QAA

Doctoral degree characteristics

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Executive summary

This guide to doctoral degree characteristics provides a summary of UK doctoral degree characteristics, highlighting similarities and differences between doctoral degrees. It is intended as a practical reference text that provides definitive information about UK doctoral programmes, including their purposes, structures, content, titles and assessment methods.

The guide is complementary to the *Master's degree characteristics* document (QAA, 2010) and provides an extension of information from that publication. The intended audiences include:

- doctoral candidates
- academic staff, particularly doctoral supervisors
- institutions
- employers
- policy makers

who will all have a different perspective.

There will therefore be diverse reasons for consulting the guide, and we hope that users will find what they need. The guide is about doctoral degree characteristics as from the point of entry to the programme; it does not address individual candidates' route to the doctorate. Nor is the guide intended to describe the characteristics of doctoral graduates: these are summarised in the doctoral qualification descriptors for the UK. Unlike the QAA *Code of practice, Section 1: Postgraduate research programmes*, this document does not cover research master's degrees such as the MPhil, MLitt, or MSc, except where they form part of a doctoral programme.

The guide draws on a range of other guidance and regulation that provides the framework for UK doctoral degrees: these publications are listed in Annex 1 and reflect the importance of the European dimension in situating UK doctorates in a wider context, particularly the Salzburg Principles and the Framework for Qualifications of the European Higher Education Area (EHEA), which contains the original 'Dublin descriptors' frequently referenced by UK institutions. Other relevant reference sources are also listed in Annex 1.

In the UK, doctoral qualification descriptors are included in *The framework for higher education qualifications in England, Wales and Northern Ireland* (FHEQ) (QAA, 2008) and *The Framework for higher education qualifications in Scotland*, part of the Scottish Credit and Qualifications Framework (SCQF) (QAA, 2001), both of which are maintained by QAA. These qualification descriptors summarise the research-specific and personal attributes agreed by the higher education sector as a minimum level of achievement for any doctoral graduate. They are reproduced in full at Annex 3. One of the most important purposes of having such descriptors is to achieve equivalence of academic standards across doctoral awards by summarising the key attributes expected of a doctoral graduate. Doctoral qualification descriptors promote a high level of consistency while affording universities the autonomy they are entitled to as research degree awarding bodies. This allows institutions to augment the generic requirements in the descriptors with detailed assessment criteria that are appropriate for different subjects and qualifications. Integration of the attributes relevant to the doctoral level with those required of more experienced researchers has recently been established in the Vitae Researcher Development Framework (RDF) (see section 2).

The purpose of section 3.1 is to show both the similarities that exist among doctoral awards and their defining characteristics as individual qualifications, so that it is possible to distinguish between them and the different purposes they fulfil. The general qualification

descriptions are not comprehensive but are intended to give a flavour of what makes each award distinctive.

All UK doctorates require the main focus of the candidate's work to be their contribution to knowledge in their discipline or field, through original research, or the original application of existing knowledge or understanding. In professional and practice-based doctorates the research may be undertaken in the workplace and so have a direct effect on organisational policy and change, as well as improving personal practice.

Introduction

This guide provides a summary of UK doctoral degree characteristics, highlighting similarities and differences between doctoral degrees. It complements the QAA *Code of practice, Section 1: Postgraduate research programmes*.[1]

The guide is intended to be useful to a wide range of people as a practical reference text that provides definitive information about UK doctoral programmes, including their structures, content and titles, their purposes, and assessment methods. It also brings together in one reference document details of the regulatory frameworks that help to assure the quality and academic standards of UK doctoral programmes in different institutional contexts. The guide is intended to be used within the UK and also to provide some international comparison of UK doctoral degrees and their graduates with those in other countries. One of the objectives is to show the high levels of academic achievement and personal attributes among graduates of UK doctoral programmes offered by a broad spectrum of autonomous higher education institutions.

Publication of this guide reflects the increased interest in doctoral education shown by UK governments, funding bodies, other HE sector organisations and policy makers in the last 10 years and the concomitant higher profile given to doctoral degrees by higher education institutions themselves as a result of the increase in number and range of such programmes being offered in the UK in the last decade.

One of the reasons for the greater emphasis given to research education by government and others concerns the impact on the UK economy of the higher numbers of doctoral candidates entering employment (section 1.1); another is the significant investment made by Research Councils UK (RCUK) of around £20 million per year of 'Roberts' funding between 2003 and 2010-11 (RCUK, 2010) in institutional skills training for doctoral programmes, which has benefitted all research degree candidates and has led to more structured research degree programmes and a more consistent level of personal and professional skills development across doctoral programmes.

The guide is complementary to the *Master's degree characteristics* document (QAA, 2010) and provides an extension of information from that publication. The intended audiences include:

- doctoral candidates
- academic staff, particularly doctoral supervisors
- institutions
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There will therefore be diverse reasons for consulting the guide and we hope that users will find what they need. The guide is about doctoral degree characteristics as from the point of entry to the programme; it does not address individual candidates' route to the doctorate. Nor is the guide intended to describe the characteristics of doctoral graduates: these are summarised in the doctoral qualification descriptors for the UK. Unlike the QAA *Code of practice, Section 1: Postgraduate research programmes*, this document does not cover

[1] The *Code of practice, Section 1: Postgraduate research programmes,* published in 2004, contains a reference to 'taught' doctorates (p 4: Research programmes). Whilst HESA retains a category which institutions can use to return numbers of students on 'taught' doctorates, the reference on page 4 of section 1 will be removed when it is revised during 2011-12 to become part of the new QAA 'Quality Code'.

research master's degrees such as the MPhil, MLitt, or MSc, except where they form part of a doctoral programme.

It is expected that the guide will be accessed mainly as an electronic resource available from QAA's 'doctoral degree' pages, alongside *A guide to the UK doctorate* produced by QAA in conjunction with the National Union of Students (NUS) and intended primarily for doctoral candidates and applicants to doctoral programmes.

Objectives

The objectives for this guide are as follows:

- to demonstrate the distinctive nature of the doctoral research degree as a qualification rooted in original research (the creation of new knowledge or the novel application of existing knowledge) and the diversity of doctoral programmes
- to summarise the quality assurance mechanisms and frameworks within which UK doctoral programmes are located and which help to provide evidence at UK, European and global levels of the high academic standards of the UK doctorate
- to show the range and relevance of research skills and other attributes acquired by doctoral graduates during their programme of study.

Annex 1 summarises other relevant reference sources.

Throughout this document we refer to doctoral candidates rather than doctoral students. The consensus is that this is the most suitable term to use, even though in some institutions a distinction is made between 'student' and 'candidate' depending on whether the individual has successfully completed some kind of transfer of status stage. Some institutions may use words other than 'student' or 'candidate', for example, 'researcher' to describe an individual undertaking a research degree.

1 Context for the characteristics of doctoral degrees

1.1 The research environment

As is widely acknowledged and highlighted in the QAA *Code of practice, Section 1: Postgraduate research programmes* (precept 5), the quality of the research environment is critical to the context of doctoral degree programmes. Access to an active and vibrant research environment, including contact with other researchers, is fundamental to doctoral candidates' success, irrespective of subject, mode of study, location, and so on. The explanation associated with precept 5 of the *Code of practice, Section 1* summarises some of the conditions that are present in high-quality research environments.

1.2 Growth in numbers of doctoral candidates

The doctoral degree has common currency globally as the highest academic qualification a university can award. Tinker and Jackson (2004) suggest that 'In terms of the academy, the PhD [or doctorate] is the highest formal qualification…' and Johnston (1997) states that 'the PhD is an important award, recognised internationally to signify high level intellectual endeavours in a specialised field of study'. For many years the PhD (or DPhil in some universities) was the main doctoral qualification in the UK (see also information on higher doctorates below); now there are different types of doctorate designed to meet the needs of a diverse group of candidates. Numbers of entrants to UK doctorates and research master's programmes have grown steadily, from 26,900 in 2002-03 to 30,735 in 2008-9 (a 14% increase: Smith et al, 2010). It is not clear whether growth in numbers taking doctoral degrees will continue, given global competition for recruitment and funding changes.

1.3 Development of regulatory and guidance framework for UK doctorates

After many years as an award mainly of significance in academic life, the doctorate has become recognised outside academia as a qualification that prepares its holders for a range of other roles. The diversification of forms of doctorate in the UK as mentioned above has occurred within the structure established by institutions themselves and by UK sector-wide organisations.

