instance, if doctoral education falls within the portfolio of a pro vice-chancellor for teaching and learning, this may facilitate integration of postgraduate diploma, masters and doctoral development opportunities, which in turn could have an impact on the numbers of masters graduates staying on to study at doctoral level. Conversely, if doctoral students fall within the responsibilities of a pro vice-chancellor for research, masters degrees may be more likely to be managed with other 'taught' degrees. Clearly the type of masters degree affects how the programme is managed, for example if a vocational programme is preparation for entering a profession or taken for professional development reasons, perhaps through part-time study while continuing to work and potentially employer-sponsored, less immersion in research might be appropriate, whereas if it is a research masters programme (e.g. MPhil or MLitt), research would be the principal element.

Doctoral degrees

DTPs and CDTs across the UK emerged directly as a result of an initiative by the UK Research Councils to influence doctoral research development and in particular to encourage inter-disciplinarity, so while there are some parallels and shared activities, research pools and DTPs/CDTs appear to be aimed at achieving different objectives.

Reflecting the difference in funding and critical mass between STEM subjects and arts, humanities and some social sciences that exists across the UK and more widely, we heard that AHRC and ESRC

have each established a single doctoral training partnership/centre in Scotland. The most recent large-scale AHRC initiative is a Scottish Graduate School for the Arts and Humanities (SGSAH) (AHRC, 2014), jointly funded with SFC, which is contributing £1.8 million to infrastructure costs. We heard that the Graduate School includes all Scottish universities except one, which our contributors believe has been excluded because of its small size.

The AHRC's Scottish DTP is conceptually at the centre of the Graduate School, which is currently funding around 1,500 PhD students in arts and humanities across Scotland. The ESRC model in Scotland is similar to AHRC's, with their DTC in Scotland 'at the heart' of the Scottish Graduate School of Social Science. In 2011, 65 studentships per year for six years (2011-2016) were awarded. The arrangements are managed by a management board and a supervisory board, the latter including a representative from each partner university and taking responsibility for 'setting the overall strategic direction of the Graduate School and CDT' (ESRC, 2014).

Although the structures adopted by AHRC and ESRC seem to offer a coherent training structure, with a Scotland-wide graduate school for each, we heard that these arrangements still do not prevent stratification and inequity. For instance, some pan-Scotland events may only be open to Research Council-funded students, others to any student assigned to a supervisor linked with a DTC, and yet others are open to any doctoral candidate.

In STEM subjects, multiple DTCs/CDTs exist in Scotland, but unlike the AHRC and ESRC partnerships, they are subject-specific and university-based. For example, EPSRC funds five CDTs in Scotland, two at Edinburgh University, one at Glasgow, one at Heriot-Watt and one at St Andrews.

Even though we heard about the practical problems associated with current doctoral education and training arrangements that are thought to pose a risk to the excellence of the doctoral student experience in some situations, there was no suggestion that the implicit quality of doctoral education was being compromised. However, there does appear to be uncertainty about the future sustainability of research pooling and other doctoral training-related structures and one of our contributors suggested that 'it is a complex landscape that needs to be rationalised'.

Masters degrees

We heard that, as in the rest of the UK, masters degrees in Scotland are 'multi-dimensional'. They vary in length and breadth, and are both vocational and non-vocational. Masters training in Scottish institutions is generally thought to be of high quality.

Whatever the nature of the masters programme, our contributors emphasised the importance of ensuring no time is lost, particularly at the beginning of the programme, because full-time students in particular have only a year in which to complete both the taught part of their programme and the dissertation (a typical full-time year for a masters programme being around 48 weeks). Some universities offer non-credit-bearing modules on learning strategies to support masters students in making the transition to a different level.

Our contributors emphasised the importance of the *process* of masters study in influencing individual outcomes (Prosser and Trigwell, 1999) and ensuring that all masters graduates, even though emerging from a multiplicity of programmes, 'meet the quality threshold'. And in the same way that entrants to masters programmes have had varied education experiences, are from different backgrounds (including multicultural) and therefore have a wide range of learning needs, our contributors emphasised the associated diversity of masters entrants to doctoral degrees and the variability of training needs at the beginning of the doctorate. In Scotland, integrated masters

students have already completed five years' higher education (similar to US masters graduates), whereas it remains the case that in some subjects graduates enter a PhD without a masters qualification and may therefore need more concentrated training in the first year, particularly around research methods.

Our contributors agreed that, from a UK perspective, the Roberts initiative had established a kind of 'national curriculum' of expectations for professional skills development in doctoral education and that, although in some cases, masters training is integrated with doctoral training, nothing similar to the doctoral skills framework had been developed for masters programmes.

However, the 'Taught Postgraduate Student Experience' Enhancement Theme includes an innovative project about what it means to be a masters student - 'Facets of Mastersness' (SHEEC 2014), and how students are supported in making the transition from their first degree to completing a masters degree successfully. The project team has adapted a framework originating in New Zealand (Warring, 2011), designed to analyse the learning that takes place at different qualifications levels.

The 'Facets of Mastersness' framework comprises characteristics developed from 25 case studies, national and international (SHEEC, 2014), ranging from general studies (for example how to recognise masters level and transitions to postgraduate study) to cases about specific masters programmes in different contexts, with one Australian case study about pathways into the doctorate. From these case studies, seven facets have been defined, as summarised in Figure 19:

Figure 19: Facets of Mastersness (SHEEC, 2014)

Each of the facets has been defined, as follows:

Facet	Definition
Abstraction	Extracting knowledge or meanings
Depth (of learning)	Depth of learning, i.e. acquiring more knowledge and using knowledge differently. For example, engaging in a narrow topic in depth, engaging in up-to-date research or taking a multidisciplinary approach and

	examining something familiar and presenting it in a new innovative way.
Research and enquiry	Developing critical research and enquiry skills and attributes
Complexity	Recognising and dealing with complexity of knowledge – including the integration of knowledge and skills, application of knowledge in practice – conceptual complexity, complexity of learning process
Autonomy	Taking responsibility for own learning in terms of self-organisation, motivation, location and acquisition of knowledge
Unpredictability	Dealing with unpredictability in operational contexts – recognising that 'real world' problems are by their nature 'messy' and complex, being creative with the use of knowledge and experience to solve these problems.
Professionalism	Displaying appropriate professional attitudes, behaviour and values in whatever discipline/occupational area chose (from academic to occupational subjects), including learning ethical behaviours, developing academic integrity, dealing with challenges to professionalism, recognising the need to reflect on practice and becoming part of a discipline/occupational community

Table 19: Definitions of Facets of Mastersness (SHEEC, 2014)

The detailed case studies have been distilled in the heptagon and the definitions, which are relevant both for helping masters students make the transition from either a first degree or a postgraduate diploma, and for supporting their progression into doctoral study, if that is relevant. In addition, the definitions are relevant for employment (see below).

Other developments in taught postgraduate education include moves by the Scottish Government to increase the number of teachers with masters level qualifications. Inviting applications for the second round of a bidding process, a letter sent to providers of teacher education in September 2013 (Scottish Government, 2013), offers a total of £1.7 million (following prior initial investment of £1.3 million to support around 500 teachers) to fund the development of masters programmes for existing teachers pursuing continuing professional development leading to a masters qualification. The Scottish Government's priorities for the development of masters programmes for teachers are 'professional enquiry', the Standard for Career-Long Professional Learning and alignment with level 11 of the SCQF (see above). Funded programmes may be part-time and involve online learning and reflective practice, supporting a variety of professional learning models. This initiative is an example of professional differentiation through acquisition of a postgraduate qualification: one of our contributors described this as becoming 'a fully-fledged professional'.

International students

Scottish universities are thought to perform well in recruiting international postgraduates compared with the rest of the UK (Kemp and Lawton, 2013). It is suggested that law, pharmacy, nutrition and nursing are strongly-recruiting subjects for international students, but that there are 'proportionately fewer international students in medicine, engineering, the creative arts and design'.

International students may be affected by immigration laws which dictate that they may not take time off from their studies to work, so full-time students taking up part-time employment to help fund their degrees are technically doing so illegally. In parallel, they may be compromising their academic work, as we heard from one of our English contributors with regard to Indian students, as summarised in the case study on India.

Access

We heard that fair access is very high on the government agenda for higher education in Scotland (Kemp and Lawton, 2013), and that universities 'want the best students, wherever they are'. According to Diamond (2011) 'Ensuring all those qualified to attend university are able to do so, regardless of background, will require funding': a statement that could apply to any of the countries included in this study. For Scotland, Diamond suggests two possible forms of funding – state maintenance loans to be repaid once the graduate is earning a significant amount (already in place for postgraduate diplomas, see below), or university scholarships, which he suggests could be principally funded through philanthropy.

In their report Action on Access, Universities Scotland define 'the principle of accessibility based on ability rather than means' as universities being 'equally open to any learner with the appropriate academic potential to benefit, regardless of their social or economic circumstances' (Universities Scotland, 2014). One of the challenges for this study has been to determine whether graduates originally from under-represented groups retain this status in entering postgraduate study and/or whether graduates from such backgrounds are deterred from progressing to further study (Wakeling and Hampden-Thompson, 2013). Our contributors suggested that graduates from under-represented groups were more likely to be aware of the status of the university at which they obtained their first degree, and that 'pedigree counts, but an undergraduate degree helps you jump up the scale', and 'by the time you get to postgraduate [study] it doesn't matter where you come from'. This last point was emphasised by one of our contributors who said that they had never had a 'fair access' conversation with a postgraduate because admitting students to postgraduate study was not about personal background but academic achievement and potential, adding that when making admissions decisions about postgraduate programmes, it is helpful to have staff from different backgrounds and with a variety of experience on the selection committee or panel, so they can evaluate applications from diverse students and recognise potential in those who have not necessarily had a conventional route to postgraduate education. Doctoral supervisors may not be prepared to take a risk in recruiting students who they are not sure have the potential to succeed; this is part of maintaining standards but also about making fair and good decisions for both the applicant and the university by trying to ensure they do not recruit students who are likely to struggle. Conversely, we heard that some postgraduates believe that their supervisors 'are not good enough' and are critical of the support and guidance they receive.

These questions are part of the wider 'fair access' debate in postgraduate education. Our Scottish contributors thought that, even at postgraduate level, for some it is a question of belonging and that students from unrepresented groups may 'feel they don't fit in', although they agreed that those progressing to postgraduate study are capable of doing as well as any other students. Our contributors emphasised that it is important not just to focus on poor students but to consider a wide range of student groups when approaching fair access; this perspective is supported by the literature, as identified by Moore et al (2013). And the Action on Access report (Universities Scotland, 2014) recommends that university policies 'recognise the wide range of under-represented student groups and modes of educational delivery and widening access through lifelong learning', although Moore et al suggest that part-time degrees 'may be perceived as being lower status'. They also confirm that 'issues of identity may impact on the extent to which part-time learners see themselves as being "authentic" students'.

Schools, including primary schools, were sometimes failing to encourage younger students with potential to aspire to higher, and therefore postgraduate, education. Recommendations made in the

Action on Access report (Universities Scotland, 2014) take this view into account and suggest that to widen access, 'there needs to be an holistic and joined-up approach involving schools, colleges, universities and the Scottish Government'. The report also notes that 'Raising aspirations and closing the attainment gap between groups of school pupils is a formidable challenge and initiatives focussed on young pupils can take a generation to deliver results. Universities cannot deliver this alone but there are many things they can do'.

Diamond's view is that 'Widening access is not solely an undergraduate challenge' (Diamond, 2011). He suggests that 'easy pathways' should be created between institutions to facilitate access to higher degrees and that these pathways should be supported by similar routes to those for undergraduates, namely state loans and university scholarships. Our Scottish contributors agreed that, generally, the main issue for fair access at postgraduate level is funding but that it is also important that those in senior leadership and management positions in universities represent diversity and a range of backgrounds.

Our Scottish contributors considered it too soon to predict whether the value of higher education qualifications and their ability to differentiate individuals in the job market would be enough to encourage undergraduates and graduates to pay significant fees for pursuing studies at different levels, or whether postgraduate study would become dominated by students with the ability to pay. The latter is likely, according to Lindley and Machin (2013), who suggest that 'Postgraduate study is becoming increasingly the preserve of the better off student, both from home and abroad'. They also think the situation will be aggravated by the £9,000 undergraduate fee currently charged by the overwhelming majority of English institutions (Lindley and Machin, 2013). The plight of some self-funding students was also highlighted by our contributors; such students may have great difficulty making ends meet and some are 'practically destitute' as a result. The rise in the number of part-time professionals was also noted, some of whom are sponsored by their employers, engaging in professional development through postgraduate qualifications.

Postgraduate tuition fee loans

The SFC, through the Student Awards Agency for Scotland (SAAS), has introduced loans for postgraduate diploma students. These are known as 'Postgraduate Tuition Fee Loans' or PTFL, and SAAS has published a list of the programmes at all 18 universities for which loans are available in 2014-15 (SAAS, 2014a). Only certain postgraduate courses are funded, mainly postgraduate diplomas (which may or may not be part of a masters programme: many masters programmes in the UK have exit points at postgraduate certificate and diploma level). Loans are available for both full- and part-time students, who must already have received an unconditional offer of a place on their course to be eligible for a tuition fee loan. Scottish students who want to study for a postgraduate diploma in another UK country can obtain a SAAS loan if an equivalent programme is not available in Scotland (SAAS, 2014b). Loans for full-time students may be as much as £3,400, whereas for part-time students the maximum is £1,700 and students must complete their course within two years.

The University of Edinburgh is offering up to 50 postgraduate bursaries for students who have been awarded a PTFL for entry in 2014: £1,000 for full-time and £500 for part-time students. Since to obtain a PTFL students have to prove an unconditional offer to a postgraduate programme, the Edinburgh bursary decision is not based on academic criteria (University of Edinburgh, 2014).

As well as the PTFL scheme, the SAAS provides financial support for disabled postgraduates through the Disabled Students' Allowance (DSA) (SAAS, 2014c). The DSA may provide up to £1,725 per year for small items of equipment or consumables; up to £20,520 per year for non-medical personal help; and up to a total of £5,160 (for the whole course) for major specialist equipment. Travel expenses

for disabled students are also available for those who find it difficult to use public transport. The DSA scheme may make a difference between a disabled student deciding to progress to postgraduate study or not, particularly because the award amounts have been set at different levels to reflect realistic costs of providing support.

These measures (PTFL, the Edinburgh bursaries and the DSA) are 'fair access' attempts to support academically able part-time students who would otherwise be deterred from postgraduate study for financial reasons. It is too early to judge what their impact will be, especially since the PTFLs are almost only available for postgraduate diplomas and not for masters degrees.

As Table 20 below demonstrates, proportions of postgraduates from different ethnic backgrounds studying in Scotland are low compared with the overall number:

Ethnic Background	Level of Study					
	All Levels	Postgraduate		First Degree	Sub-degree	
		Research Postgraduate (1)	Taught Postgraduate		HNC/HND	Other Sub-degree
All Students	**278,765**	**11,980**	**41,530**	**150,940**	**39,745**	**34,565**
Asian - Bangladeshi	**340**	30	70	165	50	20
Asian - Chinese	**6,445**	515	2,480	2,440	185	820
Asian - Indian	**3,885**	240	1,315	1,280	470	580
Asian - Pakistani	**3,560**	110	480	2,010	645	310
Asian - other	**3,400**	375	1,020	1,305	415	290
Black - African	**4,945**	390	2,025	1,745	425	355
Black - Caribbean	**310**	15	100	135	25	35
Black - other	**425**	40	140	150	45	50
White	**222,045**	7,235	23,485	125,190	36,785	29,350
Mixed background	**3,730**	250	555	2,430	265	230
Other ethnic background	**2,150**	355	720	760	100	215
Unknown	**27,535**	2,425	9,145	13,325	330	2,305

Table 20: Students in higher education at Scottish higher education institutions and colleges by level of study and ethnicity (SFC 2014a)

Employment outcomes

In the UK several reports have highlighted 'skills shortages' among postgraduates. It has become *de rigueur* for some large employers and employer organisations (and occasionally senior academics) to suggest that postgraduates enter the job market unprepared and unequipped with the necessary professional skills for a successful career outside academia (Smith et al, 2010), even though recent longitudinal employment statistics for early career researchers suggest high rates of employability, at least for doctoral graduates (Mellors-Bourne, Metcalfe and Pollard, 2013). The 2013 'What do researchers do?' report is based on doctoral respondents to the Higher Education Statistics Agency (HESA) Longitudinal Destinations of Leavers from Higher Education (L DLHE) survey in 2010, three to three and a half years post-graduation, and makes comparisons with similar results from an

equivalent survey in 2008. Findings include: little change between the two cohorts; only 2% of respondents (2008 and 2010) remaining unemployed; and 18% having experienced unemployment at some point since graduating – for approximately half of those in this group this period of unemployment lasted only three months or less. According to Mosca and Wright (2010), 'It is often argued both by politicians and the media that there is an "over-education" problem in Scotland'. Evaluating the extent of 'under-employment', based on employment statistics six months after graduation, it was found that the 'graduate-job' employment rate of Scottish postgraduates (taught and research) was 92.8%, slightly higher than the rate for UK graduates of 92.2%.

Our contributors emphasised the importance of having an 'international mindset' with regard to employers of postgraduates, and suggested that involving a variety of employers at subject level, for instance through membership of programme advisory boards (or equivalent), is an effective mechanism for strengthening academic-industry links, across all subjects. The wide range of employer perspectives (international/large corporate versus SME; recruiters of vocational/occupational graduates versus recruiters from any degree subject; whether or not they have already employed postgraduates) means that it is exceedingly difficult for employers to engage with universities at a generic level, as they are likely to have diverse perspectives on the professional skills required for their organisation. However, some attributes such as the ability to communicate well (written and spoken), facility with ICT and multimedia, good interpersonal and leadership skills, initiative and competence with numerical and statistical data are widely valued by employers of all kinds. It was suggested that universities may not be making sufficient effort to market the employment-related benefits of postgraduate degrees and that it is also important to help students to realise the value of the professional skills they are developing during their degree and their relevance to employers. Encouraging students to talk about their research in a way that is understood by non-experts in their subject helps to raise awareness of professional skills and their importance. Initiatives such as the 'Facets of Mastersness' project and the Third Sector Internships Scotland scheme (see below) are helping students to recognise the professional attributes that employers are seeking.

We heard that many non-vocational employers - for example, publishers - may not advertise for doctoral graduates but are keen to employ them because of their mature approach and highly developed professional skills, including the ability to deal with complexity, to solve problems, be persistent and think independently, as well as having competence in analysing data and report-writing. But another factor in the debate about the impact of postgraduates in the work environment is the question of how individual students' distinct abilities and personalities contribute to their potential to fulfil employer expectations in a wide range of roles and this cannot in the end be completely evened out by professional development.

As the internship scheme summarised below indicates, SMEs in particular appreciate support in recruiting graduates and postgraduates (even at the level of preparing job descriptions and interviewing techniques) and through this, the additional insight they gain from close association with universities about what they can expect from (post)graduate employees.

Our contributors emphasised that 'the time has gone where all PhD students expect to become academics'. Instead, it was suggested that 'students are obsessed by employability', which could be viewed from several perspectives, positive and negative. On the question of academic careers, it is acknowledged that it is now impossible to enter academia without a PhD, but that as well as being skilled researchers academics now need a range of professional skills to be successful.

Third Sector Internships Scotland

A recent initiative by the SFC is the Third Sector Internships Scotland (TSIS) scheme, which helps undergraduate and postgraduate students to find work experience in third sector organisations. TSIS is being delivered by Queen Margaret University, Edinburgh, the Open University in Scotland and the Scottish Council for Voluntary Organisations, supported by a steering group that includes membership from a range of other Scottish universities. The scheme was introduced in 2010 for a four-year period (Third Sector Internships Scotland, 2010).

All interns are paid (Living Wage rate). Internships can be full- or part-time and can last up to the equivalent of 10 weeks' full-time work, equivalent to 350 hours. According to a mid-term report in 2012 (Caddell, 2012), at the half-way point in the initiative, the average number of hours worked by interns had been 293, with 55% of internships lasting between 315 and 350 hours, at locations the length and breadth of Scotland. At the time Caddell's report was published, 113 host organisations were contributing to the scheme, 90% of which were SMEs and 55% of which had fewer than 10 employees.

The data collected for the 2012 report showed that part-time students had been proportionately more successful in the scheme than full-time students and also that applicants from some universities were more likely to apply and be accepted for internships than those from other institutions. Case studies available on the TSIS website demonstrate significant benefits for both student and employer from the internships which are seen by participants as helping to develop professional skills and to apply academic skills (particularly at postgraduate level). The scheme is due to end in 2014.