Broader interest (outside academic institutions), in the quality and academic standards of the UK doctorate can be traced back to the 1960s, especially in the sciences and engineering (SRC, 1968; SERC, 1990). Interest across the range of disciplines intensified with publication of the Harris report (1996), commissioned by the Higher Education Funding Council for England (HEFCE), which 'wished to be sure that its funding methodology remained appropriate for a rapidly growing and evolving postgraduate (pg) sector'. The conclusions of the Harris committee were wide-ranging, covering future funding for postgraduates, the quality of the education they experienced, and encouraging institutions to ensure postgraduates had opportunities to teach. One recommendation (6.4) in particular is relevant to the development of the UK doctorate.

It reads: 'Institutions, in determining the nature of the courses which they provide, and the level of entry to these, need to pay particular regard to the employment opportunities that follow pg study, as part of assuring the quality and standards of the provision'. This acknowledged that postgraduate programmes needed to prepare graduates for the next stage in their career, whatever it might be, presaging the Roberts report (see below), as well as recognising the importance of acquiring the core research skills that are critical to the successful completion of the thesis or equivalent.

Some of the Harris recommendations concerning the quality of postgraduate education were taken up by the UK research councils, some by universities and others by HEFCE itself. Also in 1996, the Higher Education Quality Council (HEQC, QAA's predecessor), published *Guidelines on the Quality assurance of research degrees*, which were formally supported by: the Committee of Vice-Chancellors and Principals (CVCP, now Universities UK), the Standing Conference of Principals (SCOP, now GuildHE), the UK Council for Graduate Education (UKCGE) and the National Postgraduate Committee (now part of the NUS).

In 1999, the QAA published the first section of its *Code of practice for the assurance of academic quality and standards in higher education* (the *Code of practice* being one of the elements of the Academic Infrastructure[2] recommended by Dearing in 1997). The *Code of practice, Section 1: Postgraduate research programmes*, was followed two years later by the first edition of *The framework for higher education qualifications* (FHEQ) which provided a doctoral qualification descriptor, summarising the research and other attributes expected of all doctoral graduates. A year later, the 'SET for success' report was published (Roberts, 2002), the outcome of the Roberts review of the supply of people with science, technology, engineering and mathematics (now known as STEM) skills in the UK. This led to the introduction of 'Roberts' funding later in the decade - ring-fenced money provided for a fixed period (to 2011) to augment skills development for doctoral candidates and early career researchers. During this period, the UK research councils and the Arts and Humanities Research Board (the predecessor to the current Arts and Humanities Research Council) incorporated the Joint Statement of Skills Training Requirements of Research Postgraduates, now commonly known as the Joint Skills Statement (JSS) into their training requirements for research council-funded doctoral candidates. The JSS has been replaced with the Vitae Researcher Development Statement (RDS - see section 2).

In 2003, HEFCE published draft threshold standards for research degree programmes, in 'Improving standards in postgraduate research degree programmes' (HEFCE 2003). These were broadly accepted by the higher education sector as a useful guidance and regulatory framework for research degrees, and soon after this, in 2004, QAA published a revised version of the *Code of practice, Section 1*, in partnership with the UK funding and research councils and including many of the threshold standards. Both the Improving standards document and the new *Code of practice, Section 1* incorporated the Joint Skills Statement, indicating the importance now given to skills acquisition and development for research candidates. A one-off review of research degree programmes conducted through a peer review process by QAA in 2006 showed good alignment between the principles and guidance in the *Code of practice, Section 1* and doctoral education practice in English and Welsh higher education institutions.

In the UK, doctoral qualification descriptors are included in *The framework for higher education qualifications in England, Wales and Northern Ireland* (FHEQ) (QAA, 2008) and *The framework for higher education qualifications in Scotland*, part of the Scottish Credit and Qualifications Framework (SCQF) (QAA, 2001), both of which are maintained by QAA. These qualification descriptors summarise the research-specific and personal attributes agreed by the higher education sector as a minimum level of achievement for any doctoral graduate. They are reproduced in full at Annex 3. One of the most important purposes of having such descriptors is to achieve equivalence of academic standards across doctoral awards by summarising the key attributes expected of a doctoral graduate. Doctoral qualification descriptors promote a high level of consistency while affording universities the autonomy they are entitled to as research degree awarding bodies. This allows institutions to augment the generic requirements in the descriptors with detailed assessment criteria that

[2] Details of the QAA Academic Infrastructure are at: www.qaa.ac.uk/AssuringStandardsAndQuality/Pages/default.aspx

are appropriate for different subjects and qualifications. Integration of the attributes relevant to the doctoral level with those required of more experienced researchers has recently been established in the Researcher Development Framework (RDF) (see section 2).

The FHEQ doctoral qualification descriptor for England, Wales and Northern Ireland was revised in 2008. New text reflects changes requested by the sector in response to questions raised in a QAA doctoral discussion paper (QAA, 2007). The additions include: specific reference to the 'Dublin descriptors' at Annex B to the FHEQ (see executive summary and Annex 1) and further explanation about the skills held by doctoral graduates, the normal length of the qualification and possible routes to the doctorate.

Professional, regulatory and statutory bodies (PSRBs) often play a part in regulating doctoral degree programmes, especially professional doctorates. They may contribute to the design of any structured elements of the doctorate, including skills training components, and to assessment criteria; members of PSRBs may also act as external examiners of doctoral candidates. These contributions help to ensure the consistency of outcomes for doctoral graduates in particular disciplines, and in some cases to maintain standards in a relevant profession.

The UK doctorate is now offered within a secure and accepted framework of guidance and regulation that helps to encourage and assure consistent standards and provides a high-quality learning and research environment for doctoral candidates.

1.4 Development and diversification of the UK doctorate

The doctorate has a long and distinguished history which is briefly summarised in Annex 2.

Since the early 1990s, the form of the UK doctorate has diversified, leading to differently structured degrees to accommodate the needs of a diverse student population. Doctorates other than the PhD have evolved, often in response to the needs of different professions, leading to emergence of the titles 'professional' doctorate and 'practice-based', or 'practice-led' doctorate. Titles of these degrees include, for example, Doctor of Education (EdD), Doctor of Engineering (EngD) and so on. Initially, and beginning with the EdD, professional doctorates in different subjects had a significantly different structure from the PhD, which was acquired through the 'apprenticeship' model (see Annex 2) and based on independent enquiry by the candidate.

Most professional and practice-based doctorates (see definitions below) have always included structured elements such as lectures and seminars and have had an emphasis on acquiring professional skills in addition to conducting original research. With the increased attention to research and generic skills training for all doctoral candidates (see section 2), the PhD/DPhil has also become more structured, especially in the earlier years of study. Research councils have explicit but flexible requirements for the development opportunities available to the candidates they support financially through studentships. All UK doctorates, however, continue to require the main focus of the candidate's work to be their contribution to knowledge in their discipline or field, through original research, or the original application of existing knowledge or understanding. In professional and practice-based doctorates the research may be undertaken in the workplace and may have a direct effect on improving the professional practice of individuals and their host organisation.

1.5 Graduate schools and centres for doctoral training

Key features of doctoral programme development include the establishment of graduate schools and, more recently, centres for doctoral training.

Graduate schools

Graduate schools play an important part in the delivery of personal, professional and career development skills training for research candidates. This is not only an essential aspect of their research degree training but also a crucial element in professional development, enhancing employability and preparing students for their future. The UK Council for Graduate Education (UKCGE) has tracked the development of graduate schools, beginning with a survey in 1994, at which time such schools were a 'relatively new phenomenon' (Denicolo et al, 2010) in the UK, undertaking a further review in 2004 (Woodward et al) and more recently conducting a major review (UKCGE Review of Graduate Schools in the UK, Denicolo et al, 2010). Graduate schools were introduced to provide coherent research skills training and support for postgraduates; some combine taught and research postgraduates, others are solely for research candidates. The structure and coherence of the graduate school structure, whether single-subject, at faculty or school level, or as an institutional phenomenon (single institution or as part of a collaboration), also helps to encourage timely progress and completion and to provide postgraduates with a peer group network.

The latest UKCGE review confirms the diversity of UK graduate schools, and their continuing growth: since the 2004 review the percentage of institutions in the UK with at least one graduate school has grown from 67% (2004) to 76% (2009). Graduate schools may have a geographical location or may be virtual, with postgraduates from multiple institutions sometimes being part of a collaborative and possibly interdisciplinary graduate school.

Centres for doctoral training

During the twenty-first century another feature of doctoral education has been introduced, primarily initiated by the UK research councils, who have begun to focus their support through various forms of partnerships for doctoral training. Most are commonly known as doctoral training centres (DTCs). Most DTCs are organised in a similar way to graduate schools and although established initially for the benefit of research council funded doctoral candidates, are often extended to all research postgraduates studying in the relevant subject area, as long as resources permit. DTCs are often multi or interdisciplinary and reflect some of the major research themes supported by their respective research councils. They are seen by many as a model of effective practice in providing research methods and skills training for early career researchers. Universities are still in the process of integrating the DTC model with their existing governance and structures, and in many cases reporting lines and management, together with the DTCs' relationship with any existing graduate school(s) are still to be decided upon.

A residual concern for some is the potential creation of a 'two-tier' system for postgraduate training, with some doctoral candidates being part of a DTC and others not. Further information about doctoral training centres can be found on the individual research councils' websites, accessed from the Research Councils UK home pages.

1.6 Entry to doctoral degrees

Individual institutions specify entry requirements for doctoral degrees. Increasingly, doctoral candidates possess a master's degree but in some subjects it is usual to begin a doctoral programme with a bachelor's degree or, in some circumstances, its professional equivalent.

Related to the funding structures used by some research councils, some doctoral degrees are structured around a '1+3' model, with candidates completing a taught master's programme before embarking on doctoral studies. This model is now being phased out by the majority of research councils. In other cases, candidates are initially registered for a master's degree and transfer to doctoral status at or around the end of the first year on successfully completing a formal progression event. Increasingly, to meet the needs of some international funding bodies, some institutions register candidates immediately for a doctoral programme and confirm (or otherwise) the doctoral candidate status at the first formal, usually annual, progression event. Some candidates are able to enter doctoral programmes on the basis of their prior professional knowledge and experience: the QAA *Code of practice, Section 1* (Precept 7) summarises the most common acceptable routes for entry to research degree programmes.

1.7 The role of supervision

Throughout the UK doctorate's history, the supervisor has been fundamental to the support and development of the PhD/DPhil candidate, whether in the 'apprenticeship' tradition or as part of a larger support team. The candidate's relationship with his/her supervisor is key to a successful research degree programme. More recently, the role of the supervisor has been under scrutiny in the same way as the doctorate itself, with a view to assuring consistency of supervision while allowing flexibility of operation to reflect discipline differences. Some universities give awards for excellent supervision, based on evidence provided by staff and doctoral candidates. Also some supervisors can count their supervisory achievements in making a case for promotion.

Effective supervision is often linked to a candidate's ability to complete on time and to maintaining a high quality learning experience in doctoral programmes. The QAA *Code of practice, Section 1* contains four precepts, or principles (numbers 11 to 14), concerning supervision and emphasises the fundamental role of supervisors in maintaining quality and consistency across doctoral programmes. It encourages the use of supervisory teams, not only to provide effective support for candidates but to provide a framework in which new supervisors can gain experience alongside those with more experience.

Professional development opportunities for supervisors of doctoral candidates are now the norm. Institutions offer a variety of such opportunities: some have separate induction events for new and experienced supervisors; others favour joint programmes that enable supervisors with different backgrounds and experience to learn from one another. It is also common for supervisor development to occur at school or faculty level where there is a common understanding of supervisory roles in a particular group of subjects. There is no single model, but as the QAA *Code of practice, Section 1* makes clear, institutions should support and encourage supervisors to engage in professional development and to keep abreast of effective supervision practice (precepts 11 and 13).

2 Purposes of the doctorate

Doctoral degrees fulfil many purposes. They are the most individually distinct of the academic qualifications available because of their roots in research and the pursuit of knowledge, and their requirement for the candidate to produce work requiring original thought, based on independent study. Whereas until the late twentieth and early twenty-first centuries the purpose of acquiring a doctorate was for entry to the academic profession, now this is just one of many options for doctoral graduates, who enter diverse jobs across all sectors, bringing their research skills to bear in their own professional context. It is now the case that most academic staff in UK universities have a doctoral degree and this contributes to the high quality research output of institutions. Some individuals, on the other hand, study at doctoral level purely as a personal challenge, or for interest, with no intended 'career' relevance.

UK doctorates have developed to reflect the different purposes for which candidates register for doctoral degrees. Development has also been influenced by sponsors and employers of doctoral graduates, continuing professional development being a key reason for the emergence of professional doctorates. In all cases, as stated in the Smith report (Smith et al, 2010), the value of a doctorate to the graduate's personal and professional life is clear:

> Postgraduates are highly employable and, on average, earn more than individuals whose highest qualification is an undergraduate degree. Feedback from postgraduates shows generally high rates of satisfaction with their experience and with the knowledge and skills acquired through postgraduate study.

Since the 1990s, sector-wide organisations such as the research councils, QAA and government have encouraged doctoral candidates and institutions towards greater emphasis on skills development to prepare graduates for the next stage in their careers. As a result, particularly in the first decade of this century, doctoral candidates in the UK were expected to engage with skills development programmes and activities designed to enhance their employability and career prospects. Some skills are acquired as an integral part of the research degree experience. For example, most doctoral candidates have a variety of opportunities to communicate their findings during the degree programme by attending seminars and conferences, giving presentations and writing papers for publication.

Skills development programmes take different forms in different institutions, with some being more formal than others, some compulsory (for example successful completion of some elements being a pre-requisite to graduating with a doctorate), others optional but strongly recommended; some are credit-based, others not. But the approach in every institution that awards research degrees has been informed by the expectations of the QAA *Code of practice, Section 1* (Precept 18 of which states that institutions are expected to 'provide research students with appropriate opportunities for personal and professional development')[3]. Institutional adherence to the *Code of practice, Section 1* is audited through the normal Institutional audit or review process[4]. Institutions are expected to provide their research candidates with opportunities to acquire and develop skills and competence in a range of areas, including research skills and techniques, research environment, research management, personal effectiveness, communication skills, networking and teamworking, and career management, as outlined in the Research Councils' Joint Skills Statement[5]. This has now been replaced by the Researcher Development Statement[6], a summary of the

[3] www.qaa.ac.uk/Publications/InformationAndGuidance/Pages/Code-of-practice-section-1.aspx
[4] www.qaa.ac.uk/InstitutionReports/types-of-review/Pages/default.aspx
[5] www.qaa.ac.uk/Publications/InformationAndGuidance/Pages/Code-of-practice-section-1.aspx (Appendix 3)
[6] www.vitae.ac.uk/rds

Vitae Researcher Development Framework[7], designed to integrate more effectively the requirements of doctoral researchers with those of other researchers at different career stages. The Researcher Development Framework (RDF) 'describes the knowledge, behaviours and attitudes of researchers and encourages them to aspire to excellence through achieving higher levels of development'.

The effectiveness of these researcher development initiatives in preparing doctoral researchers for subsequent careers in research is illustrated in the Vitae publication 'What do researchers do? Doctoral destinations and impact three years on'[8]. This shows for doctoral graduates across many disciplines how the doctoral qualification and the skills and attributes they acquired during their programme of study helped them to secure employment and quickly start to make valuable contributions in their new settings. Using the Impact and Evaluation Group's Impact Framework,[9] analysis of the Vitae career profiles of researchers[10] shows that nine out of ten doctoral graduates in the career profiles recognised that they had acquired knowledge and skills through participating in and completing their doctoral programme, and three-quarters reported a positive change in behaviour, such as learning how to manage projects more effectively and being better at time management.

[7] www.vitae.ac.uk/rdf
[8] www.vitae.ac.uk/wdrd
[9] www.vitae.ac.uk/impact
[10] www.vitae.ac.uk/policy-practice/303951/RDF-Researcher-profiles.html

3 Forms of doctorate and naming of awards

The sections below summarise the different doctorates offered by UK universities. UK doctoral graduates are expected to reach a comparable level of intellectual achievement irrespective of the programme and subject. The doctorate (the 'third cycle' of degrees in the Bologna process) is distinctive because it is about creating new knowledge, or applying existing knowledge in a new way; this is the characteristic that differentiates it from bachelor's and master's (first and second cycle) degrees. Some research master's programmes take up to two years to complete and are based solely on an independent research project. In many cases research master's degrees are considered to prepare candidates for doctoral study. The normal maximum period of registration for the UK doctorate is four years full-time and six to eight years part-time.

The doctoral qualification descriptors in the UK qualifications frameworks summarise succinctly the principal attributes of doctoral graduates. These provide a regulatory and guidance framework for doctoral degrees and show the differences between first, second and third cycle qualifications.