In providing written evidence to the Economy, Energy and Tourism Committee in 2013, NUS Scotland 'proposed a range of measures … to promote opportunities for training, education and work experience. In particular, it suggested a postgraduate apprenticeship scheme to "promote greater numbers of jobshare opportunities with graduate employers"… combined with "investment in additional part-time study opportunities with support for fees and living costs"' (Scottish Parliament, 2013).

Careers advice

Our Scottish contributors briefly discussed the role of university careers services in supporting postgraduates to make the transition from university to the next stage in their careers, whether academic or non-academic (the majority). One view is that careers services prioritise undergraduates because of the relatively smaller numbers of postgraduates, but that timetabled, targeted events for doctoral students can be successful and that entrepreneurial skills events are of particular interest.

The final point made by our contributors on the topic of postgraduates' impact in employment was that it is not possible to make simple comparisons between the employability of STEM postgraduates and others: the subject of study really does matter in relation to postgraduates' preparedness to enter different employment roles, sometimes in a precise way (e.g. linked to the exact topic of a doctoral thesis), and sometimes in a more general sense. And in some careers, for instance in the arts, it is possible to become a specialist without any kind of higher education qualification – these subject differences need to be recognised and acknowledged to reflect the highly complex area of postgraduate employment.

Summary

Postgraduate education in Scotland has many strengths; it also faces some challenges, not least the dilemma about undergraduate fees, which will inevitably affect postgraduate degrees. We conclude, however, that the strengths in Scotland outweigh the challenges, although there remain enhancements in the area of postgraduate degrees that, if made, could help to sustain current excellence into the future.

Scotland's strengths in higher education include:

- its research productivity, including research pooling;
- concentration of a diverse group of institutions, all of which contribute differently to postgraduate education and appear to recognise one another's specialisms and high quality;
- the 'enhancement' approach to monitoring and maintaining quality;
- the collaborative nature of many of the initiatives currently taking place;
- its outward-facing and internationally-focused approach to higher and postgraduate education.

Potential challenges are:

- the potentially confusing structures that exist for doctoral training and the possible associated 'training' overload for doctoral candidates;
- the risk of a 'two-tier' system of doctoral training opportunities evolving partly as a result of funding models and structures;
- the potential threat to competition, in research and for students, emanating from the research pooling system, acknowledging that this is also a strength that generates many benefits, especially from an international perspective.

Annex F - Spain

Spain

Context

Higher education in Spain is characterised by a model which is highly decentralised with responsibilities shared between the national government, the 17 autonomous communities and the universities. The Ministry of Education, Culture and Sport (often referred to as the 'Ministry of Education') is responsible for the general framework and for ensuring an overall consistency, while regional ministries develop their own regulations, allocate budgets and provide the organisation for higher education in each autonomous community. This results in 17 different university systems in the 17 autonomous communities. With a total population of Spain of about 46.5 million, the autonomous communities vary substantially in size (the most populous being Andalusia with a population of about 8.3 million while La Rioja has the smallest population with about 320,000).

According to the Spanish constitution universities have autonomy, which is strongly protected. There are 79 universities in Spain, of which 50 are state or public universities and the remaining 29 are private universities. This includes five open universities which provide distance learning (one national public Open University (UNED) and four regional private universities). Of the public universities, 48 fall under the authority of autonomous communities while two fall under the Ministry of Education. Six of the private universities are Catholic universities. The universities are spread over approximately 230 campuses of which 21 offer distance learning. In the academic year 2010-11, almost one and a half million (1,445,392) students were registered at Spanish universities (87.8% at public universities, the remainder at private universities).

Modernising Higher Education in Spain

There has been a growing awareness in Spain of the need to modernise its system of higher education, not least to bring it into line with the European Union aspirations for the EHEA, the European Research Area (ERA), and the European Commission 2006 Modernisation Agenda for Universities. However, modernisation has proved to be a major challenge, given the largely decentralised administrative structure of the country and its university system with its constitutional system of regional autonomous communities with responsibility for education, and hence the need to achieve consensus among very different stakeholders.

The Spanish Government designed its so-called modernisation strategy in 2008 and presented this to the two representative bodies, the Council for Universities (the Council of University Rectors chaired by the Minister for Education) and the General Conference for University Policy (the Council bringing together those responsible for university education in the regional governments of the autonomous communities and also chaired by the Minister of Education), thus aiming to achieve consensus across the different regions and stakeholders. This led to the Strategy University 2015 (*Estrategia Universidad* 2015 or EU2015), which was approved by the Council of Ministers in 2009 and was intended to 'bring about structural and cultural change in the Spanish university … with a time horizon of 2015' (Government of Spain, 2010). The EU2015 promotes the development of highly internationalised, well-managed and well-funded universities, and focuses on the following four key dimensions:

- missions, including education, research, knowledge transfer, social responsibility;
- people, including academics, researchers, students and administrative personnel;
- institutions, including governance, funding, internationalisation, quality and evaluation, communication;

- environment, including campus, university-city-territory, regional development.

One of the cornerstones of the EU2015 was the International Campus of Excellence Initiative (CEI) which was intended to create strategic aggregations of universities and other 'knowledge triangle' (education, research and innovation) institutions and businesses in order to strengthen regional development and push forward research and development and knowledge transfer. A further key element of the EU2015 was completing the re-organisation of degrees into the Bologna bachelors/masters/doctorate structure. Part of this also involved reducing the number of bachelors courses, encouraging inter-university collaboration, developing a quality model for masters courses, and modernising the PhD through enhanced research training, incentivising doctoral programmes of excellence and encouraging the creation of doctoral schools 'as dynamic structures for the new trans-disciplinary doctorates' (Government of Spain, 2010).

International Campus of Excellence Programme (CEI)

This programme was launched in 2009 through competitive calls for proposals with the aim to promote excellence and internationalisation in the Spanish university system, through improving the quality of teaching and research and promoting innovation. Substantial funds were allocated through competitive selection processes which aim to create a new concept of the university campus with greater social and economic integration with the surrounding urban or regional area, through collaborations with businesses, technology centres and other research and development institutions. The evaluation panel used the following evaluation criteria for proposals:

- improved teaching and adaptation of teaching spaces according to the EHEA and renovation of teaching buildings;
- improvements in science and knowledge transfer of university-based results to businesses;
- sustainability, transformation of the campus, development of an integral social model, interaction with the territorial environment.

In the first round of competition, 18 universities were awarded €2,000,000 to develop a detailed plan to transform their existing campus into a CEI, and five campuses were selected for substantial funding through their autonomous communities to transform their campuses through integration and collaboration with local and regional institutions. However, although the CEI programme involved a major commitment to improving quality, according to one contributor, the financial crisis of 2008 meant that the universities have not received the funds awarded through CEI.

Bologna restructuring

Following the Bologna Agreement, the previous structure of degrees (the three-year *Diplomatura* and the four- to five-year *Licenciatura*) were replaced by a bachelors/masters structure in which the country decided to adopt a four-year (240 ECTS) bachelors degree plus a one- to two-years (60, 90 or 120 ECTS) masters, plus a three-year PhD. 2010-11 was the first year of full adaptation to the Bologna structure. A previously restricted system of masters degrees was liberalised after 2004 and the number of masters degrees has expanded substantially in response to market demands.

Quality

As is evident from the discussion above, improvement of quality is high on the Spanish policy agenda. There is a particular aspiration and aim to ensure that Spanish standards, practices and policies meet standards set by the European Commission and other bodies in the EU. This has led to the EU2015, with its particular initiative of CEI, and to the formation of a national agency for QA, the

Agencia Nacional de Evaluación de la Calidad y Acreditación (the National Quality Assurance Agency or ANECA). The past five years have seen vigorous activity as Spain aims to transform its university system, and enable it to compete with top universities internationally, while also contributing nationally to excellence in teaching, research and innovation.

Quality assurance

ANECA was created in 2002 as a national agency carrying out QA tasks across the country. ANECA joined ENQA in 2004 and the European Quality Assurance Register (EQAR) in 2008 and has an explicit goal to ensure that Spanish QA standards and procedures are in line with European QA guidelines. There are also 10 regional agencies which serve more local functions, but which require collaboration with ANECA. These agencies were brought together in 2006 in the Spanish Network of Agencies for University Quality (*Red Española de Agencias de Calidad Universitaria* or REACU) which collaborates with ANECA to bring the Spanish system into line with that of the European ENQA and EQAR. Degree programmes are required to be verified, then accredited; accreditation is valid for six years for bachelors programmes and four years for masters programmes. The Mención programme awards a quality label recognition of doctoral programmes.

Masters programmes

There is a range of different types of masters programmes in Spain. Following the Bologna restructuring, masters degrees may be awarded on completion of 60, 90 or 120 ECTS (i.e. one to two years) and may be (i) related to professional activity, (ii) related to further specialisation or (iii) focused on research, in preparation for the doctorate. There is no formal distinction between taught and research masters programmes.

The majority of masters programmes are 'official' i.e. verified and accredited by the Ministry through ANECA; however there are also a number of masters programmes and other postgraduate courses which are issued by the university and not included in the Register of Diplomas established by the Ministry of Education. Thus there is a distinction between a) official masters and b) masters which are issued by the university (*titulos propios de la Universidad*) and which are not verified and accredited.

Over the past decade, there has been a substantial growth in the number of masters programmes (Figure 20). By 2009-10 there were 2,429 officially recognised masters degrees on the register, a substantial increase from the 829 programmes registered in 2006-07. There are a number of joint masters degrees in Spain, 8.9% of all masters courses in 2010-11, and Spain provides the largest number of Erasmus exchange students and Erasmus Mundus joint masters programmes. Although private universities accounted for a substantial increase in numbers of masters students earlier in the 21st century, this has now slowed down (see Figure 21).

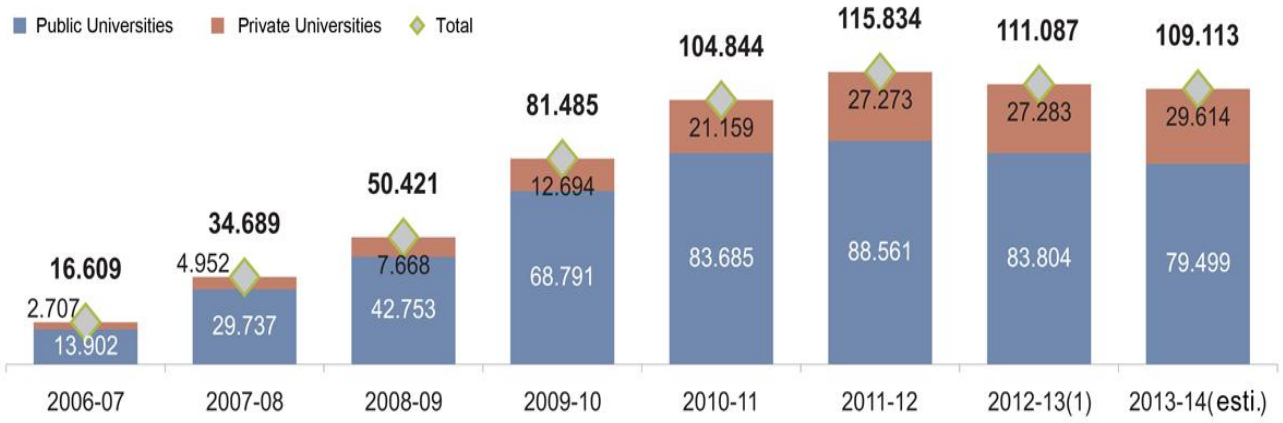


Figure 20 Number of masters students enrolled by type of university over the period 2006-2014 (Ministry of Education, Culture and Sport/*Ministerio de Educación, Cultura y Deporte*, 2013)

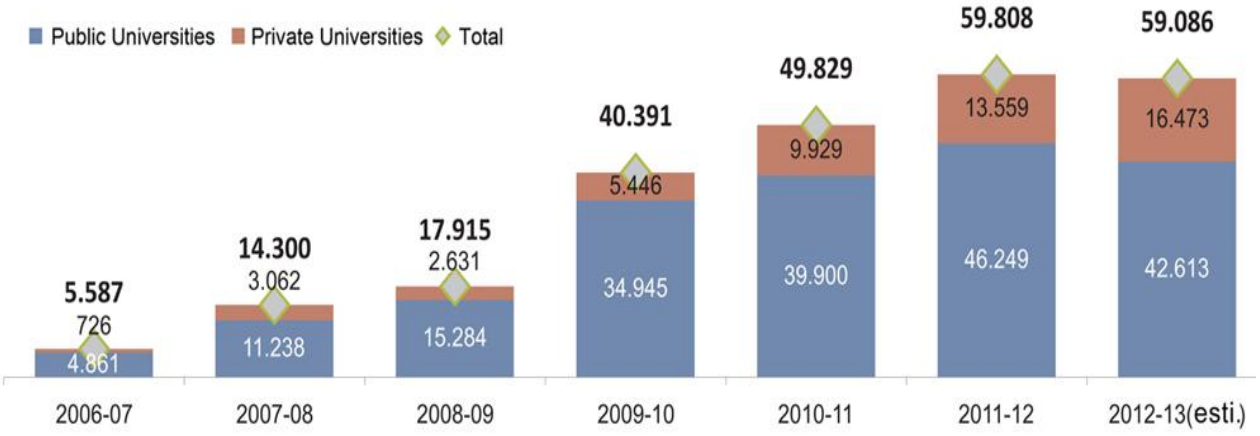


Figure 21 Number of masters students graduating by type of university (Ministry of Education, Culture and Sport/*Ministerio de Educación, Cultura y Deporte*, 2013)

In terms of subjects studied, Figure 22 below shows that over half the masters students enrolled in 2012-13 were engaged in the broad field of social sciences or law.

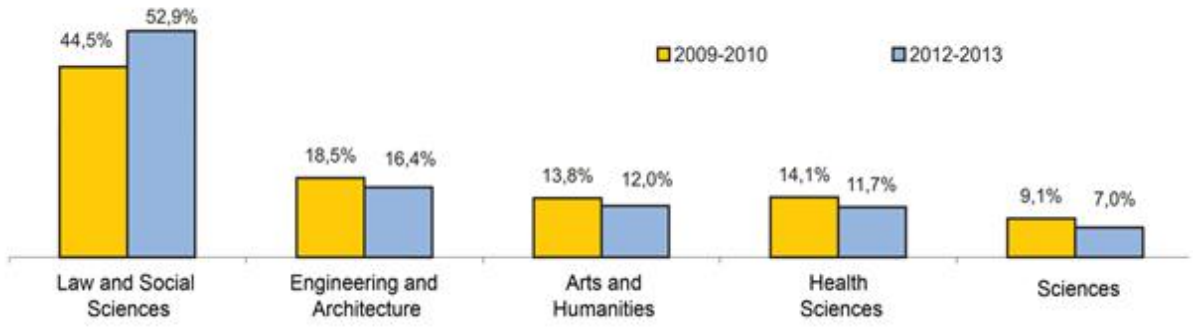


Figure 22 Proportion of masters students by field of study (Ministry of Education, Culture and Sport/*Ministerio de Educación, Cultura y Deporte*, 2013)

Following the Bologna restructuring to bachelors/masters structure, the majority of students progress from bachelors to masters. Progression is dependent on satisfactory completion of the bachelors programme. All universities offer bachelors and masters programmes, and students tend to attend their local university, resulting in a spread of students across universities. Although at the present time demand for and participation in higher education is spread across the regions, increased competition nationally is likely to lead to a more differentiated university system and Spain is aware of the need to become more competitive in international league tables.

Doctorate programmes

The PhD degree has undergone significant change in the years since 1997, since when there have been a number of laws (Royal Decrees) on the PhD, which have sought to improve its quality, organisation and output. A major goal of these reforms has been to reduce the number of students enrolled as PhD students in order to address a number of problems such as lengthy completion times, and frequently low numbers finally defending the thesis. The most recent decree of 2011, stipulated that the PhD programmes have to be verified by the Ministry through the national agency, ANECA.

Traditionally in Spain entry to the PhD required a student to: identify a supervisor willing to accept the proposal; to undertake the *Diploma de Estudios Avanzados* (DEA) (a form of research training); and work towards submission of the thesis. However, in the past 10 years, the PhD has become more structured, and students are required to undertake a masters degree prior to embarking on the PhD; this serves as the research training and replaces the former DEA programme. Selection for the PhD has become more rigorous with an expectation of a three- to four-year completion time, completion of seminars, and publication of articles. By 2010-11 1,624 doctoral programmes had been placed on the Register of which 90 were taught jointly by more than one university.

Relevant here is the goal of EU2015 to set up international and inter-university doctoral schools and postgraduate schools with joint research programmes and research training.

Access

The EU2015 strategy aimed for universities to 'guarantee access for all groups of people, with special emphasis on gender equality and the rights of persons with disabilities' (EU2015). Under the EU2015, a new model of scholarships, grants and loans was set up which aims to increase investment in grants, subsidies and loans in the period to foster access by the most disadvantaged groups to universities.

The University Observatory for scholarships, study grants and academic performance (*Observatorio Universitario de Becas, Ayudas al Estudio y Rendimiento Académico*) is an instrument which has been set up to compile and analyse relevant information and to monitor the take-up and effectiveness of grants and scholarships.

Higher education in Spain has relied on a very basic tuition fee (which may vary by autonomous community and by field of study). Thus, for example, laboratory based subjects attracted higher fees. However, in a number of autonomous communities, tuition fees are the same for all fields, established by law of the regional governments every year within the range established by the Ministry of Education. Recently fees per credit have been introduced, with an increased fee when the student fails and has to register for the same course for a second or even a third time. However, following the economic crisis of the past six years or so, tuition fees have increased, although they

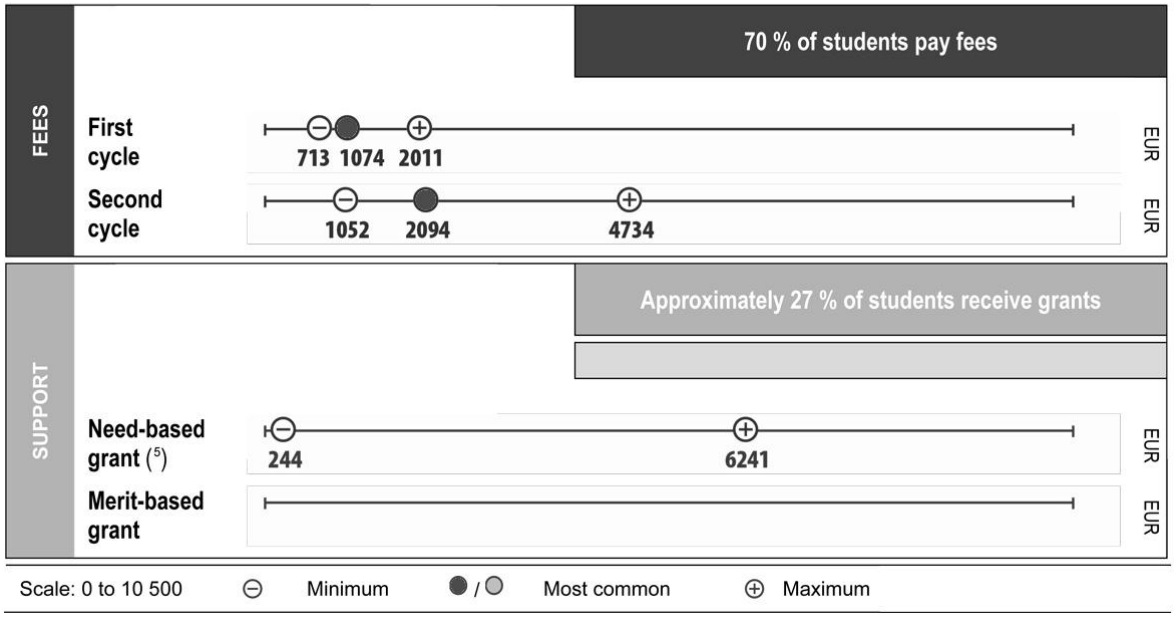
remain low. One of our contributors stated 'The fees are very low for bachelor degrees, covering less than 20% of the actual costs.' The increase caused by the crisis has been only for masters degrees that are not professionally oriented.

There is a system of grants to support students from low income families, though these are dependent on satisfactory academic performance. The grant is normally available to waive the tuition fees; take-up of the grant is 15-20% of the student population. The government has recently raised the issue of loans (rather than grants) which would be repayable once the student is in employment. However there is no tradition of loans in Spain; students still tend to attend their local university and pay tuition fees privately or through the fee waiver.

Table 21 summarises sources of funding and support for first and second cycle degree students.

SPAIN

MAIN CHARACTERISTICS



Key points

Fees (2012/13)

• The amount of fees is determined by the kind of the studies, the number of ECTS taken and the number of exams failed in each subject. In addition, amounts differ between regions as each one has a different range.

• For international students (from outside the European Union) who have not set their residence in Spain, the fees can be increased, depending on the region.

• Exemptions from fees are based in need criteria (family income being the most significant one), but a minimum level of academic performance is also required. Also, large families and disabled persons have very significant discounts, and may even be exempt.

• In the current economic crisis context, the government approved a new decree-act on urgent measures for rationalization of public expenditure in education in 2012. One of the measures adopted in this act is that university students have to cover between 15 % and 25 % of the real total cost of their studies (to be decided by each Autonomous Community). These urgent measures were implemented in the academic year 2012/13.

Support (2011/12)

• Although student **grants** exist at national, regional and local level, only the ones at national level have been considered here, as they are quantitatively the most important ones. There are many types of grants, aimed at covering different types of expenses such as transportation, residence, meals, books and materials, etc. The grant also covers tuition fees. Students can receive different types of grants, depending on their family income. The average amount of a grant is EUR 2 497.03 and a waiver from tuition fees. The maximum grant is EUR 6 241 and a waiver from tuition fees, and the minimum is EUR 244 and a waiver from tuition fees.

• Grants are need-based, but a minimum level of academic performance is also required.

• No loans, no tax relief for parents and no family allowances.

Table 21: Main characteristics of HE student fees and support – Spain 2013-14
(Eurydice, 2013)

Fair access and widening participation are considered to be a high priority in Spain. Access to university is organised by the universities in the region. Although under the earlier system, all students who completed the high school examination were entitled to attend higher education, access is now determined more selectively. Under the current system, all students who wish to attend an institution of higher education take a general examination organised by the regional ministry and the regional universities; scores on this examination count for 50% weighting, with the other 50% weighting determined by average high school scores, and the total determines the overall university entry score. Over recent years, different fields of study (and universities) are increasingly ranked on the basis of popularity and demand, and may require higher entry scores.

Applicants for masters degrees are generally required to have a bachelors degree, and all applicants for the PhD are required to have a masters degree, or at least 60 ECTS from an official masters degree.

The PhD may be funded through some form of grant, although one commentator estimated that only about 50% of PhD students are grant funded. Grants are awarded by universities, by the Ministry of Education, Culture and Sport and by regional ministries, on the basis of merit. Some students work to support themselves through the PhD, effectively studying part-time, though this was said to be a problem since this route lengthens the time to completion.

Employment outcomes

We were told that the relationship between postgraduate achievement and employment is complex in Spain. Due to the problems of employment, and the nature of employment, Spain has a number of mature and traditional industries which do not (yet) require 'knowledge' experts. This means that many graduates find themselves over-qualified, at least in their first job.

According to the Government (Government of Spain, 2010), 'university policies, along with the rest of economic policies in the country, must strike a balance between universities and the economic fabric to prevent the jobs obtained by university graduates being significantly below the skill level afforded by their education. There is increasing dispersion in the returns to post-graduate education in Spain, and one possible cause is the increase in over-qualification. The fact that people (as often happens at present) are over-qualified, in certain jobs, generates job dissatisfaction, and diminishes the economic returns of education' (p.99).

Several of those interviewed expressed the view that young people with postgraduate qualifications may have to take jobs that are well below the level of their qualification if they are to have any chance of finding employment and acquiring experience. This is referred to by the ministry as

‘occupational mismatching’ and may last several years before the graduate is able to gain employment commensurate with the post-graduate skills. ‘Occupational mismatching occurs mainly among young people with university qualifications since there are fewer jobs for them and also because the most senior jobs are more specific and complex’ (EU 2015, p.99).

The percentage of university graduates working at a lower professional level in Spain in 2007 was 44% (while the average of OECD countries was 23%). This reflects the general employment situation in Spain, and has worsened with the economic crisis. One of our interviewees suggested that post-graduates did not necessarily have the skills relevant to the wider labour market, and that post-graduate higher education needed to focus more on generic skills in order to meet employment demands. It is now the case that many young graduates who have been trained in Spanish public universities have had to emigrate and find work in other countries, leading to what one commentator referred to as ‘loss of Spanish talent’.

Summary

Spain is in the process of major reform with a focus on quality enhancement and the pursuit of excellence in more elite universities. The EU2015 strategy has a focus on quality and on fair access, and aims to achieve consensus and cooperation across the autonomous communities in order to strengthen the national university system. In a similar way that applies to all countries, funding of a mass higher education system is a challenge, and the shift from a very basic tuition fee to increased tuition fees, and consideration of student loans has challenged the Spanish culture of higher education.

Annex G – United States

United States

Context

The United States has a population of around 317 million, with an increase of around 2.25 million between 2013 and 2014, and is the third most populous country, behind China and India. As in other countries, such as England and India, urban populations are growing and rural populations declining, with around 80% of people now thought to live in urban areas. Accreditation and oversight of universities is a federal responsibility, but approval of accreditation agencies is at national level, through the US Department of Education, which maintains a list of currently accredited institutions and programmes, updated three-monthly[24].

The United States have long been considered world leaders in postgraduate education with regard to both numbers and quality (Agarwal, 2009; Wildavsky, 2010; Gumport in Altbach et al, 2011; The Economist, 2012; National Science Foundation2014). Its postgraduates often emerge as leaders of international corporations, have global mobility after graduating, and progress to senior positions in academia and beyond.

US institutions consistently dominate the top 100 in global university league tables (Shanghai Jiao Tong University, 2013; THE 2014) and in the latest results, the US has 52 and 45 universities respectively in the top 100 of these tables, compared with the UK's nine/11, Australia's five (both rankings), Germany's four/five and Norway's one (see also Table 25 in Annex H). The Association of American Universities (AAU), a group of 62 research universities, suggests that the US's graduate programmes are 'an international magnet for talented students' (AAU, 2014).

The United States are also widely estimated to spend a larger proportion of their GDP on higher education than any other country, yet have 'only the 15th largest proportion of young people with a university education' (The Economist, 2012), the implication being that there is a gap in expectations between the high level of funding and what it achieves.

The US is known for its long tradition of liberal arts undergraduate education which is characterised by small class sizes and a teaching-centred approach and, despite its title, includes STEM (BS) as well as arts, humanities and social sciences (BA) subjects. A US liberal arts degree typically lasts for four years and focuses on breadth as well as depth of study. Thus, those entering graduate programmes (in the US the term 'graduate' rather than 'postgraduate' is used) in the US or elsewhere have often studied a broader range of subjects at undergraduate level than in many countries as well as having had the opportunity of an extra year to deepen their understanding, giving them an advantage when applying for graduate programmes overseas.

Recent developments in doctoral education have included a five-year project for 'transforming doctoral programs', the Carnegie Initiative on the Doctorate (CID), (Walker et al, 2008). This work was taking place at the same time as the Bologna Process incorporated 'third cycle' (doctoral) degrees (2003) and when in the UK Roberts funding was being used to introduce professional skills training in doctoral programmes. The Carnegie Initiative supports cohort models of doctoral training, the development of a range of professional skills and also inter-disciplinarity. In parallel, it advocates flexibility to take account of individual and discipline-specific needs and recognises the diversity of

[24] US Department of Education (2014) Database of Accredited Postsecondary Institutions and Programs: http://ope.ed.gov/accreditation/

backgrounds of doctoral candidates. As with the 10-year assessment of research doctorates (see below), the CID regards doctoral researchers as integral to a university's research effort.

The US graduate funding environment and incentivising high quality research

Another distinctive feature of US higher education is its funding model: federal grants are available to undergraduates and postgraduates at different levels in a variety of categories, but the funding of universities is principally a state responsibility, with the federal government retaining the obligation to provide research funding. Over half of the US's 'basic' scientific research (primarily aimed at increasing 'fundamental knowledge and understanding') is said to be carried out in universities (Gumport, in Altbach et al, 2011; AAU, 2014) and is funded by the federal government through organisations such as the National Institutes of Health (the largest funders), the National Science Foundation, NASA, and the Defense and Energy Departments.

The most highly esteemed US universities globally and nationally are able to secure millions of dollars through endowments which adds to their standing and capability to sustain critical mass of staff and students. A National Science Foundation study found that 10 out of 896 eligible institutions received approximately 20% of federal research and development grants in 2011, with Johns Hopkins being granted more than twice as much as any other university (Weigley and Hess, 2013), (acknowledging that universities with medical schools such as Johns Hopkins receive significant research funding from the National Institutes of Health). All but one of these 10 institutions feature in the most recent top 20 of one or both of the two global ranking lists summarised in Annex H, showing that as in some other countries' higher education systems it is often easier to obtain funding if you are already successful and financially secure.

In 2012 funding cuts for public universities at state level caused a flurry of concern, with some claiming that, based on trends between 1980 and 2011, 'average state fiscal support for higher education will reach zero by 2059', with the caveat that this situation could arise sooner in some states than others (Mortensen, 2012). The source of this calculation was the National Income and Product Accounts of the United States, which considered expenditure by state and local governments on higher education and based the prediction on an extrapolation of percentage expenditure decreases between 1980 and 2011. Two states bucked the trend: Wyoming (up by 2.3% since 1980) and North Dakota (up by almost 1%).

Mortensen claims that as a result of cuts, public universities are 'enrolling a shrinking share of students from lower-income families and competing most aggressively for the students that can afford to pay higher tuitions with institutional discounts'. This situation is explored further in the Fair Access section below. Other senior figures in graduate education spoke about the limits on doctoral recruitment as a result of funding constraints and the lack of academic jobs available for PhD graduates (Gumport in Altbach et al, 2011). And in 2012, concern was expressed that funding cuts announced by the federal government in 2011 resulting in increases in tuition fees would only exacerbate trends such as declining literacy in college graduates (The Economist, 2012).

According to one of our interviewees, the significant decrease in federal funding is likely to lead to a reduction in the number of graduate, and in particular, masters programmes available which, combined with greater levels of debt in those considering applying to postgraduate programmes, may reduce the numbers of masters and doctoral graduates in future. In this interviewee's opinion, however, this situation is most likely to affect institutions 'at the margins', with elite universities managing to sustain current levels. Another view is that, despite the reduction in federal funding and the possibility of debt inhibiting growth, masters education could flourish, because of its increasing popularity and perceived value in employment (particularly in vocational subjects, see below), and

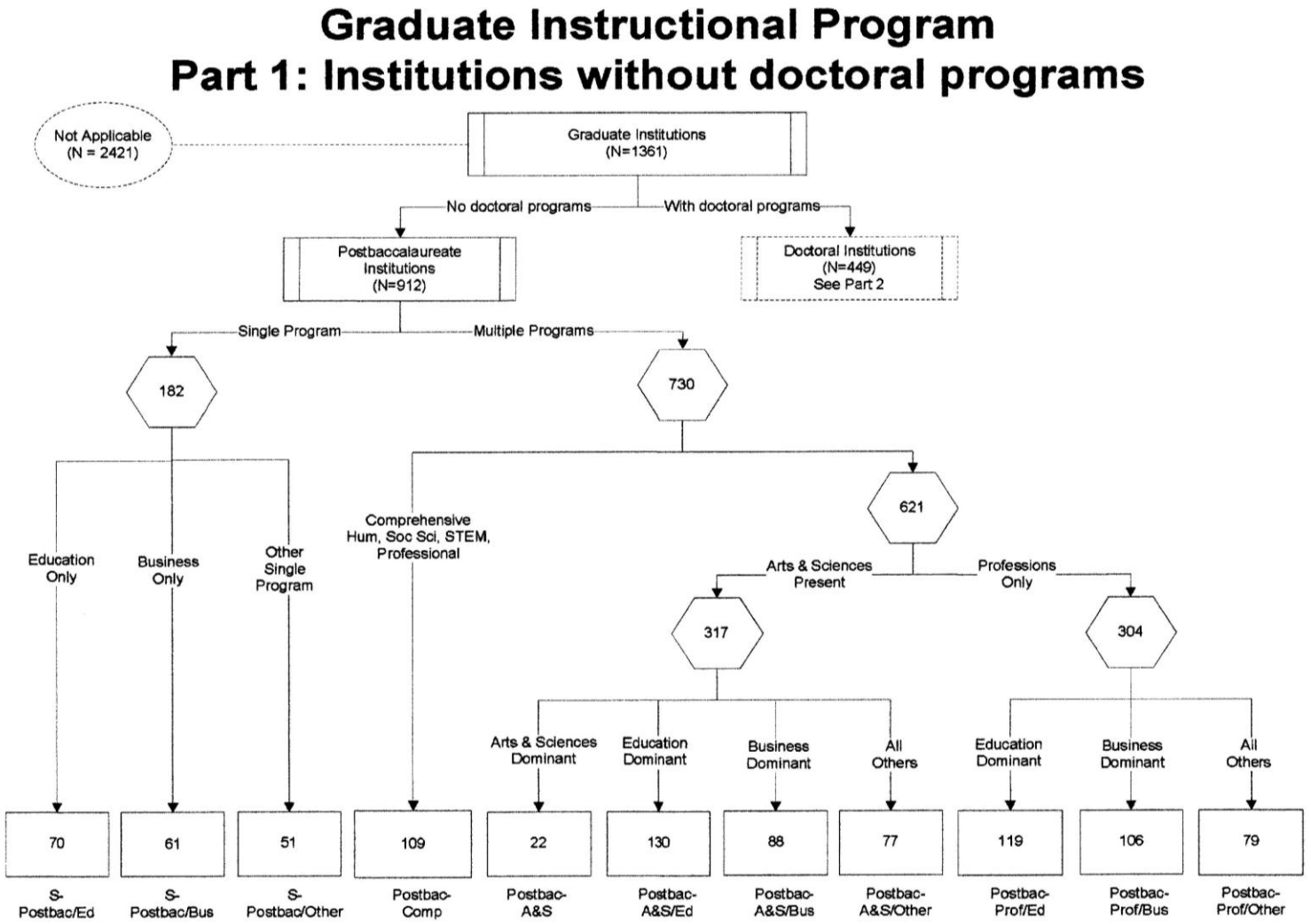
that some institutions will be able to expand masters programmes thereby increasing tuition fee revenue.

Incentivising universities and schools to improve research quality

One of our contributors spoke about funding models, rewarding excellence and the need to grow critical mass in high quality research. It is common practice in Australia, the US and the UK for most public financial support for research to be distributed to those who are already excellent and this model also prevails within institutions, with already successful departments and schools able to generate more income. The alternative view put forward by our interviewee is that there is no automatic relationship between quality and the need for support and that to increase excellence overall, funding should be allocated to departments or schools in universities thought to have the most potential to improve, because top-ranked departments may not continue to advance the more funding they receive (although they do need support to maintain their performance). In other words, funding should also be awarded where it will make the most difference, for example, to enable a new head of school to make changes that will lead to higher quality research and perhaps the ability to generate more external research funding. In a more fine-grained funding environment, there might be a threshold below which a department would not be permitted to admit research students. Our contributor recognised the challenges of identifying departments that might benefit from additional funding but this would be one way of growing critical mass within an institution, whereas incentivising those who are already at the top may lead to over-concentration and shrinkage.

Institutional diversity

With such a large number of higher education institutions, it is unsurprising that US universities are categorised with regard to their postgraduate education capacity using the Carnegie classifications. Separate classification groups have been developed for undergraduate and postgraduate institutions, the latter being the Graduate Instructional Program Classification (Carnegie Foundation, 2014). This contains 18 categories of postgraduate education and provides a clear indication of an institution's capacity in either masters or doctoral education, or both. Figure 23 shows two flowcharts giving details about the various classifications and the numbers of US institutions in each category. Part 1 summarises institutions without doctoral programmes, Part 2 institutions with doctoral programmes. These classifications make it clear what programmes each institution is accredited to provide, ranging from one or more masters programmes in a single field, e.g. education or business, to multiple subject masters and doctoral programmes, including those in STEM subjects. In the main all institutions who offer doctorates also offer masters programmes.



Notes: These flowcharts represent the logic of each of the six all-inclusive classifications. The numbers in the boxes indicate how many institutions are in that category. These numbers are approximate. Special focus institutions are only included in the Basic and Enrollment Profile Classifications. For detailed information regarding the classification methodology, please see the Methodology section on the Classification website.

Figure 23: Carnegie Foundation Programme Classifications (Carnegie Foundation, 2014)

Graduate Instructional Program Part 2: Institutions with doctoral programs

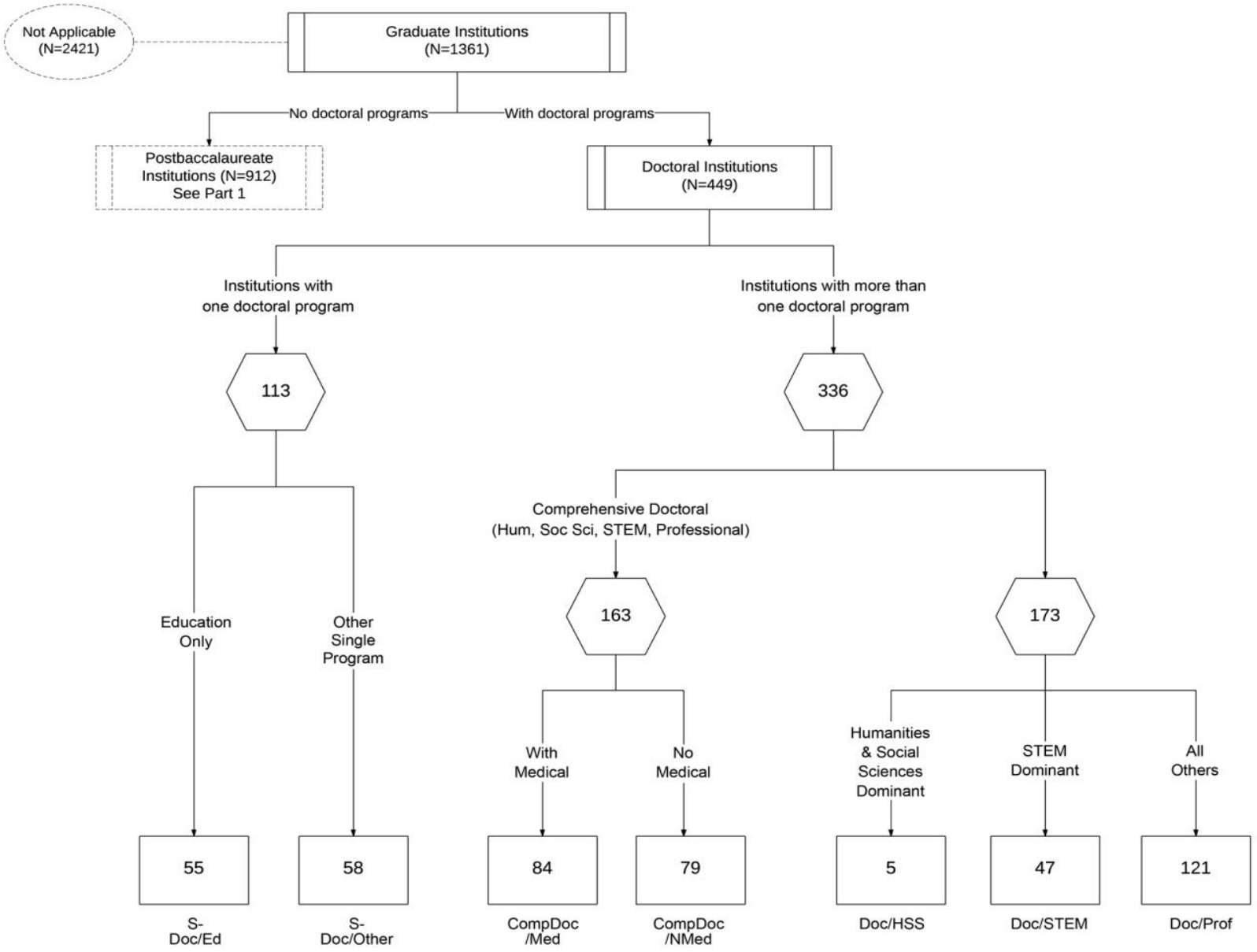


Figure 23: Carnegie Foundation Programme Classifications (Carnegie Foundation, 2014)

We heard that the United States has a 'phenomenal variety of players in graduate education' – public, private, urban and regional, including a thriving 'for profit' sector. The result, some believe, is that potential graduate students choose to apply to the institution that best suits their needs, at both masters and doctoral level, but in all groups, there are institutions that do a really good job and a less good job in both the public and the private sector. Generally the extent to which institutions are effective in supporting postgraduates, particularly masters students, to successful completion depends on 'whether faculty is mobilised in that area to take the degree seriously and put in the energy and thought that is essential'. And a point made by one contributor when discussing the quality of doctorates generally was that irrespective of subject or structure, it is the commitment of staff and rigour of the programme in that particular university that determines the quality of outcome and the level of achievement. This interviewee suggested that the diversity of outcomes based on institutional environment was connected with the amount of freedom universities have generally and the lack of a national statutory standard-setting body, although clearly institutional culture has an impact on the quality of the student experience and outcomes, and the 10-yearly National Research Council assessment of research doctorates has an impact on institutional practice (see below).