3.1 Summary of UK doctoral awards and their main characteristics

The following doctoral degrees have many common characteristics and are all part of a group of qualifications with equivalent academic standards and status, as is made clear in the QAA qualifications frameworks and the *Code of practice, Section 1*. The purpose of this section is to show both the similarities that exist among doctoral awards and their defining characteristics as individual qualifications, so that it is possible to distinguish between them and the different purposes they fulfil. The general descriptions below are not comprehensive but are intended to give a flavour of what makes each award distinctive.

Doctor of Philosophy (PhD or DPhil, used interchangeably)

The first Doctor of Philosophy (DPhil) in the UK was awarded by the University of Oxford in 1917, and the title has been retained since for degrees awarded on the basis of registration on a formal programme of study offered by an academic institution and an output that constitutes original research as defined by the academic community into which the candidate wishes to be admitted.

Main characteristics

- Still the most common form of doctorate in the UK, PhD or DPhil programmes are based largely on a supervised research project over three to four years (full-time; part-time candidates normally take up to twice as long), during which the candidate is registered at a higher education institution. All doctoral candidates are required to make an original contribution to knowledge by conducting an independent research project; the form this takes depends on the candidate's academic discipline and degree.
- More recently, there has been a greater emphasis on personal and professional development in PhD programmes in the UK, especially during the period of ring-fenced 'Roberts' funding at the beginning of the twenty-first century, managed by Research Councils UK, which has led to increasingly structured programmes that include both research and transferable skills training. Acquisition of these skills, together with evaluation of the candidate's discipline-specific research skills, is generally monitored or assessed through annual progress reviews. Whether or not

the structured elements are formally assessed, examination of the research degree itself focuses on the quality of the candidate's thesis or equivalent and his/her defence of it at the viva voce ('viva').

- Practical work, such as in the creative and performing arts, may well form part of a candidate's PhD output, or the output from professional and practice-based doctorates. Artefacts and outputs of a practical nature, sometimes involving multimedia, are related to the candidate's discipline rather than to a form of degree programme.

Assessment

In the final assessment, candidates are assessed on their thesis, portfolio, artefact or composition (the latter two normally and the portfolio sometimes are accompanied by a critical commentary on the work), and by an oral examination, the viva. A minimum of two examiners are usually present, one internal and a minimum of one external. Some universities allow the supervisor to attend the viva, with the candidate's agreement, and some universities involve an independent chair to assure fairness and consistency of practice, as well as adherence to assessment regulations.

PhD by publication

Many institutions award the PhD/DPhil 'by publication' or 'by published work' which may then be reflected in the title (PhD by Publication, or by Published Work). Institutions have different eligibility requirements for this degree, which is awarded infrequently.

Main characteristics

- The PhD by publication shares most of the characteristics of the PhD/DPhil above and is normally awarded on the basis of a series of peer-reviewed academic papers, books, citations or other materials that have been published, accepted for publication, exhibited or performed, usually accompanied by a substantial commentary linking the published work and outlining its coherence and significance, together with an oral examination at which the candidate defends his/her research.
- A PhD by concurrent publication is now permitted by some institutions, particularly in science and engineering subjects, whereby a candidate can present a portfolio of interconnected, published research papers contextualised by a coherent narrative, demonstrating overall an original contribution to knowledge. Such publications may include papers, chapters, monographs, books, scholarly editions of a text, technical reports, creative work in relevant areas, or other artefacts.
- In the case of a PhD by publication or published work, the candidate may not be required to register formally for the qualification or to have followed a formal programme of study towards the degree; in other cases a shorter than normal period of registration is permitted for such candidates, who may already be graduates or academic staff members of the institution, or of a partner institution.

Assessment

In the PhD by publication the candidate is normally examined on these materials and the commentary, sometimes supported by a CV. The final assessment takes the same form as outlined above for other PhDs, namely assessment of the thesis and/or portfolio and an oral examination. If the candidate is a staff member of the university, then it is usual to appoint two external examiners for the final assessment in addition to an internal examiner.

Integrated PhD (PhD)

Main characteristics

- Some universities have introduced the 'integrated' PhD in a range of subjects. These programmes are structured in nature, normally with a choice of taught modules and a range of research topic options within the field of study, and include formal lectures, research seminars and workshops at master's level during the first year or two years.
- The supervised research project may begin at the point of registration and be undertaken in parallel with structured elements, or may depend on successful completion of taught elements and be undertaken in years three and four.
- Integrated PhDs normally offer exit awards at master's level based on successful completion of taught modules. If in a scientific discipline, integrated PhDs may offer candidates the opportunity to convert to a specialist research area from other scientific disciplines.
- Research training provided through research council funded centres for doctoral training (see 1.4) is similar to the integrated PhD model.

Assessment

Although some integrated PhD candidates may have to pass taught elements, the overall assessment for the award is submission of a satisfactory thesis, portfolio or similar output and successfully passing an oral examination with independent examiners, as for the PhD and PhD by publication.

Professional and practice-based (or practitioner) doctorates

As part of the diversification of UK doctorates, qualifications have evolved, often in response to the needs of the professions, and/or the career progression of professionals working in different fields. Often, professional and practice-based doctorates are the choice of doctoral degree for mid-career professionals; in a few cases they are required for entry to a profession, namely as a licence to practise. Even if not studied for career reasons, such degrees can provide an opportunity for individuals to situate professional knowledge developed over time in a theoretical academic framework. As a result, professional and practice-based doctorates have different structures and attract candidates at distinct stages of their lives and careers.

Doctorates in which the candidate is involved in professional learning may fall in either the professional or practice-based category, depending on degree content and context, and on the candidate's circumstances. In this guide, we have chosen to combine information about professional and practice-based doctorates in one section to avoid repetition and because, at the macro level of doctoral characteristics that this guide is concerned with, it is difficult to address detailed differences. This approach may not be in line with some of the thinking about these degrees, but we have taken care to make clear the differences between the two, where they are significant. Individual institutions make the final decision about whether a qualification should be described as a professional or practice-based doctorate, using defining criteria that may differ somewhat.

Titles of professional and practice-based doctorates normally reflect the subject or field of study of the candidate and thus there is considerable variation in nomenclature. However, institutions normally use the convention of 'Doctor of…', for example, Doctor of Education (EdD) - the first EdD programme was established at the University of Toronto, Canada, in 1894 (Scott et al, 2004) - or Doctor of Social Science. This helps to achieve a degree of

consistency, with institutions making the final decisions about the titles of their academic awards in consultation with any relevant professional, regulatory or statutory body (PSRB).

Professional and practice-based doctorates normally include structured elements such as lectures, seminars, and workshops, with an emphasis on the candidate acquiring skills relevant to their professional practice, in addition to producing original research. Some programmes may also provide other forms of learning support such as e-learning, tutorials, peer learning and assessment and so on.

Main characteristics

- Professional and practice-based doctorates are based on a supervised research project and usually contain significant lecture and seminar elements. In some programmes, these elements are assessed and either a pass/fail or a mark or grade is given; such assessments may act as incremental hurdles for the candidate as part of his/her progress towards the independent research project. UK professional doctorates are designed to meet the needs of the various professions in which they are rooted, including: business, creative arts, education, engineering, law, nursing and psychology.
- Research projects in these degrees are normally located within the candidate's profession. In practice-based or practitioner doctorates the candidate's output involves practice-related materials. For example, in the performing arts, the output involves a written commentary (which may be shorter than the traditional PhD thesis, and includes both reflection and context), and one or more other artefacts, such as a novel (for creative writing), a portfolio of work (for art and design), or one or more performance pieces (for theatre studies, dance, or music). In clinical practice-based doctorates such as the DClinPsy or the MD, the research is likely to draw on clinical work involving clinical trials or other work with patients in the practical/clinical setting; the clinically based and academic research are then combined in the candidate's thesis or portfolio.
- Professional doctorates are normally rooted in an academic discipline as well as in a profession (education, engineering, law and so on). Candidates whose research arises out of practice alone, who are not working in an academically related professional field and who spend most of their time learning in their work environment rather than in an institution, would be more likely to complete a practice-based doctorate. In both practice-based and professional doctorate settings, the candidate's research may result directly in organisational or policy-related change. Some practice-based doctorates have a general title to reflect their distinctiveness.