Institutions offering four-year undergraduate programmes ('four-year institutions') either specialise in a liberal arts curriculum as outlined above or in technical subjects such as a variety of vocational degrees (e.g. business and engineering). Community colleges, typically categorised as 'two-year institutions', have open admissions, and graduates who complete their associate degree successfully at a community college may then progress to a 'four-year institution' for another two years of study to gain either a BA or a BS.

Even though the Carnegie Foundation Program Classifications already group institutions at a basic level as summarised in Figure 23, one of our interviewees nevertheless thought it was possible that 'having more well-defined and differentiated missions would improve the quality of learning and opportunities for graduate students'. This interviewee also alluded to 'mission gallop', suggesting that all universities were now trying to be 'research-intensive', rather than pursuing excellence in their field, e.g. focusing on providing high quality learning in undergraduate and masters programmes. It is suggested that 'graduate education has become so intertwined with sponsored research that the two have emerged as the foremost *raison d'être* for universities in the top tier, as an increasingly noble aim for lower tiers to emulate, and as an implicit professional imperative for research university faculty' (Gumport, in Altbach et al, 2011). In parallel with similar patterns across Europe, Gumport argues that federal funding has meant that support for doctoral education is concentrated in STEM subjects and that it is 'less evident in the social sciences and virtually non-existent in the humanities'.

US universities are highly regarded nationally as well as internationally. We were told about the most successful US research institutions which, relatively speaking, have superior resources and whose advantages are allowing them to maintain quality in the face of federal and state reductions in funding. One of our interviewees suggested that some self-selection of the brightest students occurs in respect of these universities and interestingly, that such students have an 'attitude of irreverence' towards their esteemed professors, are highly motivated and ambitious to succeed. This interviewee also confirmed the value of international postgraduates in US universities and their contribution to the intellectual environment.

Time to completion

Challenges for postgraduate education in the recent past have included improving completion rates of students on both masters and doctoral programmes (CGS, 2010a, 2010b, 2013a), and the need to be more inclusive in enrolments.

Masters degrees

According to the CGS, masters degrees are the fastest growing and largest component of graduate education in the US, yet their recent study, based on a comparison between STEM and MBA masters students in five institutions, shows that completion rates within two years (the normal period of study for US masters) are below 50%(CGS, 2013a).

In 2013, using a grant from a private foundation, the CGS conducted a pilot study of completion and attrition rates in STEM masters and MBA programmes between 2003-04 and 2006-07, based on students at five institutions: Loyola University Chicago, Purdue University, Southern Illinois University Edwardsville, Texas A&M University, and Wright State University. STEM subjects were chosen as the main focus for the study because of their 'close association with innovation, job creation and positive employment outcomes' (CGS, 2013a).

Among the findings were that only 41% of the STEM masters students had completed their degree within two years, 60% completed within three years and 66% completed within four years. In contrast, 67% of MBA students had completed their degree in two years, 81% completed within three years and 86% within four years.

Completion rates for women enrolled in STEM masters programs were higher than those for men after two, three and four years, yet completion rates for women enrolled in MBA masters programmes were lower than those of men during the same time period. Completion rates for women enrolled in STEM masters programmes were higher than those of men at the two-, three-, and four-year periods. In contrast, completion rates for women enrolled in MBA masters programmes were lower than those of men during the same time period.

Figure 24 provides more details of STEM completion rates, which show a gradual improvement in completions during the period sampled.

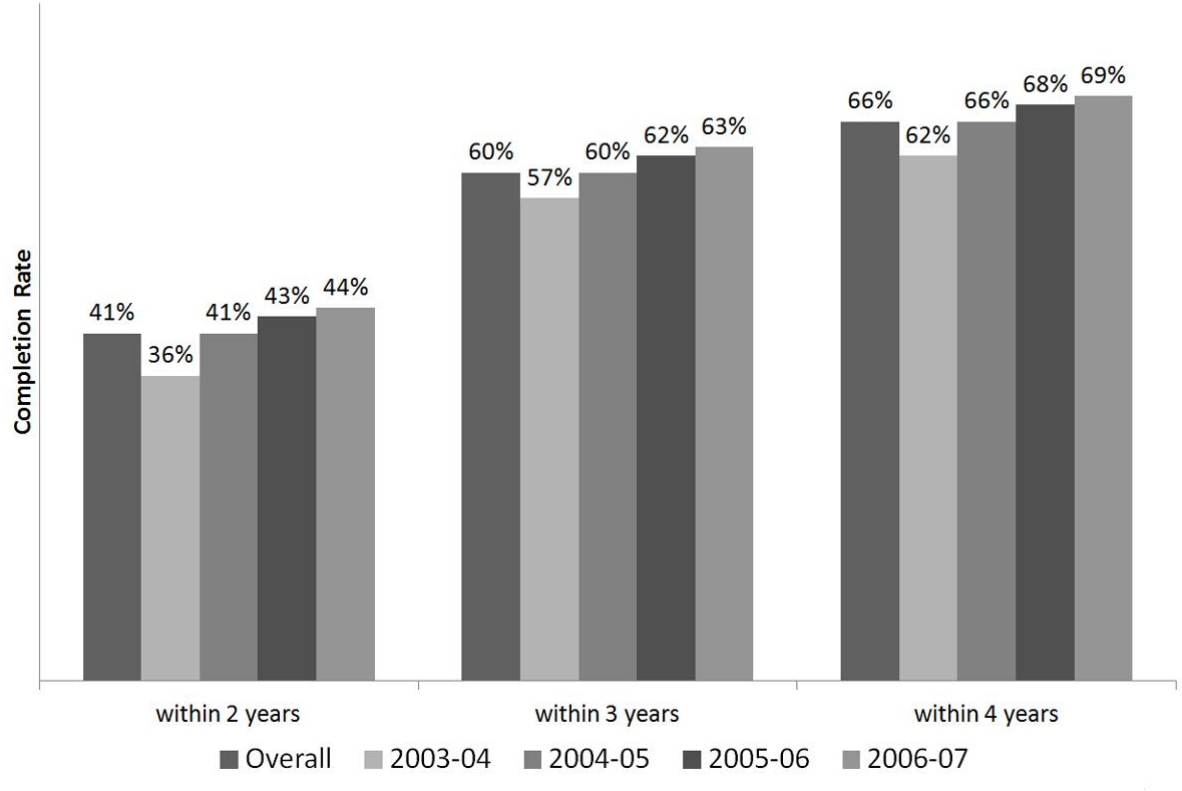


Figure 24: Cumulative completion rates for STEM student cohorts (CGS, 2013a)

The most frequently mentioned reason for enrolling in a masters programme was to support professional development, with a broad consensus about wishing to improve skills and knowledge. The CGS findings show that the most important factor identified by participants with respect to successful completion was motivation and determination which was cited by 92% of the graduating students involved in the project. Family support (not funding) and studying a masters degree full-time were jointly the second most important consideration, at 82%. Most of the students who had concerns about their ability to complete mentioned competing priorities around study, work and family commitments, with 18% of first year students expressing concern about their 'study/work/life balance'. Responding to a question about future plans, 62% of students who had not completed said they planned to continue working in their current employment (CGS, 2013a).

With respect to attrition, 10% of STEM masters students left their programme of study after six months, 17% left after one year, and 23% left after two years. By contrast, 10% of MBA students left their programme of study after two years. With only a few exceptions, patterns in attrition rates mirrored those of completion rates. Most students, even non-completers, reported generally high levels of satisfaction with various attributes of their masters experience, such as programme structure, advising, and instruction.

Doctorates

Concerns about low completion highlighted in some of the literature (e.g. Lovitts, 2001; Grasso et al, 2009) resulted in the CGS leading a seven-year project – the PhD Completion Project – to analyse and document PhD completion rates in the US. As in other countries, completion rates vary according to discipline (CGS, 2010a).

The CGS received financial support from Pfizer and the Ford Foundation to undertake the PhD Completion Project which initially involved 29 US and Canadian research universities; 25 other partner universities participated in various aspects of the project. Funding was used to carry out pilot projects to evaluate doctoral completion and attrition rates. The project began with an analysis of baseline programme data in 2008 using information from public and private universities which reported that completion rates 10 years after students began their doctoral programme were: 63.6% in engineering; 62.9% in life sciences; 55.9% in social sciences; 54.7% in mathematics and physical sciences and 49.3% in humanities.

One of the strands of the PhD Completion Project was to conduct exit surveys of PhD graduates from 18 institutions between 2006 and 2008. The majority of graduates surveyed (1,406) had successfully completed their doctorate and a small number (59) had withdrawn. When asked about factors contributing to their ability to complete, 80% of respondents indicated that financial support was a main factor, with graduates in mathematics and physical sciences valuing financial support most highly (83%) and humanities graduates valuing it the least (although still relatively highly at 73%).

The graduates surveyed also considered mentoring and advising valuable with respect to successful completion, particularly during the final stages of the programme when finishing their dissertation, with 90% overall indicating satisfaction with the quality of their relationship with their mentor/adviser and little difference depending on field of study.

We also understand from our interviewees that adequate support for graduate students is considered critical to their ability to complete on time: one suggested that some graduate schools increase support for doctoral students who are teaching (TAs) or undertaking other part-time work, in recognition that timely completion is harder for them than for other students.

We heard an interesting perspective on the way in which doctoral students apply and are accepted into a programme, particularly in a science subject, involving two models. The first is when applications from potential PhD candidates are shown to the faculty in a department/school who choose which student they think they can best support and work with, and the student is then 'attached' to that adviser for the duration of his or her programme. The second model occurs where doctoral students are accepted into a department without a specific adviser and during their first two years they take courses and work with many different faculty members. Only when they move to the thesis are they supported by a single adviser. In both cases, however, an advisory committee or chair is often appointed before the topic is finally determined, but when the student has become familiar with the area in general.

We were told that the two models deliver different educational experiences. In the first case, the student's topic is determined by choice of adviser before they have had an opportunity to gain any experience of the broader subject. In the second system, the student has more knowledge of the subject before s/he has to specialise, can make a more informed decision about their research interests and therefore be better matched to their adviser. The second model is controversial among some faculty who prefer the idea of having a student working with them from the beginning of the programme and may decide not to go and work at a university if they cannot be assigned specific PhD students. Having general support that is not tied to a single faculty member, at least in the initial years, is thought by two of our contributors to be preferable for the student's development and independence. The extent to which students might prefer one model or the other may depend on their subject, topic, background, and individual characteristics, with some more prepared for being independent from the start of their programme and others more likely to benefit from a named adviser at the outset.

Some of the positive outcomes of the CGS PhD Completion Project are summarised in 'Policies and Practices to Promote Student Success' (CGS, 2010b) which includes 'promising practices' in: selection and admissions; mentoring and advising; financial support; programme environment; research experience; and curricular and administrative processes and procedures. Important changes potentially attributed to the Project include: improved tracking of doctoral students and record-keeping ('development of a "culture of evidence"'); better understanding of doctoral non-completion and attrition through further research; increased sensitivity with respect to students from under-represented groups; better co-ordination across departments university-wide; and in some cases improved student progress and completion.

Quality

The overall quality of the US research environment is underlined by its position in producing the most PhD graduates annually (Elsevier, 2013) as shown in Figure 25.

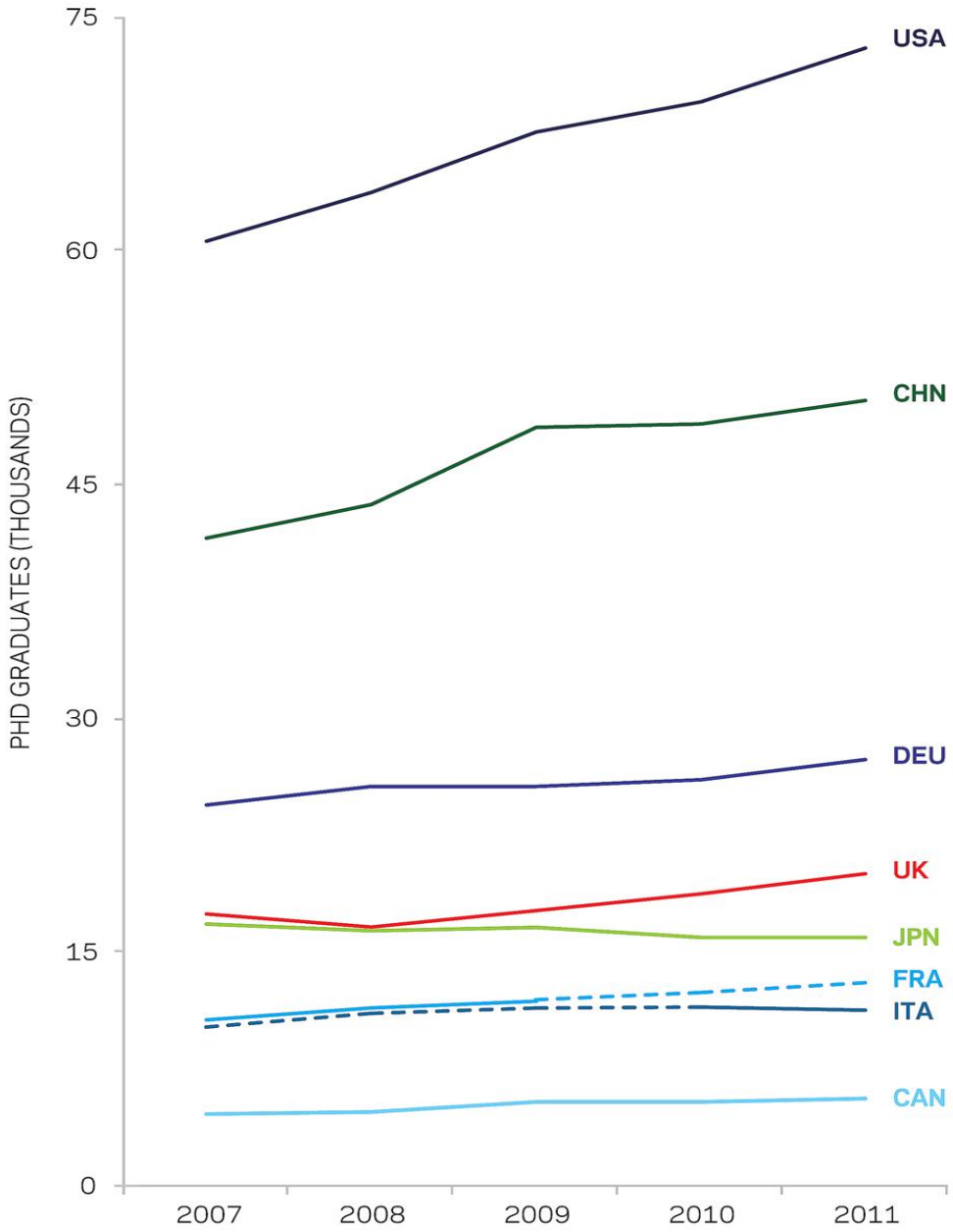


Figure 25: Annual numbers of PhD graduates 2007 - 2011 (Elsevier, 2013)

Although the US remains among the countries that dominate the world's 'research landscape' with respect to research output, its primacy is not assured (NSF, 2014) and it is now sharing this position with Europe and Asia-Pacific countries, as shown in Figure 26 below.

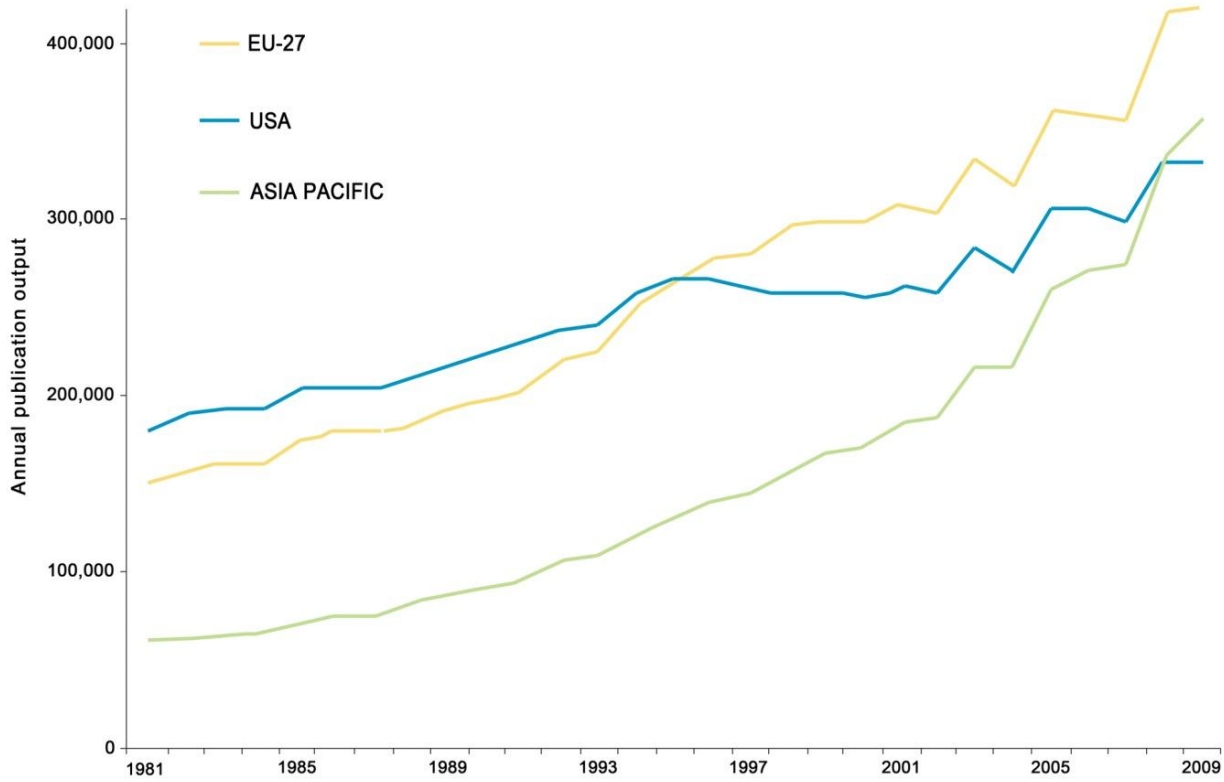


Figure 26: Annual publication output comparative graph (Adams and Pendlebury, 2010)

According to statistics produced by the National Science Foundation (Fiegener, 2011), in 2010 there was a decline in the number of research doctorates awarded (from 49,554 in 2009 to 48,069 in 2010), for the first time since 2002, yet by 2012 a 4.3% growth 'marked the largest single-year increase since 2007' (NSF, 2012) .

With respect to the 2010 figures, Fiegener suggests 'The 2010 decline was magnified by the recent reclassification of many Doctor of Education (EdD) degree programs from the research doctorate to the professional doctorate category' (see below). He notes that there was a decline in all fields but that the reduction in numbers of EdDs awarded was substantial.

US Council of Graduate Schools

The US CGS provides an authoritative reference point for graduate education at many levels, describing itself as 'the national voice for the graduate dean community'. It has two main arms, acting as an advocate for graduate education in a policy context and disseminating effective practice in both masters and doctoral programmes. Within this broad remit, the CGS offers four core activities:

- *Benchmarking*: The CGS has a research unit that both undertakes empirical research, often funded by external grants, and analyses data from other sources. It produces statistical information that enables and encourages institutions to compare their performance with others, either in similar mission groups or more widely.

- *Best practices*: This strand of CGS's work targets issues and challenges in graduate education faced by institutions. One of the purposes of the benchmarking activity is to share effective

practice. The CGS has a limited amount of money available to provide modest grants for 'improvement and innovation' (often matched by university funding) at member institutions.

- *Public policy*: The CGS acts as a resource for policy-makers in graduate education, research and scholarship. Its location in Washington DC means it is well placed to influence and keep track of policy changes and regulations on behalf of its members.

- *Global engagement*: One of CGS's areas of expertise is in global trends in graduate education, about which they organise meetings and publish resources. They also support their members to 'internationalize their campuses' and to develop global partnerships.

CGS's core membership consists of postgraduate degree-awarding institutions (over 500 US and Canadian universities and around 25 from other countries) but they also have corporate and non-profit members who have 'strong investments in graduate education', one of the purposes of encouraging these members being to develop and strengthen links between the sectors. About 20% of CGS members are masters level institutions where the highest degree offered for the most part is a masters degree although some of them may also offer a few doctorates.

Annual membership fees are based on the graduate student head count at an institution using a banding system with nine categories and range from $2,936 (1-500 students) to $8,868 (15,501 students and above) for regular membership, slightly less for associate members (CGS, 2014). Universities and other organisations with an interest in the graduate education sector can also choose to join the CGS Sustaining Membership Network which is intended to facilitate graduate education partnerships between higher education institutions and other organisations. Fees for membership of this network reflect the benefits for corporate members and give non-university members access to key faculty in institutions and new developments in graduate education. The Sustaining Membership Network membership has four categories: Allies ($6,000 per annum); Champions (currently $10,000, rising to $15,000 in 2015), Collaborators ($25,000) and Visionaries ($75,000, $25,000 constitutes the annual fee). Members in the latter two categories, having demonstrated commitment and peer respect, become members of the Council's Corporate Leadership Circle, sharing their expertise and influencing development.

The CGS presents as a highly knowledgeable, professional, multi-faceted and well-resourced organisation that clearly has a major impact on US graduate education, undertaking research and development on behalf of the sector. We heard that it is respected and valued nationally and internationally and is a significant source of support and good practice for US institutions.

Measuring quality

One aspect of defining and measuring high quality achievement is achieved through graduate programme review which has been in place in the US 'for decades'. Typically managed by a graduate school, faculty contributing to a programme conduct a self-study, involve external reviewers (who may be external to the university and/or to the department) who visit and conduct an in-depth review, following which a report is written on the quality of the programmes in that area. Reports are used systematically to address quality issues in graduate programmes (CGS, 2011). Other quality measures that may be used at department, graduate school or university level are 'inputs and throughputs' such as the grade point average (GPA) of students and whether the number of students per adviser is feasible for providing optimum support, as well as student satisfaction surveys.

Almost all masters programmes now have learning objectives and quality is measured by whether or not the students can achieve the objectives. Departments offering professional masters degrees may measure outcomes by looking at graduate career outcomes; this practice is likely to grow, especially measurement of career outcomes against programme objectives and there is recognition that such evaluation becomes more meaningful 10-15 years after graduation. Reflecting the need to develop objective longer-term evaluation of career outcomes at national level, the CGS has recently launched a project designed to develop effective practice in tracking careers which can be used to improve practice.

Institutional accreditation

The US Education Department approves a range of private associations responsible for accrediting US universities. The Department maintains a published list of regional and national accrediting agencies, judged to be 'reliable authorities as to the quality of education or training provided by the institutions of higher education and the higher education programs they accredit'. The Education Department also recognises state agencies for the approval of public postsecondary vocational education' (US Department of Education, 2014). Some of the accreditation agencies are 'specialized', national organisations established to approve universities in delivering programmes in particular, often vocational, subjects, e.g. engineering and technology, chemistry, business, clinical laboratory sciences, nursing, psychology and social work.

Accreditation agencies have to meet strict, government-specified criteria before they can apply for government approval, including guaranteeing there is no conflict of interest with the institutions they will be responsible for accrediting, and that they are able to accredit a variety of standards with respect to the academic programmes in the institutions they are approved to accredit. Since there is no federal ministry of education with responsibility for higher education, institutions have 'considerable independence and autonomy' (US Department of Education, 2014) in the way they operate. Accreditation, which operates at regional level, is therefore a way of assuring quality through peer evaluation of both institutions and the programmes they offer.

The National Research Council and the 10-yearly assessment of research degree programmes

The National Research Council (NRC), together with the National Academies of Sciences and Engineering and the Institute of Medicine work together to coordinate programmes in US scientific, medical, engineering and social sciences research. The National Research Council is described as 'the principal operating agency of both the National Academy of Sciences and the National Academy of Engineering in providing services to the government, the public and the scientific and engineering communities', in partnership with the Institute of Medicine. The NRC has five separate divisions: Behavioral and Social Sciences and Education; Earth and Life Studies; Engineering and Physical Sciences, Policy and Global Affairs and the Transportation Research Board. The National Academies, as they are known, sponsor research and are responsible for several internationally peer-reviewed journals, convene events around research topics, and promote education and outreach at all levels.

One of the NRC's roles is to conduct a 10-yearly assessment of research doctoral programmes which covers PhDs but not professional doctorates. This initiative began in 1982 as an assessment of the scholarly quality of the faculty – their productivity and the quality of publications. Further assessments took place in 1995 (based on 1993 data) and in 2010, the most recent. The assessment is deliberately not designed to enable users to identify 'top' universities: the report emphasises that 'These illustrative rankings should not be interpreted as definitive conclusions about the relative quality of doctoral programs… Rather, they demonstrate how the data can be used to rank programs based on the importance of particular characteristics to various users', for example, faculty at

participating universities. The 2010 report and accompanying tables allow the user to weight any of 20 characteristics of most importance to them to produce an institutional ranking. The 20 programme characteristics are:

- Publications per allocated faculty member	- Percent non-Asian minority students
- Citations per publication*	- Percent female students
- Percent faculty with grants	- Percent international students
- Awards per allocated faculty member	- Average PhDs, 2002 to 2006
- Percent inter-disciplinary faculty	- Average completion percentage
- Percent non-Asian minority faculty	- Median time to degree
- Percent female faculty	- Percent students with academic plans
- Average GRE** scores	- Student work space
- Percent 1st-yr. students with full support	- Student health insurance
- Percent 1st-yr. students with external funding	- Number of student activities offered

Staff metric	Student metric

*Excluding computer science and humanities
**Graduate Record Examination

Table 22: Twenty characteristics used to evaluate research degree programmes in 2010 (Ostriker et al, 2010)

One of our contributors indicated that, although developing and deciding on the 20 characteristics was challenging (partly because of the difficulty of gaining a consensus about the most important criteria for any doctoral school), it was essential they were the right criteria because they underpinned and gave validity to the whole exercise. Determining the characteristics to be used was therefore one of the most important tasks the committee undertook. They do not include as a measure student research papers or articles published in peer-reviewed journals which could be viewed as an additional quality measure, although variable subject practices may have prevented this.

In 2010 using these characteristics the NRC collected data on more than 5,000 doctoral programmes in 62 fields in 212 US universities. Questionnaires were completed by doctoral faculty, heads of doctoral programmes, administrators and students, with information about publications and citations derived from external sources and taking account of performance over a longer timeframe than the other characteristics. The report contains two types of ranking for 'overall program quality' for each research programme assessed: survey-based (faculty-ranked importance of the 20 characteristics in determining the quality of a programme); and regression-based (randomly selected faculty rated the quality of a sample of programmes in their field). Weightings using statistical techniques were then assigned to each of the 20 characteristics based on the sample ratings and applied to the data for each programme. Further statistical measures were applied to the rankings to measure the degrees of uncertainty arising from the calculations.

The outcome of the 2010 assessment is a comprehensive report which provides illustrative ranges of doctoral programme rankings for three 'dimensions' of doctoral education:

- *research activity* (publications, citations, percentage of faculty holding research grants, etc.);
- *student support and outcomes* (percentage of fully funded students in 1st year, percentage of students completing within a specified time, expected placement in academic positions); and

- *diversity of the academic environment* (percentages of faculty and students from under-represented groups and percentage of international students).

As well as providing data in these areas, the report summarises general findings and trends, for example: a growth of 22% in the number of female students; an increase in PhDs awarded to graduates from under-represented groups; and that larger research programmes tended to be ranked more highly than smaller ones. Other findings are that doctoral education is mainly offered by public universities (72%), that under-represented minorities make up less than 5% of all faculty (except in social sciences and humanities), and that more than half of US doctoral students in the majority of subjects complete their doctorate in less than six years.

The 2010 assessment exercise was controversial, partly because it was difficult to agree on a set of metrics considered appropriate for the evaluation of a range of subjects. When the committee leading the exercise first met to consider what assessment criteria they would use, it was thought that deciding on the criteria would be challenging because of the different goals held by universities and departments, but this turned out not to be the case – from chemical engineering to education, all doctoral schools had a very similar aim: 'to produce individuals who would do leading research and become renowned faculty members' (even though, as in the UK, only a small proportion of doctoral graduates take up academic jobs). However, much consultation took place during development of the methodology for the assessment (which has changed over time to improve the process) and adjustments were made by the multi-discipline committee to accommodate a wider range of subjects by making the study more data-intensive and include more student-centred characteristics. The adoption of a dual ranking system, rather than a one-dimensional approach led to greater confidence in the outcomes (Ostriker et al, 2010).

The 2010 report was the result of a high profile assessment process with political implications and therefore institutions took the outcomes very seriously, some using them to support graduate programme review. One of our contributors suggested that one of the most positive outcomes of the 2010 exercise is that it established a pattern of 'routine data collection' of information that is 'critical to a university's ability to evaluate the quality of its own research degree programmes'. We also heard that, although this was a controversial and difficult process, with differences of perspective resulting in two ranking methodologies, the result is that the outcomes are potentially useful to institutions and to different stakeholder groups, including applicants, existing students and faculty.

An important feature of the 10-yearly assessment is that it is undertaken by the higher education sector on behalf of the sector and, although an independent peer review process, is not driven by external or government imperatives but directed by academic leaders in different subjects from universities across the US. Our contributors told us that this enabled an informed and rigorous evaluation methodology to be developed, as well as a nuanced interpretation of the process outcomes.

The 10-yearly assessment demonstrates the fundamental importance of doctoral students to the research effort in the US: they are integral to research activities and to the development of their subject. In other countries the emphasis in assessing the quality of research programmes may be more on education and training than candidates' contribution to research output.

Graduate Record Examination

Similarly to students in India, applicants for masters or doctoral programmes in most fields (but not in fine arts, medicine, pharmacy, law or a few other subjects), are likely to be required to pass the

Graduate Record Examination (GRE) general test and some disciplines require prospective entrants to take a GRE subject test. The general test is a three and three-quarter-hour examination containing sections on quantitative reasoning, verbal reasoning and analytical writing. In addition to the GRE, the Personal Potential Index (PPI) was introduced in 2009 by the Educational Testing Service (ETS) (who also administer the GRE) and is described as a non-cognitive standardized assessment that tests for creativity, resilience, teamwork and other personal and professional attributes (ETS, 2014). The PPI is not currently widely employed but is growing in use.

The Fulbright Commission advises that 'Generally speaking, if your scores are within the range of last year's admitted class, the GRE General Test will not make or break your application [to graduate school]' (Fulbright Commission, 2014), but they also point out that doing well in the test can help to make a prospective student stand out in the selection process or can make up for 'poor academic results at … undergraduate level'. One of our interviewees confirmed the value of the GRE as one element of selection for graduate programmes, suggesting that 'people come to your attention who would not otherwise'. This contributor emphasised the value of an admissions system combining 'standardised tests, school grades and personal recommendations' because of its ability to 'cast a wide net' combined with 'quality control' which helps the selector to decide whether a student is a good match for an institution.

Postgraduate training and development

The reputation and quality of US postgraduates internationally, including in UK universities, is high. US postdoctoral graduates are sought after in a range of subjects because of their roundedness, maturity, teaching experience and other qualities. Some of these attributes are developed as a result of a longer period of study than postdoctoral graduates from other countries have completed, and some result directly from the nature of the postgraduate experience in the US. For example, masters degrees typically last two years and during their postgraduate years (masters and doctoral), students gain considerable experience of teaching because of the prevalence of the TA system. Therefore, US postdoctoral graduates are often older than for example UK graduates with similar qualifications, and many have had opportunities to gain diverse experience that is useful in a variety of settings, including in an academic environment.

We heard that in different disciplines, for instance, the American Astronomical Society, Modern Languages Association, etc. and similarly for English, engineering, computer science, etc., professional subject associations in the US meet to discuss common policies in postgraduate education in their subject, but that 'there are no enforcements' according to one contributor. Although the national US Research Councils do not require specific research methods and professional skills training in the students they sponsor such as those specified by the UK Research Councils, PhD programmes are 'relatively structured, including coursework and exams, centering on the dissertation research' (Nerad, 2014, in Balaban and Wright, 2014). And the NSF's introduction of funded Integrated Graduate Education and Research Training (IGERT) (IGERT, 2014) provides doctoral candidates in the STEM fields and in social, behavioural and economic sciences with typically two-year stipends of an average of $30,000 to undertake inter-disciplinary training, combining research and professional skills development.

We also heard that, although the majority complete research methods and other courses in their first year or two, the extent to which a PhD candidate is encouraged to engage with formal training may be affected by the attitude of his/her adviser (supervisor). One of our interviewees emphasised the importance of faculty being careful and purposeful in guiding postgraduate students and helping them to acquire a range of attributes. Another contributor suggested that 'transferable skills' development for doctoral students remains 'a work in progress', noting that there is no equivalent to

the UK's Vitae in the US to influence national and institutional policy in this area or to lead the implementation of professional skills development, especially since the federal government has no formal involvement in graduate education.

As in all countries, advanced doctoral training in the US is influenced by the field of study, which affects content and research methods. With a few exceptions, doctoral programmes also have a linked masters degree and we heard that masters students often share structured courses with doctoral candidates in the first two years of PhD programmes. Graduate schools at institutional level are usually responsible for both masters and doctoral programmes.

One contributor emphasised it was to be expected that doctoral training should be determined by the discipline and that it would be a concern if that was not the case since universities are training doctoral candidates to be independent researchers and scholars and therefore substantial differences between methodologies and exposures to material should be expected at doctoral as opposed to masters level. This interviewee also suggested however that some similarities in the professional skills acquired by doctoral graduates should be expected.

Teaching Assistants

As mentioned above, US doctoral students are likely to be more involved in teaching than their counterparts in other countries. The AAU (research-intensive institutions) describe the US's system as 'combining graduate education with cutting-edge research' and claim this 'strengthens American research while also producing highly educated individuals who will become the next generation's scientists, teachers, and leaders…'. However, another perception is that the current system is out of balance and that both 'interdependence and strain' are evident 'between doctoral education, academic research and the federal government' (Gumport, in Altbach et al, 2011).

A significant proportion of US graduate students are at least partially funded by working as TAs; others are supported through research grants and scholarships. One estimate is that graduate students overall provide around 25% of all undergraduate teaching in the US, with over 40,000 graduate students (13% of masters students and 41% of doctoral candidates) employed in assistantships while pursuing their degrees (Gumport, in Altbach et al, 2011). While this is a positive situation in that the TA scheme helps to support graduate education and provides on the whole high quality teaching for undergraduates, it also has the potential to compromise the ability of graduate students to complete their degree (time to completion being an ongoing area of concern in the US), although we have not found any empirical evidence for this (Nettles and Millett, 2006).

Universities provide opportunities for doctoral candidates in some subjects (e.g. biological sciences, chemistry or health-related disciplines) to be sponsored by local employers, such as medical clinics. These employers may be the largest in the region so provide a stable and relevant source of funding for doctoral candidates, sometimes through part-time internships. In other cases, although students are not necessarily tied to working for their sponsor longer term, they may initially by employed by their sponsoring organisation immediately after graduating from their doctoral programme.

Research and graduate funding

Several of our interviewees expressed concern that recent reductions in federal and state funding for public higher education would compromise universities' ability to maintain the current levels and quality of US graduate education. This is not a new phenomenon and, as Gumport suggests, has many multi-layered consequences, including: the internal tensions that arise from universities' efforts to reclaim indirect costs resulting from infrastructure expenses: the increasing costs of training PhD students in the sciences; combined with 'no real federal support' for PhD students in

the humanities. Related to general funding concerns is the potential for universities to miss out on leading edge inter-disciplinary research and training because of insufficient resources at department or research institute level with the concomitant risk of international calibre research faculty becoming distanced from graduate training (Gumport, in Altbach et al, 2011).

Despite this somewhat gloomy outlook, prospective postgraduates in the US continue to have access to a wide range of funding sources (NSF, 2014). In the biological and physical sciences and engineering, research education is funded through training grants made to departments within universities, or to groups of inter-disciplinary faculty for specific research programmes. The block grants enable departments and faculty to pursue research in new or emerging fields and/or to target particular student groups, e.g. under-represented minorities. In addition, research students can apply for individual fellowships for use in whichever institution the student is accepted for study, which cover the cost of tuition fees and living expenses (stipends). The majority of research students in STEM subjects are funded through research assistantships connected with faculty members' research grants (around 80% of the funding), with training grants and fellowships making up the remaining 20%. Teaching assistantships are offered in all fields but more often in the humanities and social sciences.

Masters degrees

In the US, 'taught' masters degrees ('taught' is not a term used in relation to masters degrees in most of the countries included in this study) are usually either the first stage of a doctoral programme or separated out as 'professional' masters, i.e. a degree that prepares the graduate to enter specialised employment straight after completing the degree. Professional masters students may often be local and/or working part-time while studying. Some of the masters graduates from universities that only offer undergraduate and masters programmes go on to undertake PhDs at other institutions, including the elite universities. In common with India, the US is experiencing a rise in the popularity of professional masters programmes and increased breadth in the subjects offered. As in the UK, professional masters degrees in the US are typically highly structured and content-driven, preparing the graduate for a career in a particular profession, e.g. masters degrees in: architecture, business administration, public administration, public health, social work, professional science.

In some fields research masters programmes are a hurdle or 'screener' for entry to the PhD, or may even be a PhD pre-requisite, although this practice is diminishing and has been decreasing for around 25 years because of the increasingly integrated nature of the PhD. Some first degree graduates who want to further develop their knowledge and skills and who wish to complete their study at masters level rather than progressing to a PhD, enrol in research masters degrees (which may also be linked to a PhD programme in that subject). Alternatively, research masters degrees may be awarded to students who have been registered for a PhD programme, but who for academic or personal reasons do not continue on that programme. These are described as 'terminal' masters degrees.

Figure 27 below shows the subject distribution of masters degrees awarded in the US in 2011-12. The largest number of these degrees was awarded by research universities with very high research activity (33.4%) and masters colleges and universities (30.6%), followed by research universities with high research activity (18.3%), doctoral/research universities (15.4%) and institutions with other Carnegie classifications (2.2%) (CGS, 2012).

At masters level, education (23.4%) and business (22.3%) were the largest subject fields, the smallest being physical and earth sciences.