Assessment

As for the PhD/DPhil, professional and practice-based doctorates are assessed through submission of a thesis or portfolio and, in the majority of cases, an individual oral examination, or viva. The institution's definition of whether the award is a professional or practice-based doctorate will have a bearing on the assessment criteria for the degree. The thesis may be of a shorter length than for the PhD to reflect the assessed work completed by candidates during the programme. In the assessment of professional and/or practice-based doctorates, examiners' criteria may include the extent to which the candidate understands current techniques in the discipline, for example through demonstrating engagement with and use of research methods and how they inform professional practice.

3.2 Summary of doctoral award titles with brief details of each qualification

Table 1 below is not comprehensive and does not necessarily cover all doctoral degree titles but shows some of the most common award titles and their abbreviations. It provides a quick reference guide to UK doctoral qualification titles. The UKCGE publication: Professional Doctorates in the UK 2011 (Fell et al, 2011) provides a summary of the principal professional doctorate qualifications in different disciplines at the time of publication and has been used as a reference document for some of the brief details below.

Table 1 - Summary of the most common doctoral award titles and their abbreviations

*Full title**	*Abbreviated title and brief details**
*Please note that the most frequently used versions of titles and abbreviations are included; some institutions may have chosen slight variations on these, for example 'Doctor/Doctorate in [Discipline]'. Titles and abbreviations are chosen to avoid confusion with other types of doctorate, for example higher doctorates, as mentioned below. The list is in alphabetical order.	
Doctor of Business Administration	**DBA** The DBA is more often studied on a part-time basis by working professionals rather than full-time. Guidelines for the DBA are available from the Association of Business Schools (ABS), a professional body for the field.
Doctor of Clinical Psychology	**DClinPsy** This is a practice-based professional doctorate. The DClinPsy is different from most other professional doctorates because it provides a license to practice for UK clinical psychologists. The Health Professions Council (HPC) is the body to which individuals apply for registration as a licensed clinical psychologist. All clinical psychology training is accredited by the British Psychological Society (BPS) and also has to be approved by the HPC which is responsible for the Standards of Proficiency clinical psychologists have to demonstrate. These cover: conduct, performance and ethics, continuing professional development, and proficiency.
Doctor of Dental Surgery	**DDS** The DDS is normally offered specifically for practicing clinicians who wish to further develop their research skills and apply their research to clinical problems. It involves a clinical component as well as research methods training. The duration of the degree is three years full-time.
Doctor of Education	**EdD** The EdD was the first of the professional doctorates to be developed in the UK, beginning at the University of Bristol in the early 1990s and based on similar

	programmes in North America. It is predominately undertaken by practising educators.
Doctor of Educational Psychology	**DEdPsy** The DEdPsy is normally a four-year programme for full-time candidates and around six years part-time. The degree is designed to meet the needs of practising educational psychologists. Entrants are likely to have a bachelor's degree in psychology and often a master's in educational psychology, as well as at least one year's experience in the profession. Courses are usually accredited by the British Psychological Society.
Engineering Doctorate	**EngD** The EngD was introduced during the 1990s partly to increase business awareness and to develop particular skills in engineering doctoral graduates, as a result of a perception in industry that the PhD had too narrow a focus. EngD programmes are offered within research themes, including a range of industrial and engineering topics, including large-scale IT systems and environmental technologies. In recognition of the specialised nature of their training, EngD candidates are commonly called Research Engineers (REs).
Doctor of Health Research	**DHRes** The DHRes is one of a group of professional doctorates in health and social care. Doctoral candidates in these disciplines are likely to be mid or senior career professionals who already have a strong professional background in their field. Such doctorates normally include clinical research and are likely to include clinical-related improvements and/or innovations.
Doctor of Medicine	**MD, or in some cases, MD (Res)** The MD is not a clinical degree although applicants must usually hold an MBBS or BDS (Bachelor of Medicine, Bachelor of Surgery or Bachelor of Dental Surgery) degree or equivalent, be registered with the General Medical Council or the General Dental Council and have at least three years of clinical or scientific postgraduate experience. The period of study for the MD is usually 2 years full-time or 4 years part-time. In some universities, the MD is classed as a higher doctorate (similar to the DSc (Doctor of Science).
Doctorate in Music	**DMus** In some institutions this abbreviation refers not to a Doctorate in Music but to a higher

	doctorate (see below). Others use titles for doctorates in music which reflect the candidate's topic, for example, 'PhD in Musical Composition'.
Doctor of Philosophy	**PhD or DPhil** The PhD is the most common qualification and offered in most academic subjects in the UK. The normal maximum period of study is four years full-time, eight years part-time. Most PhD programmes include research methods and other skills training. Candidates funded by UK research councils or other sponsors are required to meet their funder's criteria as well as the institutional regulations for their programme. The title may have additional information attached, for example, 'in Musical Composition'.
Integrated PhD	**PhD** The Integrated PhD is normally highly structured in the first two years and often attracts international candidates. As for the PhD above, this may have additional information attached, for example, 'in Molecular Biology'.
Professional Doctorate	**DProf** The DProf is a practice-based (or practitioner work-based) doctorate and is often taken on a part-time basis. Professional practice is at the heart of the DProf, which is usually open to experienced professionals who are employed in any area of work, including those in emerging professions and disciplines. Key features include: the degree has a practice-based rather than an exclusively institutional focus; candidates are normally working while completing the doctorate and already possess significant professional experience. Successful completion of the degree normally leads to professional and/or organisational change that is often direct rather than achieved through the implementation of subsequent research findings.
Doctor of Public Health	**DrPH** Entrants to the DrPH are required to have at least two years' experience in public health management and a master's degree in a cognate subject. The programme is intended for professional managers and leaders in global health and public health practice, who are faced with understanding and applying scientific knowledge in practical contexts. The programme therefore links theory and practice and is appropriate for a range of applicants, including international candidates.

	The minimum period of study is three years for full-time candidates and four years for part-time candidates.
Doctor of Social Science	**DSocSci** This is a generic title for a group of social sciences professional doctorates, some of which may also have individual titles, in subjects including psychology, criminal justice, professional practice, health, social care and social work. Most doctorates in this group are regulated by professional, statutory and regulatory bodies (PSRBs). The minimum period of study for DSocSci and other social sciences professional doctorates is three years full-time. Part-time routes are normally available to those working full-time.

3.3 Higher doctorates

Higher doctorates are not included in this guide, except to define them in this section and so to differentiate them from other forms of doctorate.

Higher doctorates (typically the Doctor of Science, DSc or ScD and DLitt) are a higher level of award than the DPhil/PhD or professional or practice-based doctorates. They are normally awarded by institutions to staff who have earned a high reputation for research in their field through their professional practice, which may or may not have been gained in an academic institution. The DSc is typically a mid-career qualification; candidates seeking promotion to professorial level in a STEM subject may be expected already to have gained a DSc.
The DLitt, by contrast, is typically awarded to experienced academics, usually already holding professorships, who have published a significant number of books and peer-reviewed articles. Higher doctorates are therefore always awarded for published works.

Individual institutions' regulations specify a limited range of titles for higher doctorates, which can be awarded either for a substantial body of published original research of distinction over a significant period or as an 'honorary' degree, to recognise an individual's contribution to a particular field of knowledge.

3.4 Degree certificates

As autonomous bodies, higher education institutions decide how to represent individual qualifications on degree certificates or equivalent. When naming qualifications, institutions in England, Wales and Northern Ireland are guided by *The framework for higher education qualifications in England, Wales and Northern Ireland* (FHEQ) (paragraphs 70-75), while Scottish institutions refer to Annex 2 of *The framework for qualifications of higher education institutions in Scotland* (2001) (Qualification nomenclature). The *Code of practice, Section 2: Collaborative provision and flexible and distributed learning (including e-learning)* (QAA, 2004) provides guidance on naming awards that are made by more than one institution (Certificates and Transcripts - Precept A24).

Institutions normally include the title of the thesis, together with the broad subject area or field on doctoral degree certificates, especially in professional doctorates. As noted in Precept A24, 'the certificate and/or the transcript [Diploma Supplement or HEAR] should record the name and location of any partner organisation engaged in delivery of the programme of study'.

This guidance is now particularly relevant to doctoral degrees as candidates increasingly may wish to spend part of their time studying at another institutions either in the UK or further afield, and may receive sponsorship from international organisations for research outside their home institution.