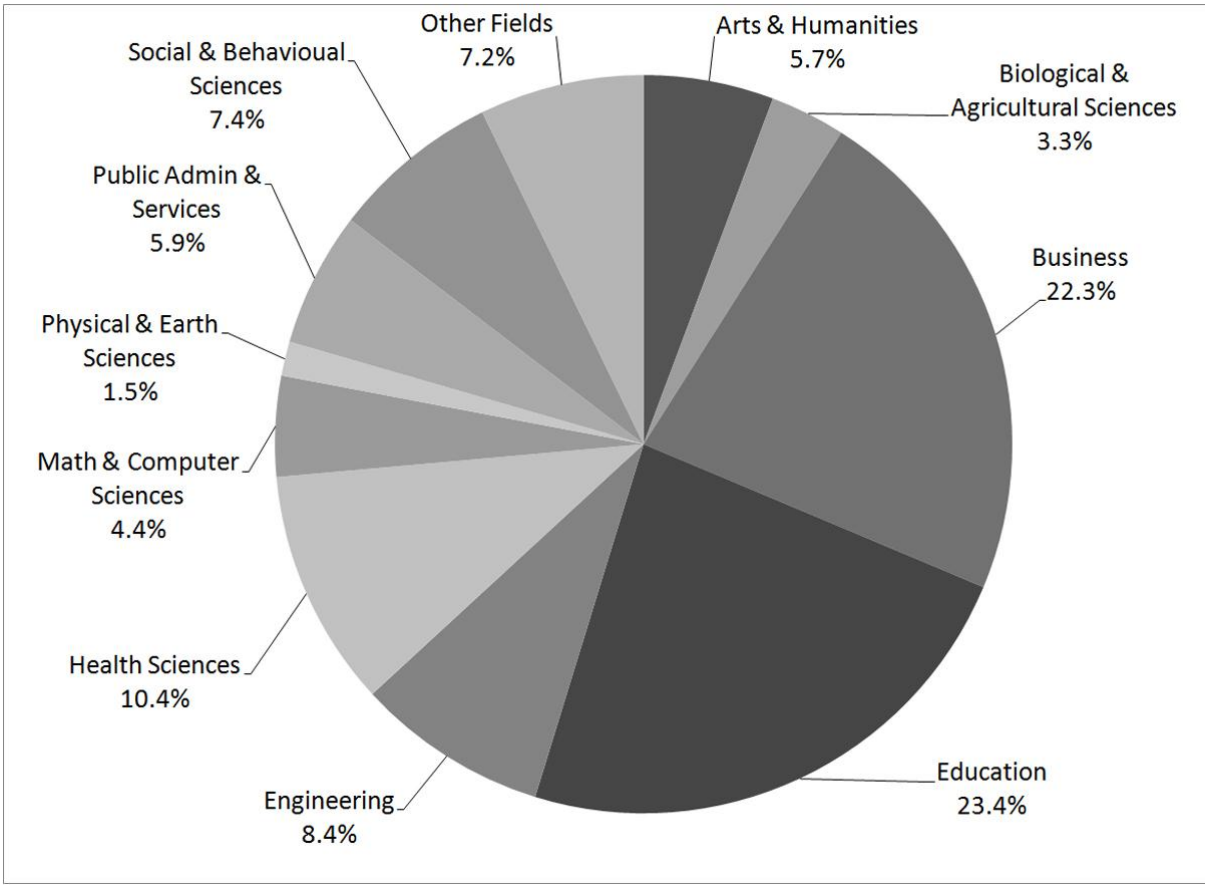


Figure 27: Masters degrees awarded by broad field, 2011-12
(CGS, 2012)

Typically professional masters degrees take two years, but may be longer - for example, in architecture they can last as long as four years. Wherever feasible these programmes are cohort-driven but this is not always possible, for example, if there are large numbers of part-time students. In each subject area, courses are prescribed with a certain amount of flexibility to allow for specialization in some areas. Students following professional masters programmes do not necessarily have to write a dissertation but normally have to complete a strongly practice-related 'capstone' project, in which they are not expected to undertake original research. For example, a student on a professional masters programme in public administration may carry out a social services programme evaluation for an agency in which they did an internship. In the evaluation they would be required to apply the knowledge and abilities they have acquired during the programme and in this case, to use the relevant evaluation methodologies to the programme, which may be the kind of activity they would be expecting to lead if in a management position in the agency.

Masters degrees in professional graduate schools are also taken by mid-career professionals, for instance those working in central government may take two years out of their job to obtain a masters degree in public administration in the expectation it will lead to a promotion or increase in salary.

Growth in professional science masters degrees
In line with the growth in employment opportunities in science-related careers, professional science masters degrees have increased in popularity. Between 2010 and 2013, enrolments grew by 23%, so that by autumn 2013 there were around 5,800 students studying on professional science masters

(PSM) programmes. PSMs have a dual purpose in that they enable graduates to undertake advanced training in science or mathematics in parallel with developing a range of professional skills. Demonstrating the effectiveness of higher education endowments in the US, a private trust, the Alfred J Sloan Foundation, has provided support for professional masters degrees in STEM subjects since 1997 and has awarded more than $23 million in grants for these programmes in a wide range of institutions. The trust has also founded a related professional body – the National Professional Masters Association – to support faculty and administrators working with professional masters STEM programmes.

The CGS conducts an annual survey of professional science masters degrees. The results of the fourth annual survey released in January 2014 show continuing upward trends in enrolment and degrees being awarded. Some of the 2013 results are as follows. In 2013, over 1,900 students, 28% of whom were international students, enrolled for the first time in PSM programmes, with around 67% full-time and the rest part-time. Almost equal proportions of women (47%) and men (53%) are enrolled in PSM programmes, which are currently dominated by four subject groups: computer and information sciences (21%), environmental sciences and natural resources (15%), mathematics and statistics (15%), and biotechnology (14%). In the academic year 2012-13, 18% of US-based PSM graduates were international students and 23% were from under-represented groups (Bell and Allum, 2011).

We heard that applicants' choice of institution and subject in masters programmes is influenced by their undergraduate experience. If, for example, a student had attended a masters-focused institution or a small regional undergraduate institution (see Figure 23) for their first degree, they might be more likely to aspire to a masters degree at a highly regarded regional institution than applying further afield. We heard that graduates from under-represented minorities have been advantaged by taking this route, especially since in some cases conventional wisdom suggests that students undertaking a masters at a PhD institution (see Figure 23, Carnegie foundation program classifications, Part 2) may find that faculty interest in masters degrees is not as great as in PhDs and therefore such students would not always benefit from exposure to high level research faculty.

We also heard about variability in the quality of masters (and undergraduate) programmes in some institutions, but that there are institutions in both the public and private sectors that provide high quality masters education (professional and research) with excellent graduate outcomes, and that some of the most prominent professional masters programmes in the country are offered at research-intensive universities high up in the national rankings.

Doctorates

As in the UK, doctoral candidates may be registered either on a PhD or a professional doctorate programme, taking courses and seminars and working with advisers and mentors in both teaching and research. Typically, a research masters is integral to a PhD, with the first two years containing varying amounts of structured training.

Figure 28 shows the number of doctorates awarded in 2011-12 by subject area; more than half of doctorates were awarded in STEM subjects, the largest single field being health sciences at 17.9% of the total, and with arts and humanities at less than 10%. Most doctoral degrees were awarded by research universities with very high research activity (62%), followed by research universities with high research activity (17.7%), doctoral/research universities (9.3%), masters colleges and universities (6.5%) and institutions with other Carnegie classifications (4.5%) (CGS, 2012).

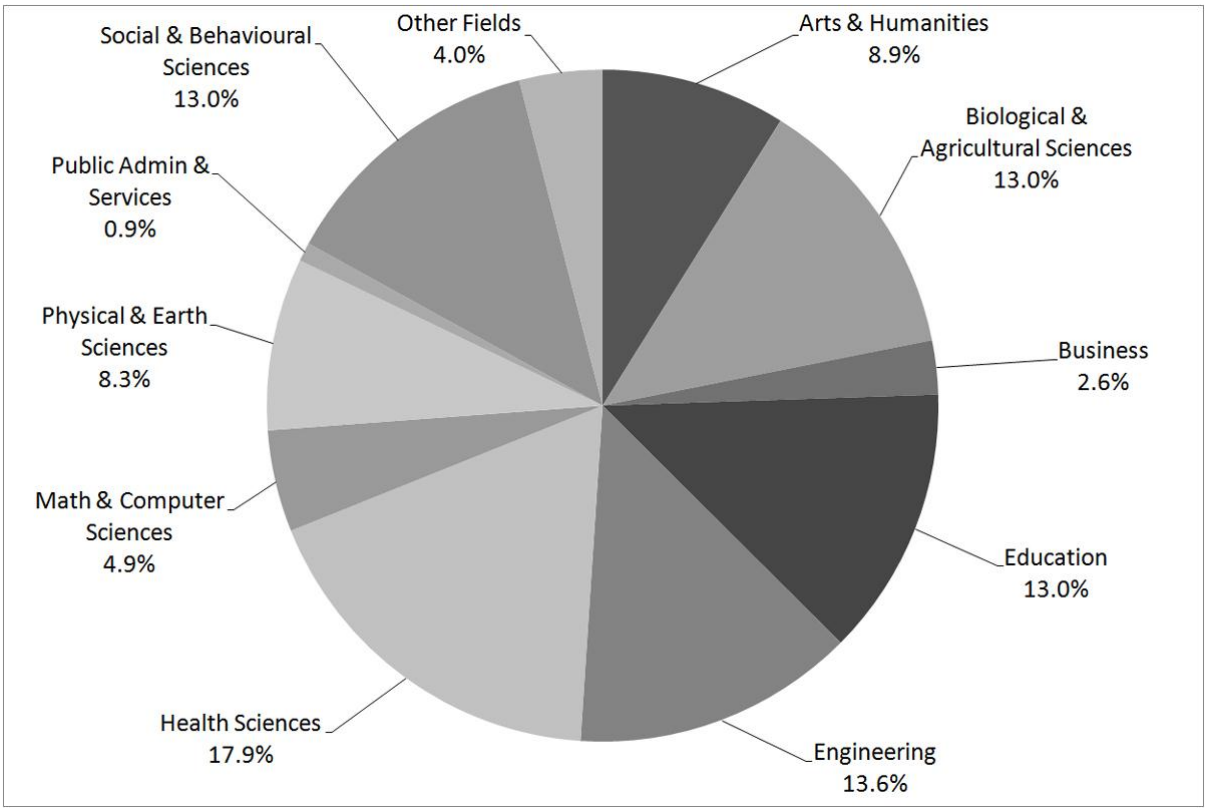


Figure 28: Doctoral degrees awarded by broad field, 2011-12 (CGS, 2012)

Part-time study

Overall just over 40% of graduate students study part-time in the US and as in other countries, the pattern varies depending on the subject, as summarised in Figure 29.

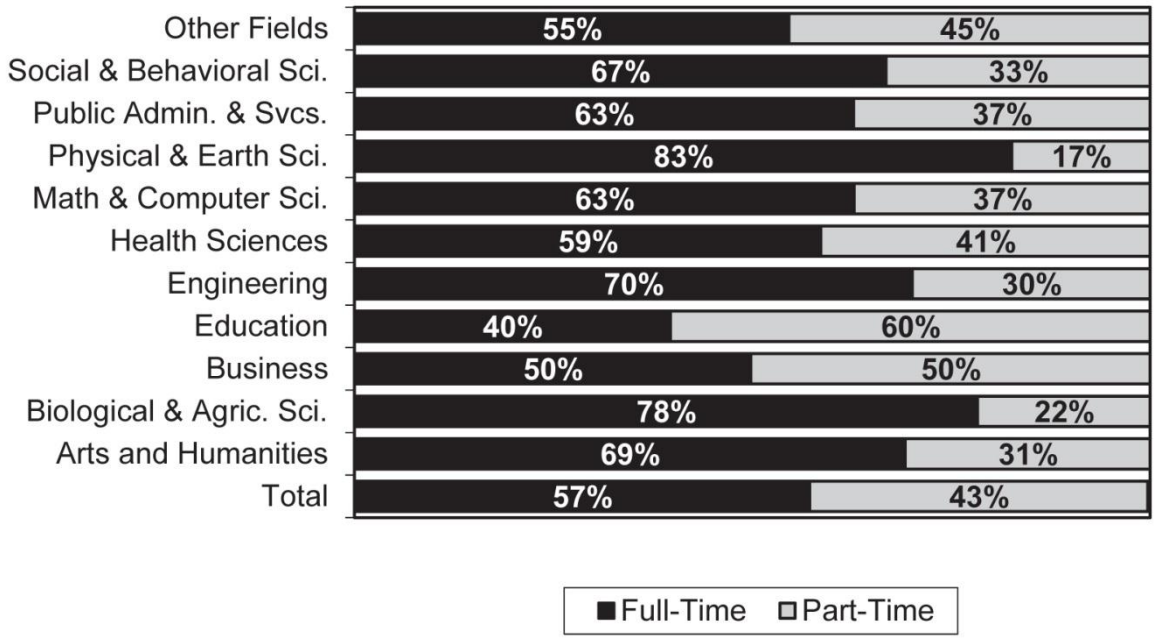


Figure 29: Full- and part-time graduate enrolments by subject 2012
(CGS, 2012)

Professional doctorates

As in the UK, professional doctorates in the US vary in length, structure and content and in the US it is common to differentiate between 'research' doctorates and professional doctorates, including clinical doctorates where candidates are applying their knowledge in a clinical setting such as nursing, or a business environment. 'Research' doctorates are defined by the NSF (2012) as follows: 'Research doctoral programs are oriented toward preparing students to make original contributions to knowledge in a field; they typically require the completion of a dissertation or equivalent project and are not primarily intended for the practice of a profession'. The NSF's Survey of Earned Doctorates (SED) carried out annually by the NSF and on which Fiegener's paper is based, 'recognised 18 distinct types of research doctorates in 2010'. In that year 95.8% of research doctorate graduates received a PhD and 3.1% the EdD (other professional doctorates are not included in the SED).

Unlike most of the other countries in this study, the US does not have a qualifications framework for higher education in which doctoral attributes are affirmed, but as noted by Fiegener, during the first decade of the 21st century, 143 EdD programmes across the US were re-designated following a three-year review, becoming professional doctorates rather than 'research' doctorates (NSF, 2012).

One of our interviewees described the purpose of professional doctorates as enabling graduates to operate 'at the highest levels in their profession'. The length, structure and content of professional doctorates differ depending on professional needs and expectations, with variation among, for example, programmes in business, education and psychology.

The importance of international students in the US

We heard that one of the most important attributes of life in the US is wide access to higher education and that it was essential that the country should continue to welcome international students, for breadth of ideas and to foster an intellectual community in the face of reduced levels of funding.

The US system of admission to postgraduate programmes is faculty-based and departments or schools make recommendations to their graduate school about which students to admit. One of our interviewees confirmed that faculty are 'looking for best individual talent wherever it is'. Around 18% of US graduate students overall are international, and in some fields up to 50-60%. As well as looking for evidence of individual talent, faculty members are likely to take into account the applicant's home institution, especially if they have previously recruited students from a university who have proved successful. One of our interviewees commented that 'The institutional training provided by the applicant's university is always important' and that 'the less information you have about an applicant's undergraduate or masters experience, the more you would be inclined to recruit from institutions that have given you good graduates in the past'.

At national level, international students are an important feature in monitoring trends. In a recent report about international graduate admissions (CGS, 2013b), the CGS confirmed that, in line with a general growth trend in international graduate applications between 2006 - 2012, there was a 7% growth in applications from international graduates to US graduate schools, up from a 2% increase in 2013. The growth overall masked a 1% decline in applications from China (currently 33% of the US's international students are from China), but in parallel there was a 32% increase in applications from India (currently 18% of the US's graduate students are from India). Another factor evident from the report is that the fastest-growing fields of study: engineering (14% growth), physical and earth

sciences (16% growth) and business (7% growth), already comprise 64% of all international students enrolled in graduate programmes in the US.

With respect to international enrolments, first-time entrants from India increased by 40% in 2013-14, substantially more than the 1% and 2% increases in 2012 and 2011 respectively. This is in contrast with a slower growth rate of 5% in graduate entrants from China. Commenting on these trends, Professor Debra Stewart, until recently the President of the CGS, highlighted the 'strong pipeline of international graduate students' in the US and emphasised the importance of continuing to monitor trends in enrolment patterns of graduate entrants from the countries sending the largest number of international students to the US: China, India and South Korea (CGS, 2013b).

One of our contributors suggested that doctoral graduates in the sciences from Eastern Europe are of a high quality, that English universities still produce people who are very good and that the biggest change in the profile of international students is the higher quality of entrants from India and China than in the past. For post-doctoral work this interviewee singled out Germany as the country that had improved the most, producing high quality doctoral graduates by maintaining high standards of training and investing heavily in doctoral students, for example, through the Max Planck Institutes. Good language skills were also mentioned as a critical advantage.

Inter-disciplinarity in doctoral programmes

Doctoral training normally takes place within a broad field, e.g. biological or physical sciences. In many fields, research is now inherently inter-disciplinary particularly, for example, in biosciences, and this is reflected in doctoral training. In some schools PhD candidates are given the option to major in one discipline, e.g. physics and take a minor subject in another, e.g. computing; another example might be an English major and gender studies minor. We heard that approximately 10% of doctoral candidates are able to take advantage of the major/minor model and that this approach is often valuable at subsequent stages in the researcher's career.

Drawing on annual data generated by the NSF's 'Survey of Earned Doctorates' (an annual census of all individuals receiving a research doctorate from an accredited US institution in a given academic year), Millar and Dillman's (2012) working paper identifies trends in how US doctoral graduates report their dissertation titles. They found that between 2001 and 2008, '28.4% of doctoral graduates reported two or more fields of dissertation research', indicating their research was inter-disciplinary. Data indicated there were some variations among disciplines (but no 'dramatic fluctuations' across the eight years surveyed). Graduates who reported their primary dissertation topic as 'life sciences' accounted for the largest proportion of inter-disciplinary dissertations (27.0%), with education (13.5%) and engineering (13.4%) dissertations the next largest proportion. Dissertations in mathematics, computer science and communications accounted for the smallest proportions of inter-disciplinarity and are therefore included in the 'other fields' in Figure 30 below (Bell, 2014d).

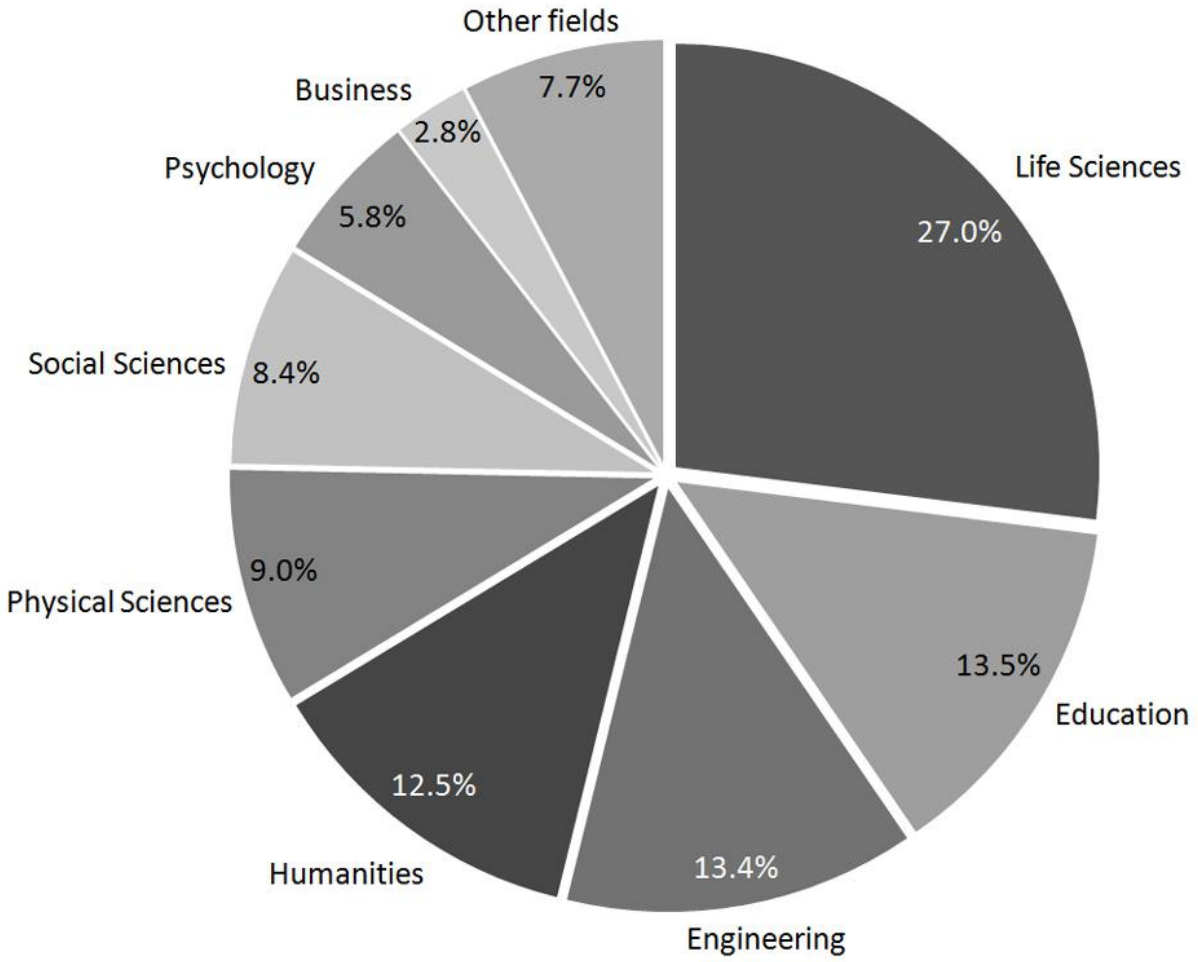


Figure 30: Proportions of inter-disciplinary dissertations, by subject, 2001-2008
(Millar and Dillman, 2012 in Bell, 2014d)

CGS makes the point that evaluating the nature and extent of inter-disciplinarity in doctoral programmes is challenging and that the taxonomies used for multiple surveys of graduate enrolment and outcomes in the US do not lend themselves to measuring inter-disciplinarity effectively. However, it is clearly a topic of interest to researchers, policy-makers and governments, in the US and internationally, and therefore a field in which further research could be undertaken.

On the basis of the evidence accessed, the quality of US graduate outcomes is high and graduate education at both masters and doctoral levels has some enviable features. However, there may be opportunities for introducing greater consistency, for example in doctoral training, without compromising the diversity that enables graduate students to choose programmes that best meets their needs.

Post-doctoral researchers

Claiming that postdoctoral researchers 'have become indispensable to the graduate education-research nexus for their contributions in research, supervision, grant writing and publications', Gumport (in Altbach et al, 2011) also suggests that postdoctoral experience is considered as a necessary step for new doctoral graduates (especially in some science and engineering fields and that it is becoming more common in the social sciences), not linked directly to academic jobs but as 'a transitional phase of professional development'. It is interesting to note that around 50% of those

entering post-doctoral positions in the US obtained their PhD in another country. An expansion in post-doctoral research in the US was largely driven by increases in National Institutes of Health funding and this has led to thinking that the system needs to be re-examined. The percentages of doctoral graduates currently estimated to occupy post-doctoral appointments in the US are significant (life sciences: 60%-70%; physical sciences: 45%-55%; engineering: 40%-45%; social sciences: 33%; humanities: growing numbers), yet we heard from one of our contributors that several issues need to be addressed, especially now that numbers have grown. On the positive side, post-doctoral researchers are considered critical to research and to make a significant and growing contribution, but three areas continue to cause concern, as follows. There is currently no systematic method of counting accurately the number of post-doctoral researchers in the US (currently estimated to be between 43,000 and 89,000), or evaluating their working conditions; mentoring post-doctoral researchers needs to be based on good practice principles that address the development of professional skills and careers advice; and better-defined career pathways for post-docs are needed for progression and advancement to occur (Stewart, 2013).

Access

At undergraduate level, many students have economic backgrounds that make them eligible for a federal grant, the most prevalent of these being Pell grants (previously known as Basic Educational Opportunity Grants), described as 'one of America's longest-standing federal loan programmes for low-income undergraduate students' (Federal Student Aid, 2014a). In 2011-12, 41% of undergraduates received a Pell grant (NPSAS, 2013). During funding cuts in 2012, the US President prevented withdrawal of the Pell grants (which some still believe may not continue far into the future), but as a result 'hundreds of millions of dollars in graduate federal loans [were cancelled] … to allow for the $17 billion increase in Pell grant funding' (Moodle, 2012). We learned from our interviewees that because of financial constraints and in particular the cuts in state university funding, grants for graduate students may not be so readily available in future and also that interest payments on graduate loans are likely to increase.

Figure 31 shows the distribution of PhD graduates in 2011-12 by background and gender, with women making up almost 60% of the graduating population overall and black/African American graduates the highest proportion of women graduates.

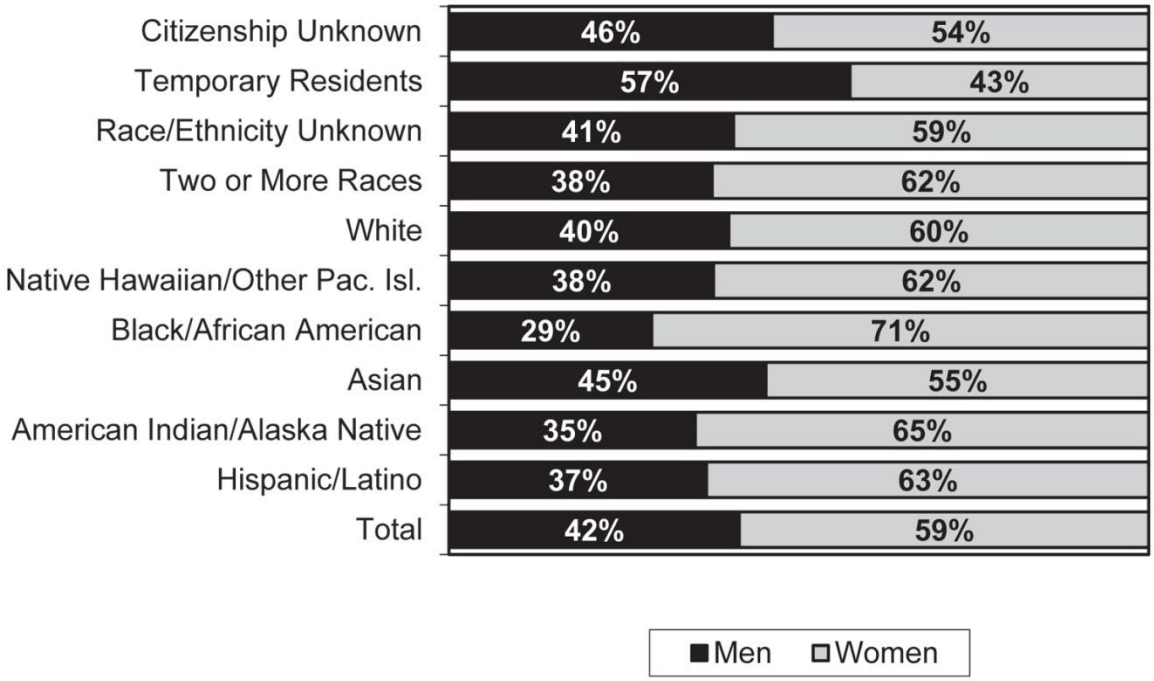


Figure 31: PhD graduates in 2011-12 by background and gender
(CGS, 2012)

Student funding and loans

The Federal Student Aid programme, operated by the US Department of Education, is the source of public funding for many US graduate students. With an annual budget of around $150 billion, this is a major programme of federal loans. Advice on the Federal Student Aid website encourages graduate students first to try and secure a scholarship or grant, or to consider a combination of work and study, before they apply to borrow money for a student loan (Federal Student Aid, 2014b, NSF, 2014).

A variety of repayment plans are offered through the federal system, including the option of linking monthly payments to income. Loans available through the Federal Student Aid programme are:

- *William D Ford Federal Direct Loans:* The largest programme, with loans coming directly from the Department of Education in two forms: direct unsubsidized loans through which students can borrow up to $20,500 per year; and direct PLUS loans, for students who need to borrow more than $20,500.
- *Federal Perkins Loans:* This is a school-based loan programme for students with 'exceptional financial need'. Students applying for a Federal Perkins loan (up to $8,000 per year) declare other funding sources.
- *Teacher Education Assistance for College and Higher Education (TEACH) Grants:* Through this scheme a grant of up to $4,000 a year is available to students completing coursework before beginning a career in teaching. To qualify for the loan, students have to provide evidence of study.
- *Federal Work-Study Grant:* This programme provides part-time jobs for graduate students (as well as undergraduates) 'with financial need', so that they can pay their graduate degree expenses. It encourages employment through community service and study-related work.

Federal Pell Grant

Most Pell grants go to undergraduate students. However, students enrolled in a post-baccalaureate teacher certification programme are also eligible.

In August 2013, the Bipartisan Student Loan Certainty Act became law. According to the CGS, this is 'the latest in a series of actions taken over the past few years with respect to federal student loans that have had a disproportionate, negative impact on graduate students' (CGS, 2014b). This is not only because as a result of the changes arising from the act there is overall less funding available to support graduate student loans; another outcome is that interest rates, previously held at 3.4% for subsidised loans, are rising. CGS is in the process of advising policy-makers about securing a better, longer-term solution to the reduction in funding available for graduate loans. They emphasise that many graduate students have an accumulated debt burden and cite evidence from a 2007-08 study showing that 73% of graduating masters students with loans had an average cumulative debt (undergraduate and postgraduate) of $41,000, and that 67% of doctoral graduates had an average cumulative debt of $60,000.

CGS notes that new debt, beginning when students enter graduate schools, is also significant and that under-represented groups, as CGS puts it 'the groups that should be a growing percentage of domestic students' have higher levels of debt than their peers. The figures that illustrate this are summarised in Table 23.

Debt incurred by graduate students in 2007-08		
Student ethnicity	Masters students	Doctoral students
White	41%	39%
African	86%	62%
Hispanic	58%	41%
Total all students	46%	39%

Table 23: Debt incurred by graduate students in 2007-08 (NPSAS, in CGS, 2014b)

CGS argues that these figures are as a result of minority groups being more likely to be enrolled in fields where students are primarily self-funding, such as education, public administration and social and behavioural sciences, but note that borrowing is also beginning to increase for students in STEM subjects who, in the past, would typically have been able to obtain full financial support for their studies (CGS, 2014b).

Community colleges

One of our interviewees spoke about the 'latent talent' that exists among students from backgrounds under-represented in US higher education and how, when supported culturally and financially such students are quick to develop confidence and to succeed. This contributor referred to the 'can-do' culture in US universities that helps to facilitate this kind of success. For many under-represented groups, community colleges are the first step towards a postgraduate qualification. Also referred to as 'two-year institutions', community colleges 'enroll higher percentages of first generation college students than four-year institutions, as well as higher percentages of low socioeconomic status students' (Provasnik and Planty, 2008, in Bell, 2012c). As in many countries, it is more difficult to enter postgraduate education later in life, particularly in some subjects, although interviewees stated that, in the US, there are more opportunities than elsewhere to undertake a postgraduate degree at different life stages, and that older students are also enrolling in higher percentages in the community colleges.

Figure 32 shows how many students from under-represented groups were able to attain a doctorate in 2009-10, having started their education in a community college:

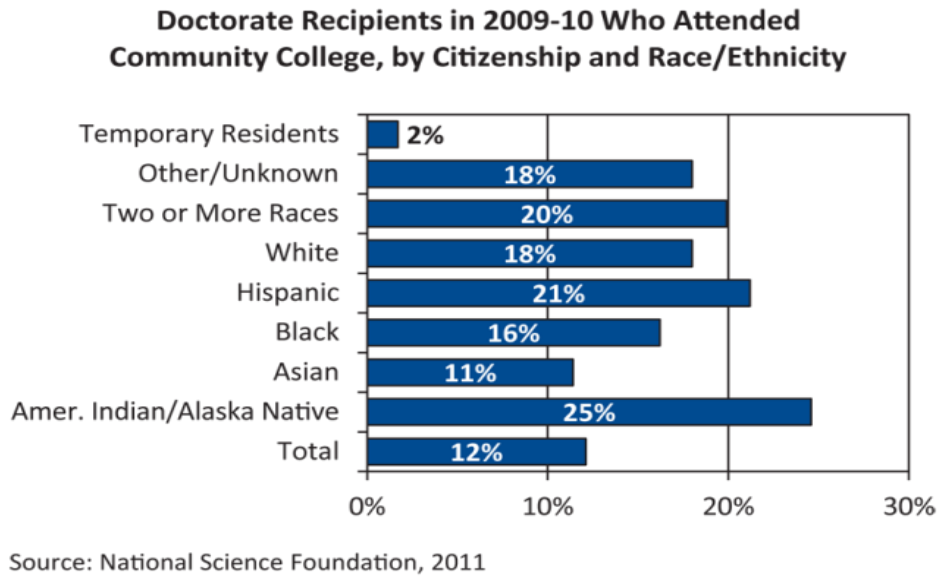


Figure 32: Doctorate recipients in 2009-10 who attended community college, by citizenship and race/ethnicity (NSF, in Bell, 2012c)

Among 2009-10 doctoral graduates, 12% had at some point during their higher education received credit from a community college, ranging from one course to a full associate degree, with women (13.3%) slightly more likely than men (11%) to have this background. Figure 33 provides a subject-specific breakdown for the 2009-10 doctoral graduate group.

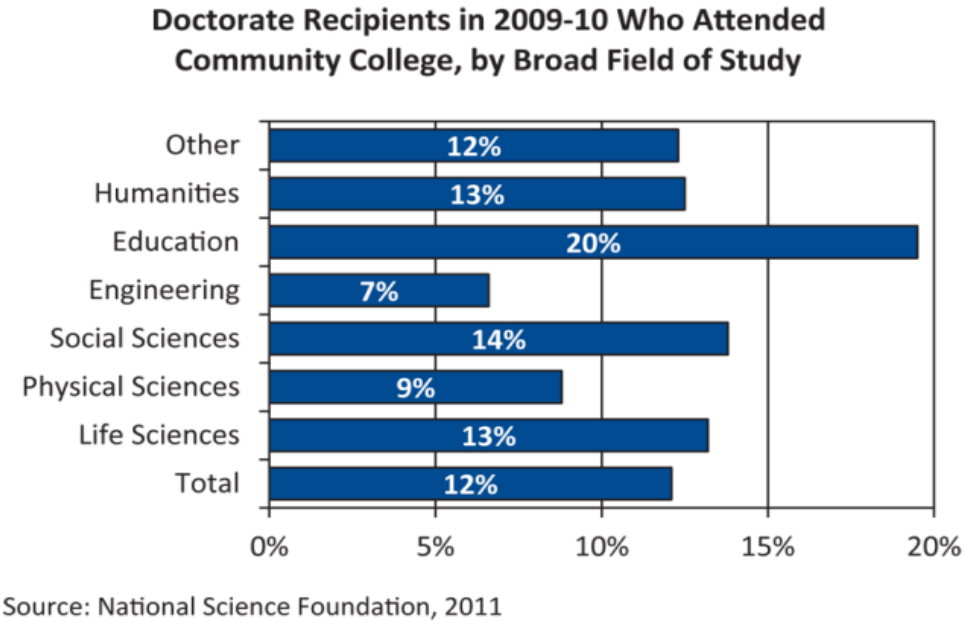


Figure 33: Doctorate recipients in 2009-10 who attended community college by broad field of study NSF, in Bell, 2012c)

The Ronald E McNair Post-Baccalaureate Achievement Program, known also as the McNair Scholars Program, awards grants to 'low-income, first-generation in college and minority undergraduates' (Bell, 2012a) to enable them to embark on doctoral studies. Students receive funding through the Department of Education's TRIO programs (grants for qualified individuals from disadvantaged backgrounds to enter post-secondary education, including doctoral programmes). Around 71% of McNair Scholars are low-income and first generation college students, with a similar proportion from under-represented minorities.

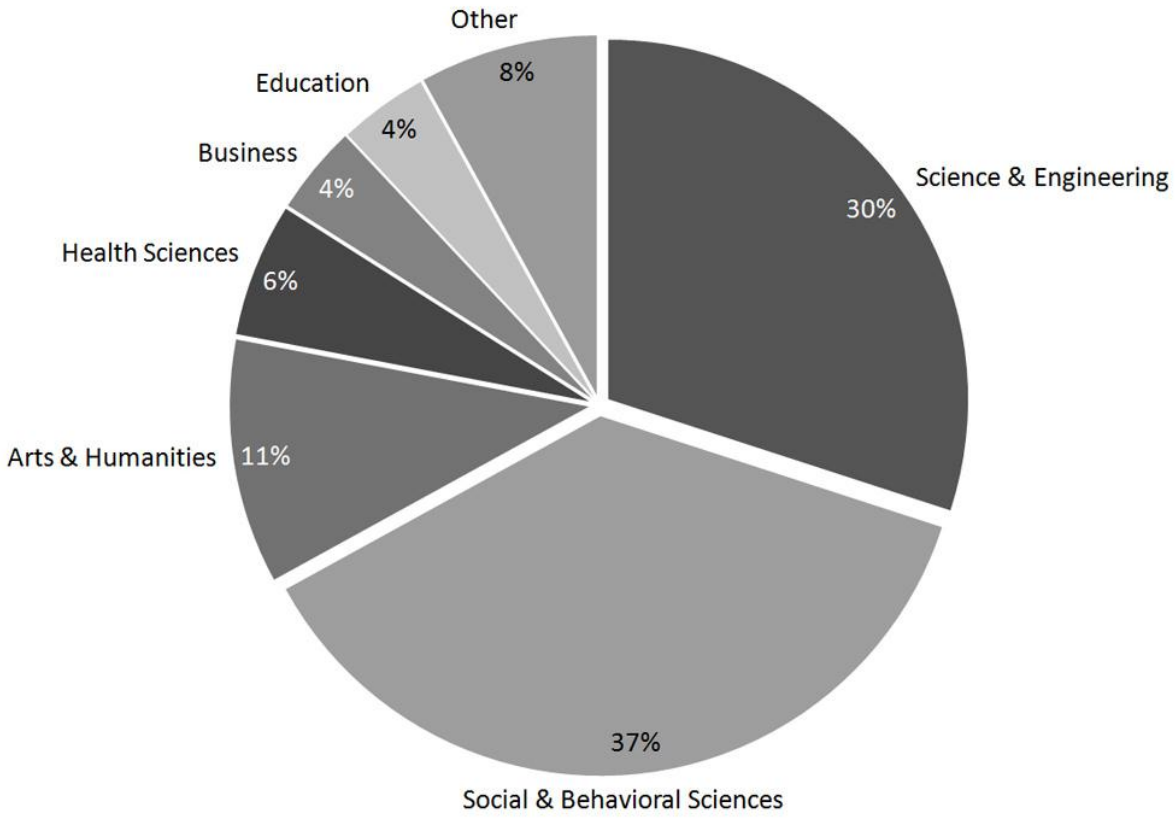


Figure 34: Undergraduate majors of McNair Scholars by field of study, 2011-12 (Bell, 2012a)

A directory of McNair Scholars, jointly sponsored by the CGS and the Council for Opportunity in Education, helps graduate schools to identify and recruit McNair Scholars for graduate schools, based on their undergraduate profile and research projects. Data show that McNair Scholars are more likely to be from under-represented groups and to be studying in STEM subjects, and also that they are likely to stay enrolled in graduate education after the first year of study.

With respect to the question of whether entrants to graduate study who, at undergraduate level, were considered to be from a group under-represented in higher education (for example, the first in their family to attend university) retain that status on transition to graduate study, one contributor described the US as 'background blind' for entry to postgraduate degrees, adding that higher education qualifications act as 'a leveller' making it possible for individuals to be judged on the strength of their ideas and intellect.

Employment outcomes

One of our interviewees observed that historically the US has been among the most effective countries, even the best, in training researchers, but that now more than half of research graduates

do not enter academic careers, there was a need to 'put more intention into the way in which students are prepared for all aspects of whatever career they choose'. This contributor noted that even as a faculty member in a university, it was now essential that graduates were capable of more than scholarship and that some research graduates are unprepared for academic careers except in the research dimension of their work. This in turn has an impact on faculty's ability to give good careers advice to students: it is unrealistic to expect them to be able to do this when they themselves have no experience of the wide range of careers research graduates now enter.

This view is confirmed by two studies reported in Nature in 2012 (Sauermann and Roach, 2012; and Russo, 2011, in Kaplan, 2012). The first, based on a survey of chemistry, life sciences and physics PhD students at leading US research universities found that as students progressed through their programme, academic careers became less attractive to them with small groups in all three disciplines reporting that their advisers and mentors had encouraged them to enter an academic research career rather than considering a wider range of options, despite the shrinkage in available academic jobs. The 2011 study, co-authored by the CGS, 'concluded that US universities, federal policy-makers and employers must coordinate their efforts to improve the career paths of postgraduates'. This situation was compared adversely with the UK's position which, kick-started by the Roberts' initiative in 2002 (Roberts, 2002), backed by targeted funding for a five-year period and supported by the UK Research Councils and the related national organisation Vitae, has resulted in 'broad spectrum' professional development opportunities for most doctoral candidates.

In parallel, research shows that those with graduate degrees are in growing demand from employers generally and that 'the number of jobs typically requiring a doctorate or a professional degree for entry is projected to increase by 20% between 2010 and 2020, with employment opportunities typically requiring a masters degree expected to grow by 22% (Sommers and Franklin, 2012). Bell notes that these increases exceed both the projected growth level for all occupations between 2010 and 2020 and the expected benefits for those with lower levels of educational qualifications. Figure 35 shows projected growth in employment by level of achievement.