4 Content, structure and delivery of doctoral degrees

Studying for a doctorate means doing, as well as learning about, research. Doctoral education is, by nature, an individual experience; even if a doctoral candidate is part of a cohort, which is becoming increasingly likely, each person's route to the degree is different when a range of factors is considered, including:

- the field in which the candidate is studying and the broad subject area, whether single subject or multi-disciplinary
- the individual's experience (academic and life) before enrolling on the doctorate
- the qualification chosen
- the university/ies at which the candidate is studying, depending on whether he/she is enrolled on a degree which is jointly offered by more than one institution
- the school or department in which the candidate is based and whether he/she is part of a graduate school and/or doctoral training centre
- the candidate's mode of study, for example full-time, part-time, campus-based or distance learning
- the candidate's relationship with the supervisor(s)/supervisory team, who may be based in different institutions, especially if a joint degree, or in industry
- the candidate's relationship with peers.

This is not a comprehensive list but begins to show how inadvisable it is to generalise about the educational experience of a doctoral candidate. The content, structure and engagement with a doctoral programme vary significantly according to the candidate's subject area and personal circumstances. The fictitious examples at Annex 3 illustrate how and why this might be the case. The examples are deliberately stereotypical to show potential differences between subjects and individuals.

The important points are as follows:

- Doing and learning about original research provides a different experience for each individual, but every discipline has clear expectations of what this means for the candidate who is working towards a doctoral qualification. In interdisciplinary research contexts, particularly in centres for doctoral training, discipline-based expectations are combined to deliver a broad-based research training without dilution of subject-specific requirements.
- Irrespective of the type of programme, institution or subject, certain elements are key to the success of doctoral programmes: a high-quality and vibrant research environment; supervision that is appropriate to the candidate and the stage he/she has reached in the programme; access to resources and development opportunities; opportunities for peer interaction and support; demanding but fair academic standards; and the need for the candidate to take responsibility for his/her own learning and research output.
- Irrespective of the variables listed above, doctoral training requirements are now similar across all UK doctorates.

5 Doctoral outcomes and assessment

Assessment is at the heart of doctoral degree standards, and the doctoral examination is therefore where all the candidate's achievements and research relevant attributes are tested, they will all contribute to the candidate's success or otherwise. Doctoral assessment includes a thorough review of the submitted written materials (and artefacts if appropriate), normally followed by a viva, or oral examination, which remains a significant feature of the summative assessment experienced by most doctoral candidates. The importance of the single major research project as the principal output of a doctoral degree is demonstrated by the rigour and format of the final assessment process.

5.1 Progress and review

Progression towards achieving doctoral outcomes is assessed during the programme, both at formal progression panels when gaps in knowledge or skills are identified, and informally through discussions with the candidate's supervisor. Although passing module assessments is a formal part of progression through the programme for some candidates, these milestones do not necessarily contribute to the overall assessment of the doctorate or to the award of the qualification; rather, they represent gateways for progression to the next stage of the programme. In all doctoral programmes there is some form of regular progress review, sometimes an annual progress review (APR) or similar, at which each candidate demonstrates his or her suitability to move on to the next stage. Some institutions or subjects review candidates' progress after the first six months, but the first APR normally occurs at the end of the first year (for full-time candidates) and as a result of this the candidate's status may change to something more formal which confirms their candidature. Normally a neutral assessor, or panel of assessors, is involved in formal progress reviews, as well as the candidate's supervisor. Regular reviews are an important part of the learning process in doctoral programmes as they provide both candidate and supervisor with useful feedback on progress. Precepts 15-17 of the QAA *Code of practice, Section 1* provide more detail on progress and review.

5.2 Submission

The doctoral candidate has to submit a substantial body of original work for assessment. This may vary in length according to the candidate's discipline. In mathematics, for example, a candidate may have developed an elegant formula to explain a long-standing problem, and the rest of the thesis, which may be relatively short, will explain the thinking behind the problem-solving - how the solution has been arrived at and what it solves or proves. In more discursive subjects, the thesis may be as long as 100,000 words. Such variations do not indicate different levels of achievement because the form and volume of the work produced have been arrived at over many years in the discipline in question and are well accepted. Many university regulations stipulate that the volume of work expected is that which could be 'reasonably produced' in the equivalent of three years of independent full-time study.
In creative arts, as already mentioned, the thesis may take the form of an artefact, and a commentary, as is appropriate for the field of study. Most doctoral examiners are looking for work of peer-reviewed publishable quality in the discipline: this may refer to elements of the thesis rather than the complete work.

5.3 Final assessment

Whether a candidate is being examined on the basis of a 'traditional' thesis, portfolio, artefact(s), clinical practice or other output, the body of work presented must demonstrate the research question and a critical evaluation of the extent to which it has been addressed.

This, combined with the candidate's performance in the viva is the point at which a decision is made, initially by the examiners, about whether he/she can be awarded a doctorate. Tinkler and Jackson (2004) state that '…the [PhD] examination process serves as an explicit gate-keeping function and is a marker of standards'. Formally, examiners of doctoral candidates make recommendations to the institution and a high-level, official university committee normally has final responsibility for deciding to award the degree in the institution's name. This formality is an important part of assuring the quality of doctoral output and achieving consistency of standards across the institution. The use of one or more external examiners helps to maintain consistency among institutions.

One of the objectives in producing this guide is to emphasise the equivalent standards across different UK doctorates. This can best be demonstrated by showing that doctoral candidates face similar intellectual challenges, both during their programme and at the point of final examination. The UK doctoral assessment (thesis and viva together) provides evidence of equivalence at the end of the programme in that all doctoral candidates experience a similar format - that is, an assessment of the thesis followed by the closed oral examination, with two or even three examiners (some institutions routinely use three examiners, two of whom are external, if a member of staff is being examined). External examining is a key feature of UK quality assurance processes, and at least one external examiner is required at each oral doctoral examination. External examiners may be international experts and may therefore be based outside the UK; in such cases it is particularly important that the external is fully briefed about the regulations under which the candidate is being examined and the assessment process as a whole, both of which may differ from the assessment practices he/she is familiar with. Precepts 22-4 of the *Code of practice, Section 1* refer to the use of external examiners at doctoral level. The role of external examiners will be addressed by chapter B7 of the new UK Quality Code which will begin to replace the *Code of practice* from 2011.

The choice of examiners for any thesis or other doctoral output is made with careful attention to the content of the candidate's research and his or her theoretical perspective and/or another relevant context in which the research was conducted. Examiners are chosen for their expertise in the field and particular interest in the candidate's research topic, as well as for their experience of the type of doctorate to be awarded. Examiners are usually members of academic staff in universities either in the UK or beyond but, depending on the type of degree for which the candidate is being examined, one examiner might also be from an industrial or other professional environment (Denicolo et al, 2005). Examiners are normally required to submit separate, independent reports after evaluating the candidate's thesis or equivalent (which are exchanged immediately prior to the viva), and a joint report following the viva. Practice varies among institutions as to whether or not candidates are shown examiners' independent reports in advance of the oral examination; some take the view that this is helpful as it enables candidates to address the examiners' queries and/or concerns during the viva.

Precepts 22-4 of the *Code of practice, Section 1* (QAA, 2004) include information about the use of assessment criteria and the procedures for doctoral assessment. Part of the guidance in the *Code of practice, Section 1* refers to use of an independent chair in oral examinations, to promote consistency and fairness. An increasing number of UK institutions use this feature; others record vivas, for similar reasons.

In the final part of the assessment, the candidate defends his or her research in the viva, and demonstrates deep knowledge and understanding of the field of study, and originality of thought, either in the creation of new knowledge or in the novel application of existing knowledge. The doctoral assessment process is entirely distinct from the assessment of students on bachelor's or master's programmes who are usually examined as a cohort and do not normally experience individual oral examinations.

In the UK, the doctoral viva is usually a 'closed' examination, where only the candidate, examiners, and any independent observer or chair is present. In many HEIs, with the candidate's and examiners' permission, the supervisor may be present to observe the examination. This general model of a closed examination has been criticised (Tinkler and Jackson, 2004) and at times compared unfavourably with some non-UK European viva models involving a public defence, where the candidate may invite family and friends to join the audience in what is considered a celebration as well as a defence of the thesis. For example, in France and Finland, following a rigorous public defence of the thesis, the candidate receives a graded outcome. However, it is also true that the UK viva (in common with oral examinations in many other European countries), provides a rigorous mode of assessment in which the candidate's knowledge and understanding of the field is thoroughly tested. Nevertheless, some think the non-UK European public defence model is preferable, and where UK universities are offering joint programmes with other European partners the public defence is sometimes used rather than the 'closed' UK model.