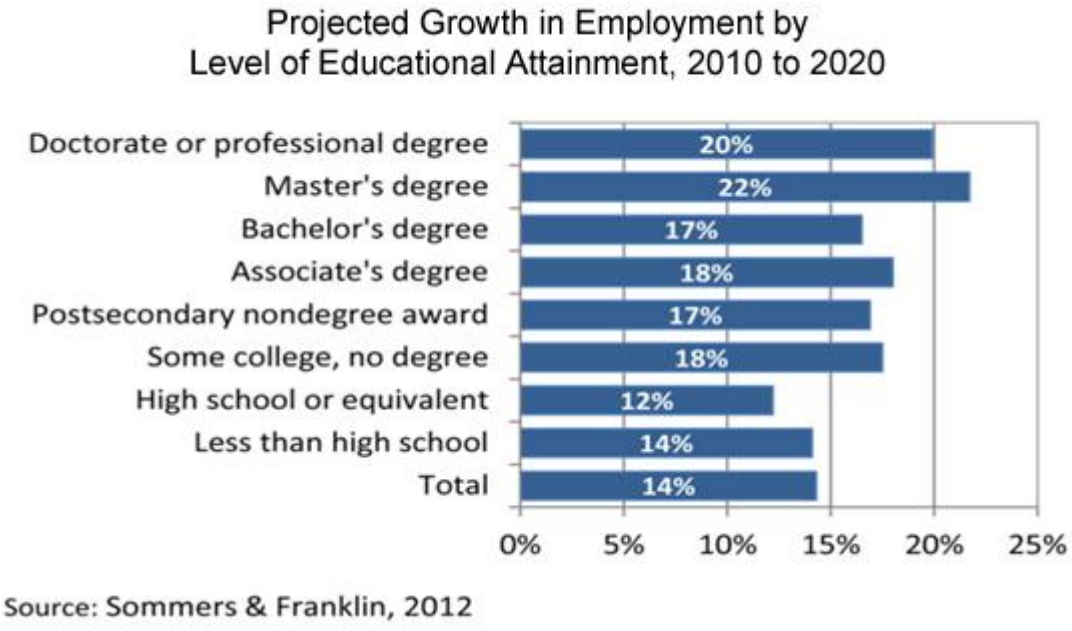


Figure 35: Projected growth in employment by level of educational attainment, 2010-2020 (Sommers and Franklin, in Bell, 2012b)

It is forecast that between 2010 and 2012 the largest employment growth will be in fields such as: health care, personal services and social services (Lockard and Wolf, 2012), with six of the occupations included in this group requiring an advanced degree, namely: marriage and family therapy (projected increase 41%); physical therapists (37.7%); audiologists (36.8%); medical scientists (36.4%); mental health counsellors (35.3%) and veterinarians (35.9%). These findings may correlate with the growth in professional masters degrees in science mentioned above. Overall the study shows 'robust growth' in employment for those holding graduate degrees; it also suggests that the projections may underestimate the number of people in the workforce with graduate degrees and notes that in some professions a bachelors degree may be the threshold requirement but that significant proportions of those entering employment in that area may also have a graduate degree. This emphasises the purpose of some graduate degrees being for differentiation in the job market and relates to 'commoditization' of doctoral education in a global context as defined by Nerad and Trzyna, in the sense that 'the degree's value, significance and utility can be assessed by anyone, anywhere, and so that an economic value can be placed on that degree by anyone with adequate expertise in educational credentials' (Nerad and Trzyna, 2008).

Earning power of graduates with 'advanced' (e.g. masters or doctoral) degrees

In 2010, a monthly sample survey of US households – Current Population Survey (CPS) – confirmed that the 'median usual weekly earnings of individuals with advanced degrees (masters degrees, doctorates, or first-professional degrees) were $1,351, compared with $1,038 for those with bachelors degrees and $626 for non-graduates with high school diplomas' (CGS, 2011). However, the median figures mask some inequalities:

- men with advanced degrees earned around 34% more ($1,552) than similarly qualified women ($1,158);
- Asian and white employees with advanced degrees earned more than Hispanic/Latino and Black/African Americans.

Table 24 gives more details about the median weekly earnings of different groups with advanced degrees.

Median Usual Weekly Earnings of Advanced Degree Holders by Gender and Race/Ethnicity, 2010 Annual Averages

Race/Ethnicity	Total	Gender	
		Men	Women
Total	$1,351	$1,552	$1,158
White	$1,368	$1,578	$1,169
Black/African American	$1,065	$1,176	$1,010
Asian	$1,466	N/A	N/A
Hispanic/Latino	$1,241	$1,387	$1,126

Notes: Includes full-time employed wage and salary workers in the U.S. 25 years of age and older with an advanced degree (master's, doctorate, or first-professional degree). N/A = Not Available. The CPS is a sample survey, and the numbers of Native Americans in the sample were too small to make reliable estimates.
Source: Bureau of Labor Statistics, 2011a

Table 24: Median weekly earnings of advanced degree holders (Bureau of Labor Statistics, 2011 in CGS, 2011)

MIT case study

A paper from MIT (Ortiz, 2013) evaluates its own doctoral degrees in the context of a selection of national and international reports from 2010 onwards about the effectiveness of doctoral education and the need to prepare graduates for non-academic careers. Their survey of 2012 graduate alumni found that 97% of those with doctorates were either working (including in postdoctoral positions) or carrying out military service, with only 2% seeking employment. The survey also showed that the median annual income of a doctoral graduate from MIT was $112,500. The paper also confirms that around 89% of MIT's doctoral students 'receive full tuition support through MIT and external sources', and that 86% of respondents to the survey reported they would have no debt directly related to their graduate education, with 78% also reporting no undergraduate debt (Ortiz, 2013). This is in contrast to other evidence we have gathered for this report; however, MIT is an elite institution and their students may not be so likely to be affected by debt as those in some other universities.

Recognising the need for better co-ordination of professional development in graduate degrees and drawing on feedback from the 2012 survey, the MIT Dean for Graduate Education established a task force to develop, during 2012-13, a more systematic and consistent approach to embedding professional development skills in graduate programmes. The cross-discipline task force comprised senior academic faculty who were responsible for co-ordinating existing professional skills development and to make materials available through a new software platform – the Professional Development Portal.

International graduates

Underlining the importance of international doctoral graduates in the US, the context of a 2009 paper about international graduates in science and engineering (drawing on 2003 data) suggested

that in all but the life sciences 'the foreign share of PhD recipients now equals or exceeds the share from the United States' (Bound et al, in Freeman and Goroff, 2009), with international students making up 51% of PhD graduates in science and engineering. More recent surveys indicate this proportion may remain similar. The 2003 data also indicate that international graduates accounted for 50% of PhDs awarded in physical sciences, 67% in engineering and 68% in economics. Findings also suggested that demand had grown for US doctoral programmes from countries where there had been a significant increase in the undergraduate population. The authors conclude that 'the influx of foreigners into the science and engineering labor market in the United States has changed the return to investment in advanced degrees in science and engineering for US residents', and that as a result the returns to US students for investing in advanced study have not improved. Furthermore, they suggest that data show the earnings of new advanced degree holders in science and engineering are lower than for others of similar standing, citing as contributory factors: low-paid academic appointments that lengthen the time between entry and completion of graduate programmes; a widening gap between junior and senior academic jobs; and the general uncertainty of university employment (Bound et al, in Freeman and Goroff, 2009).

Advanced degree holders in the US have a wide range of employment opportunities available to them and it appears that the growth in popularity of some degrees, for instance, professional science masters programmes, may be because they are seen as a route to certain fields of employment. Decreasing enthusiasm for academic jobs, which may vary depending on the discipline, is a concern but it is not yet clear whether this is a developing trend or a levelling effect linked with the growth in numbers of doctoral graduates.

Summary

On the basis of the evidence available, postgraduate education in the US continues to thrive. One of the most striking features is the positive diversity of institutions and graduate programmes, both of which enable potential graduate students to select a programme that suits their needs. The levels of endowment that some universities have access to is undeniably an advantage, especially for some graduate students in some fields.

As in all countries, there are barriers to fair access, the most obvious being financial, for instance the recent increase in interest rates for graduate loans and the burden of debt that affects some students. Those who succeed in gaining an advanced degree benefit by differentiation in earning power: again the extent to which this occurs is affected by background and whether or not the graduate is from an under-represented minority.

From an external perspective, some of the most interesting practices in postgraduate education in the US include:

- internships, for example, with local employers who may also sponsor doctoral candidates and in professional masters degrees;

- the 10-year assessment of research degree programmes that is a fine-grained evaluation of the research degree environment and places PhD students firmly in the institution's research enterprise;

- the role of community colleges in the progress of individuals from under-represented groups, from initial post-secondary education through to successful completion of doctoral degrees and the levels of participation in graduate programmes of minority students.

The lack of any national statutory intervention in the management of graduate education, in particular the Department of Education's remit not including graduate degrees (except through the institutional accreditation process) affects the co-ordination and consistency of graduate training, especially in the area of professional skills, and reliance on state funding at regional level leads to inconsistency and potential inequalities. However, a benefit of this approach is apparent in the institutional autonomy and diversity that exists across the US.

Reduction in funding for graduate progammes at state level and the potential for increasing debt among graduate students is a concern, particularly the impact on advanced degree-holders' capacity to benefit from their qualification and the potentially widening gap between elite institutions and others. The decrease in interest in entering academia, at least in some fields, as well as a decline in the number of academic jobs available is also of note.

Annex H – Number of universities featuring in world university rankings

Table 25: Number of universities featuring in Shanghai Jiao Tong University Rankings 2013, the Times Higher Education World University Rankings 2013 and the Times Higher Education Asia University Rankings 2013-2014 (India only)
(Shanghai Jiao Tong University, 2013; Times Higher Education World University Rankings and Asia University Rankings, 2014)

Country	Number of universities featuring in:	
	ARWU 2013 ranking	UK Times Higher Education ranking 2013-2014
Australia	**5**	**5**
	University of Melbourne 54th; Australian National University 66th; University of Queensland Australia 85th; Western Australia 91st ; University of Sydney 97th	University of Melbourne 34th; Australian National University 48th; University of Queensland Australia 63rd; University of Sydney 72nd; Monash University 91st
Belgium	1	2
	Ghent University 85th	Ghent University 85th; Catholic University of Leuven 61st
Canada	4	4
	University of Toronto 28th; University of British Columbia 40th; McGill University 58th; McMaster University 92nd	University of Toronto 20th; University of British Colombia 31st; McGill University 35th; McMaster University 92nd
China	-	2
		Peking University 45th; Tsinghua University 50th;
Denmark	2	-
	University of Copenhagen 42nd; Aarhus University 81st	
England	**8**	**10**
	University of Cambridge 5th; University of Oxford 10th; University College London 21st; Imperial College London 24th; University of Manchester 41st; University of Bristol 64th; King's College London 67th; University of Nottingham 83rd	University of Oxford 2nd; University of Cambridge 7th; Imperial College London 10th; University College London 21st; London School of Economics and Political Science 32nd; King's College London 38th; University of Manchester 58th; University of Bristol 79th; Durham University 80th; University of York 100th
Finland	1	1
	University of Helsinki 76th	University of Helsinki 100th
France	4	3
	Pierre et Marie Curie University (Paris 6) 37th ; University of Paris Sud (Paris 11) 39th; Ecole Normale Superieure Paris 71st; University of Strasbourg 97th	Ecole Normale Superieure 65th; Ecole Polytechnique 70th; Pierre et Marie Curie University (Paris 6) 96th;
Germany	**4**	**5**
	Technical University Munich 50th; University of Heidelberg 54th; University of Munich 61st; University of Freiburg 100th	University of Munich 55th; Georg-August University Göttingen 63rd; University of Heidelberg 68th; Free University Berlin 86th; Technical University Munich 87th
India	**Universities featuring in top 100 of the ARWU Ranking of Asian Universities - 9:** Panjab University 32nd; Indian Institute of Technology (IIT) Kharagpur 45th; IIT Kanpur 55th; IIT Delhi 59th; IIT Roorkee 59th; IIT Guwahati 74th; IIT Madras 76th; Aligarh Muslim University 80th; Jawaharlal Nehru University 90th	
Israel	3	-
	Hebrew University of Jerusalem 59th; Technion-Israel Institute of Technology	

	77th; Weizmann Institute of Science 92nd;	
Japan	3	2
	University of Tokyo 21st; Kyoto University 26th; Osaka University 85th	University of Tokyo 23rd; Kyoto University 52nd;
Korean Republic	-	3
		Seoul National University 44th; Korea Advanced Institute of Science and Technology 56th; Pohang University of Science and Technology 60th
Netherlands	3	8
	Utrecht University 52nd; Leiden University 74th; University of Groningen 92nd	Leiden University 67th; Delft University of Technology 69th; Erasmus University Rotterdam 73rd; Utrecht University 74th; Wageningen University and Research Center 77th; University of Amsterdam 83rd; University of Groningen 98th; Maastricht University 98th
Norway	**1**	-
	University of Oslo 69th	
Russia	1	-
	Moscow State University 79th	
Scotland	**1**	**1**
	University of Edinburgh 51st	University of Edinburgh 59th;
Singapore	-	2
		National University of Singapore 26th; Nanyang Technical University 76th
Sweden	3	1
	Karolinska Institute 44th; Uppsala University 73rd; Stockholm University 82nd	Karolinska Institute 36th;
Switzerland	4	3
	Swiss Federal Institute of Technology Zurich 20th; University of Zurich 60th; University of Geneva 69th; University of Basel 83rd	Swiss Federal Institute of Technology Zurich 14th; Ecole Polytechnique Fédérale de Lausanne 37th; University of Basel 74th
United States	**52**	**45**
	Top 20: Harvard University 1st; Stanford University 2nd; University of California, Berkeley 3rd; Massachusetts Institute of Technology (MIT) 4th; California University of Technology (Caltech) 6th; Princeton University 7th; Columbia University 8th; University of Chicago 9th;Yale University 11th; University of California, Los Angeles 12th; Cornell University 13th; University of California, San Diego 14th; University of Pennsylvania 15th; University of Washington 16th; The Johns Hopkins University 17th; University of California, San Francisco 18th; University of Wisconsin-Madison 19th; University of Michigan – Ann Arbor 23rd; University of Illinois at Urbana-Champaign 25th; New York University 27th	**Top 20**: California University of Technology (Caltech) 1st; Harvard University 2nd; Stanford University 4th; Massachusetts Institute of Technology (MIT) 5th; Princeton University 6th; University of California, Berkeley 8th; University of Chicago 9th; Yale University 11th; University of California, Los Angeles 12th; Columbia University 13th; The Johns Hopkins University 15th; University of Pennsylvania 16th; Duke University 17th; University of Michigan 18th; Cornell University 19th; Northwestern University 22nd; Carnegie Mellon University 24th; University of Washington 25th; University of Texas at Austin 27th Georgia Institute of Technology 28th

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List of abbreviations	
AAU	Association of American Universities
AHRC	Arts and Humanities Research Council
AHSS	Arts, Humanities and Social Sciences
ANECA	Spanish National Quality Assurance Agency
AQF	Australian Qualifications Framework
ASC	Academic Staff College
ATAR	Australian Tertiary Admission Ranks
ATN	Australian Technology Network
ARWU	Academic Ranking of World Universities
BAFöG	Federal Training Assistance Act
BBSRC	Biotechnology and Biological Sciences Research Council
BRIC	Brazil, Russia, India and China
CAT	Common Admissions Tests
CDT	Centre(s) for doctoral training
CEI	International Campus of Excellence Initiative (Spain)
CID	Carnegie Initiative on the Doctorate
CGS	Council of Graduate Schools
CPS	Current Population Survey
CSIR	Council of Scientific and Industrial Research
DAAD	German Academic Exchange Service
DBIS	Department for Business, Innovation and Skills
DDOGS	Deans and Directors of Graduate Schools
DEA	Diploma de Estudios Avanzados
DFG	German Research Foundation
DIISRTE	Department of Industry, Innovation, Science, Research and Tertiary Education (Australia)
DLHE	Destinations of Leavers from Higher Education
DQR	German Qualifications Framework for Lifelong Learning
DSA	Disabled Students' Allowance
DTP	Doctoral training partnership(s)
EastCHEM	See ScotCHEM
ECTS	European Credit Transfer and Accumulation System
EHEA	European Higher Education Area
Eng D	Doctor of Engineering
ELIR	Enhancement-led Institutional Review
ENQA	European Association for Quality Assurance in Higher Education
ERA	European Research Area
ESRC	Economic and Social Research Council
EPSRC	Engineering and Physical Sciences Research Council

EQAR	European Quality Assurance Register
EQF	European Qualifications Framework
ETS	Education Testing Service
EU	European Union
FHEQ	Framework for Higher Education Qualifications in England, Wales and Northern Ireland
FICCI	Federation of Indian Chamber of Commerce and Industry
FQHEIS	Framework for Qualifications of Higher Education Institutions in Scotland
Go8	Group of Eight research intensive universities
GDP	Gross Domestic Product
GDR	German Democratic Republic
GPA	Grade Point Average
GRE	Graduate Record Examination
HDR	Higher degree by research
HE	Higher education
H1	Honours first class
H2A	Honours upper second class
HEA	Higher Education Academy
HECS	Higher Education Contribution Scheme
HEFCE	Higher Education Funding Council for England
HELP	Higher Education Loan Programme
HEPI	Higher Education Policy Institute
HESA	Higher Education Statistics Agency
ICSSR	Indian Council of Social Science Research
ICT	Information and Communications Technology
IELTS	International English Language Testing System
IGERT	Graduate Education and Research Training
IRO	Independent Research Organisation
IRU	Innovative Research University
ISER	Institute of Science, Education and Research
JEE	Joint Entrance Examination
JSS	Joint Skills Statement
KMK	Standing Conference of the Ministers for Education and Culture
LDLHE	Destinations of Leavers from Higher Education Longitudinal Survey
LERU	League of European Research Universities
MA	Master of Arts
MASTS	Marine Alliance for Science and Technology for Scotland
MBA	Master of Business Administration
MECES	Spanish Qualifications Framework for Higher Education
MIB	Master of International Business

MIT	Massachusetts Institute of Technology
MLitt	Master of Letters
MPhil	Master of Philosophy
MRes	Master of Research
NAAC	National Assessment and Accreditation Council
NET	National Eligibility Test
NIFU	Norwegian Institute for studies in Innovation, Research and Education
NKC	National Knowledge Commission
NOKUT	Norwegian Agency for Quality Assurance in Education and Training
NOMA	NORAD's Programme for Master Studies
NORAD	Norwegian Agency for Development Co-operation
NQF	Norwegian Qualifications Framework
NRC	National Research Council
NSF	National Science Foundation
NUHEPs	Non-university higher education providers
NUS	National Union of Students
NVEQF	National Vocational Education Qualifications Framework
OECD	Organisation for Economic Co-operation and Development
OFFA	Office for Fair Access
PG	Postgraduate
PGT	Postgraduate taught
PGR	Postgraduate research
PISA	Programme for International Student Assessment
PPI	Personal Potential Index
PPP	Public-private partnership(s)
PREQ	Postgraduate Research Experience Questionnaire
PRES	Postgraduate Research Experience Survey
PSM	Professional Science Masters
PTFL	Postgraduate Tuition Fee Loan(s)
QA	Quality assurance
QAA	Quality Assurance Agency for Higher Education
QF-EHEA	Qualifications Framework of the European Higher Education Area
QQI	Quality and Qualifications Ireland
RCUK	Research Councils UK
RDF	Researcher development framework
RDS	Researcher development statement
REACU	Spanish Network of Agencies for University Quality
REF	Research Excellence Framework
RTS	Research Training Scheme

RUN	Regional Universities Network
SAAS	Student Awards Agency for Scotland
SC	Scheduled Caste
SED	Survey of Earned Doctorates
SES	Socio-economic Status
SHEEC	Scottish Higher Education Enhancement Committee
SIRE	Scottish Institute for Research in Economics
SCQF	Scottish Credit and Qualifications Framework
ScotCHEM	Umbrella organisation for two Scottish research pools in chemistry: EastCHEM and WestCHEM
SINAPSE	Scottish Imaging Network: A Platform for Scientific Excellence
SET	State Eligibility Test
SFC	Scottish Funding Council
SFU	Centres of Excellence in Higher Education
SGSAH	Scottish Graduate School for the Arts and Humanities
SINAPSE	A medical imaging research partnership of six universities
SME	Small and medium sized enterprise(s)
ST	Scheduled Tribe
STEM	Science, Technology, Engineering and Mathematics
SULSA	Scottish Universities Life Sciences Alliance
SUPA	Scottish Universities Physics Alliance
TA	Teaching Assistant
TAFE	Technical and further education provider(s)
TEKNA	Norwegian Society of Graduate Technical and Scientific Professionals
TEQSA	Tertiary Education Quality and Standards Agency
THE	Times Higher Education
TSIS	Third Sector Internships Scotland
UGC	University Grants Commission
UKBA	UK Border Agency
UKIERI	UK-India Education and Research Initiative
UNED	Open University (Spain)
UNESCO	United Nations Educational Scientific and Cultural Organization
UUK	Universities UK
WestCHEM	See ScotCHEM

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