In a minority of non-UK European doctoral examinations, the candidate knows in advance whether he/she has passed. In the UK and elsewhere, examiners do not normally reveal the outcome to the candidate in advance of the viva because one of its purposes is to check on both authorship of the thesis and the candidate's engagement with the described research process. In private, the examiners will usually have exchanged individual reports in advance, having read the thesis and may both/all independently have come to the conclusion that the candidate should pass as long as nothing occurs during the viva to alter this opinion. In the UK it is not considered good practice to reveal the outcome before the final part of the assessment has taken place. Often the examiners have a private meeting before the viva to discuss the merits of the candidate's output and to plan the conduct of the oral examination, including the questions they each wish to ask the candidate.

The viva can be a difficult experience for some and may lead to a recommendation that the candidate should not be awarded a doctoral degree. A minority of candidates fail the doctoral assessment outright. In most institutions examiners have the option of awarding a different qualification such as an MPhil if this is more appropriate to the candidate's achievements.

There are normally guidelines or regulations for this option. Even for successful candidates, it is often the case that doctoral examiners will ask for either 'minor' or 'major' amendments to the thesis; institutions have different definitions about what constitutes 'minor' or 'major' and there are also variations in the length of time candidates are given to complete the changes but three to six months for minor changes and six to 12 months for major changes is not uncommon. Once any amendments have been made, there is no indication in the award that they have been required by the examiners; the UK doctorate is not graded or classified in any way.

In a minority of cases, the doctoral examination does not include an oral examination. For example, some professional clinical doctorates use a system of continuous assessment, normally involving production of a portfolio by the candidate and including an evaluation of a clinical research project.

5.4 Programme specifications and credit for doctoral degrees

Some doctorates, particularly professional and practice-based degrees, are summarised by their institution in programme specifications which contain details of structured elements, progression and assessment requirements. 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. Where credit is awarded for the doctorate overall, the normal credit volume in the UK is 540 (see www.qaa.ac.uk/AssuringStandardsAndQuality/Qualifications/Pages/Academic-Credit.aspx for more details).

6 International comparisons, including Bologna

The PhD is an internationally recognised research qualification, with academic institutions having a common global understanding of how the possession of a PhD represents an individual's preparedness for academic practice and/or advanced research in his/her subject specialism. Differences in expectation and understanding of what the PhD represents are more likely to occur across than within subject disciplines or fields. The introduction of professional and practice-based doctorates and the sharp increase in doctoral graduates generally have provided an opportunity for comparison and to demonstrate equivalence among doctorates of all kinds.

This section summarises the international context in which UK doctorates sit and it shows the importance of benchmarking the UK doctorate in a global environment. One of the most important reasons for this is to promote mobility and to strengthen career opportunities for UK doctoral graduates. Key factors affecting the reputation of UK doctorates include having in place adequate and rigorous quality assurance mechanisms for doctoral programmes, and the ability to demonstrate consistency of standards across varied programmes.

6.1 The doctorate in Europe

Since the original Bologna declaration in June 1999, the UK has taken steps to contextualise its doctoral awards in the wider European frameworks, including the qualifications framework for the European Higher Education Area. In parallel it has been benchmarking doctoral qualifications at a global level. Representatives of sector-wide organisations such as QAA, the UK International and Europe Unit, UKCGE, Vitae, and others have actively participated in European and other international conferences as part of this benchmarking process. As a result, the UK has actively contributed to the development of the doctorate worldwide while assuring that global changes are taken into account in UK policy-making and practice.

The UK doctorate in all its forms has been confirmed as being in alignment with European-wide guidance, in particular, with the Framework for Qualifications of the European Higher Education Area (EHEA), through a verification process led by QAA in 2008.[11] This independent verification involving colleagues from non-UK European countries as well as from the UK shows recognition of UK qualifications as having Europe-wide equivalence and standing which supports the mobility of graduates within Europe. This continues to increase through programmes such as the EU Erasmus Mundus initiative, and a growing number of UK universities offer joint or jointly-supervised doctoral programmes with non-UK European partner institutions.

The UK has contributed significantly to the development of European-wide policy for doctoral education. For example, representatives from the higher education sector in the UK have helped to ensure flexibility of entry qualifications to doctorates (EUA, 2006) and more recently have provided comments on proposals to revise the Salzburg principles (UUK Europe Unit, 2010).

[11] www.qaa.ac.uk/AssuringStandardsAndQuality/Qualifications/Pages/theFHEQ-within-Europe.aspx
www.qaa.ac.uk/Publications/InformationAndGuidance/Pages/Verification-of-the-compatibility-of-The-framework-for-higher-education-qualifications-in-England--Wales-and-Northern-Irel.aspx
www.qaa.ac.uk/Publications/InformationAndGuidance/Pages/Verification-of-compatibility-of-the-framework-for-qualifications-of-higher-education-institutions-in-Scotland-with-the-fr.aspx

6.2 Global comparisons

Until the last decade, with the exception of a few countries including the USA, the professional doctorate was not widely recognised globally, even though, as mentioned above, the first EdD progamme was established at the University of Toronto in 1894 (Scott et al, 2004). Professional doctorates offered, for example, in North America, may be taken in parallel with full-time work and may take only around two years of study, instead of the three to four-year full-time period that is common in the UK.

In the USA a comprehensive and detailed review of research doctorates was undertaken in 1993 (report published in 1995) and again in 2006 (report published in 2010). The second review surveyed research doctorate programmes[12] in six broad fields: agricultural sciences, biological and health sciences, physical sciences, engineering, social and behavioural science, and humanities. The review covered public and private universities; it found that 71 per cent of doctoral programs ranked in the study were in public universities. The 2010 report[13] provides much detailed information about US research doctorates, such as programme rankings based on different performance indicators including:

- research measurements such as numbers of publications, grants and awards
- levels of student support (including funding)
- career objectives
- completion rates
- diversity of both students and staff (faculty).

These two reviews appear to be the USA equivalent of the various quality assurance measures in place in the UK to maintain standards of doctoral education; as stated in the 2010 report, they are intended to enable benchmarking of US doctoral programs and their characteristics.

Other countries are adopting qualifications frameworks similar to those in operation in Europe. For example, the Australian Qualifications Framework has recently been revised,[14] by a dedicated Council reporting directly to the Ministerial Council for Tertiary Education and Employment.

[12] In the context of this review, 'programme' broadly represents a critical mass of researchers and their activities in a given subject in a particular institution, including numbers of research students, and the output from the 'programme' overall.
[13] For further details about the review and how to obtain a copy of the report, see: http://sites.nationalacademies.org/PGA/Resdoc/index.htm#reports
[14] Final version (2011) is available from www.aqf.edu.au/

7 Conclusion

This guide to doctoral degree characteristics has set out to provide a concise summary of the key features of doctoral research degrees in the UK, showing that doctoral research is characterised by its individuality and diversity and that the fundamental requirement for any doctoral graduate is the ability to conduct independent research in his/her field that is publishable and commands the respect of peers. In addition to their research knowledge and skills, doctoral graduates are expected to possess a range of personal qualities that are valuable in whatever the next stage of their life and/or career will be.

In compiling the guide, we have also tried to demonstrate that UK doctorates have much in common as well as being diverse, and are offered within a regulatory and guidance framework that provides consistency and equivalence of standards.

This guide is intended as a dynamic document that will be able to reflect developments in doctoral education as they occur. It has already benefited from extensive comments from the higher education sector in response to the initial consultation and reflects the views of a significant number of institutions and individuals with long-standing experience of doctoral education.

QAA would welcome ongoing comments and suggestions from institutions and doctoral practitioners about changes and developments in doctoral degrees to ensure the guide remains current and reflects the full range of UK doctoral education.

Annex 1: Reference sources relevant to this guide

The guide is formatted in a similar style to the *Master's degree characteristics* document, setting the UK doctorate in different contemporary contexts, for example, as a third-cycle qualification in the Bologna process. It contains non-regulatory information to supplement the doctoral qualification descriptor (*The framework for higher education qualifications in England, Wales and Northern Ireland* (FHEQ) (QAA, 2008) and *The framework for qualifications of higher education institutions in Scotland* (QAA, 2001)) in the same way as the *Master's degree characteristics* document (page 2, Preface, final paragraph).

Key reference sources relevant to this guide are:

- the QAA doctoral qualification descriptors (see Annex 3)
- the QAA *Code of practice for the assurance of academic quality and standards in higher education, Section 1: Research degree programmes* (see below)
- the shared 'Dublin descriptors' for short cycle, first cycle, second cycle and third cycle awards, included as Annex B to the FHEQ (see below).

Code of practice, Section 1

The Doctoral degree characteristics guide should be read in parallel with the *Code of practice, Section 1*, which provides a framework for managing and supporting research degrees and candidates. This guide is intended to augment the *Code of practice, Section 1* by providing additional material on doctoral characteristics; some sections are directly linked to precepts in the *Code of practice, Section 1*, for example the section on Assessment.

Dublin descriptors

These descriptors were originally devised by the Joint Quality Initiative and were developed for the European Higher Education Area (EHEA). They now form part of the Framework for Qualifications of the EHEA. The section of the Dublin descriptors relating to third cycle, or doctoral level, qualifications summarises doctoral graduate attributes and includes detailed criteria about research knowledge and understanding.

Other relevant background materials

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Annex 2: Brief history of the doctorate and its establishment in the UK

The PhD was first awarded as a teaching qualification in law in the Middle East in the ninth century. The degree was extended to philosophy by European universities in the Middle Ages, covering all academic subjects outside law, medicine and religious studies. Wellington et al (2005) say that the first Doctor of Philosophy degree was awarded in Paris in 1150, but that the degree did not acquire its modern status as the highest research degree until the early nineteenth century in Germany. At this point, and following the Humboldtian tradition[15] the PhD candidate followed a form of 'apprenticeship', and was normally awarded the degree in middle age. In 1861, Yale University began awarding the degree, abbreviated as Dr. Phil., to younger candidates who had completed a prescribed course of graduate study and successfully defended a dissertation[16] containing original research in science or in the humanities.

For many years in the UK the only form of doctorate awarded was the Doctor of Philosophy - DPhil or PhD. Development of doctoral titles in the UK is addressed in section 2, beginning with the introduction of the DPhil by Oxford University in 1917. Other universities that subsequently awarded the degree adopted the abbreviation PhD (from Latin 'philosophiae doctor'). Some newer UK universities, for example Buckingham, Sussex, and, until a few years ago, York, also chose to adopt the DPhil title, but the majority of UK universities use the abbreviation PhD.

[15] The 'apprenticeship' model of the PhD is associated with F. W. H. Alexander von Humboldt, the German/Prussian physical geographer and anthropologist.

[16] In the UK the formal written argument that completes and reflects the study is called a thesis. In North America it is termed a dissertation, a word used in the UK for the product of a master's and some bachelor's degrees.

Annex 3: Doctoral qualification descriptors

The framework for higher education qualifications in England, Wales and Northern Ireland (FHEQ) (second edition, revised August 2008)

Descriptor for a higher education qualification at level 8: Doctoral degree

The descriptor provided for this level of the FHEQ is for any doctoral degree which should meet the descriptor in full. This qualification descriptor can also be used as a reference point for other level 8 qualifications.

Doctoral degrees are awarded to students who have demonstrated:

- the creation and interpretation of new knowledge, through original research or other advanced scholarship, of a quality to satisfy peer review, extend the forefront of the discipline, and merit publication
- a systematic acquisition and understanding of a substantial body of knowledge which is at the forefront of an academic discipline or area of professional practice
- the general ability to conceptualise, design and implement a project for the generation of new knowledge, applications or understanding at the forefront of the discipline, and to adjust the project design in the light of unforeseen problems
- a detailed understanding of applicable techniques for research and advanced academic enquiry.

Typically, holders of the qualification will be able to:

- make informed judgements on complex issues in specialist fields, often in the absence of complete data, and be able to communicate their ideas and conclusions clearly and effectively to specialist and non-specialist audiences
- continue to undertake pure and/or applied research and development at an advanced level, contributing substantially to the development of new techniques, ideas or approaches

and will have:

- the qualities and transferable skills necessary for employment requiring the exercise of personal responsibility and largely autonomous initiative in complex and unpredictable situations, in professional or equivalent environments.

Doctoral degrees are awarded for the creation and interpretation, construction and/or exposition of knowledge which extends the forefront of a discipline, usually through original research.

Holders of doctoral degrees will be able to conceptualise, design and implement projects for the generation of significant new knowledge and/or understanding. Holders of doctoral degrees will have the qualities needed for employment that require both the ability to make informed judgements on complex issues in specialist fields and an innovative approach to tackling and solving problems.

Doctoral programmes that may include a research component but which have a substantial taught element (for example, professional doctorates), lead usually to awards which include the name of the discipline in their title (for example, EdD for Doctor of Education or DClinPsy

for Doctor of Clinical Psychology). Professional doctorates aim to develop an individual's professional practice and to support them in producing a contribution to (professional) knowledge.

The titles PhD and DPhil are commonly used for doctoral degrees awarded on the basis of original research.

Achievement of outcomes consistent with the qualification descriptor for the doctoral degree normally requires study equivalent to three full-time calendar years.

Higher doctorates may be awarded in recognition of a substantial body of original research undertaken over the course of many years. Typically a portfolio of work that has been previously published in a peer-refereed context is submitted for assessment. Most higher education awarding bodies restrict candidacy to graduates or academic staff of several years' standing.

Note: Honorary doctoral degrees are not academic qualifications.

The framework for qualifications of higher education institutions in Scotland (2001)

Doctoral degrees

SHE level:	D (SCQF level 12)
Credit definition:	At least 540 credits of which a minimum of 420 are at SHE level D (credit definitions do not apply to research-based doctorates)

General

The doctoral degrees are available through several different routes. The PhD is normally awarded following successful completion of a thesis which requires the equivalent of a minimum of three years' full-time research and study to complete. Professional doctorates also require the equivalent of three years' full-time research and study to complete and will frequently involve work-based as well as institutional-based research and study. Doctoral degrees reflect specialised, advanced knowledge, understanding and practice at the frontiers of the subject or professional area.

Characteristic outcomes of doctoral degrees:

- the creation and interpretation of new knowledge, through original research, or other advanced scholarship, of a quality to satisfy peer review, extend the forefront of the discipline, and merit publication
- a systematic acquisition and understanding of a substantial body of knowledge which is at the forefront of an academic discipline or area of professional practice
- the general ability to conceptualise, design and implement a project for the generation of new knowledge, applications or understanding at the forefront of the discipline, and to adjust the project design in the light of unforeseen problems
- a detailed understanding of applicable techniques for research and advanced academic enquiry.

Typically, holders of the qualification will be able to:

- make informed judgements on complex issues in specialist fields, often in the absence of complete data, and be able to communicate their ideas and conclusions clearly and effectively to specialist and non-specialist audiences
- continue to undertake pure and/or applied research and development at an advanced level, contributing substantially to the development of new techniques, ideas, or approaches

and will have:

- the qualities and transferable skills necessary for employment requiring the exercise of personal responsibility and largely autonomous initiative in complex and unpredictable situations, in professional or equivalent environments.

The 'Dublin descriptors' for the third cycle (doctoral level) (from the *Framework for Qualifications of the European Higher Education Area*)

The JQI Dublin descriptors for Bachelors and Masters were first proposed in March 2002 (see: www.jointquality.org). The JQI meeting in Dublin on 23 March 2004 proposed that for a better understanding of the 'Dublin descriptors' in the context of the Berlin communiqué and their possible future usage, alternative headings, as indicated below, may be more appropriate. The JQI meeting on 23 March also proposed a set of shared descriptors for third cycle qualifications:

Qualifications that signify completion of the third cycle are awarded to students who:

- have demonstrated a systematic understanding of a field of study and mastery of the skills and methods of research associated with that field
- have demonstrated the ability to conceive, design, implement and adapt a substantial
  process of research with scholarly integrity
- have made a contribution through original research that extends the frontier of knowledge by developing a substantial body of work, some of which merits national or international refereed publication
- are capable of critical analysis, evaluation and synthesis of new and complex ideas
- can communicate with their peers, the larger scholarly community and with society in
  general about their areas of expertise
- can be expected to be able to promote, within academic and professional contexts technological, social or cultural advancement in a knowledge-based society.

Glossary (from the *Framework for Qualifications of the European Higher Education Area*)

1. The word '**professional**' is used in the descriptors in its broadest sense, relating to those attributes relevant to undertaking work or a vocation that involves the application of some aspects of advanced learning. It is not used with regard to those specific requirements relating to regulated professions. The latter may be identified with the profile/specification.

2. The word '**competence**' is used in the descriptors in its broadest sense, allowing for gradation of abilities or skills. It is not used in the narrower sense identified solely on the basis of a 'yes/no' assessment.

3. The word '**research**' is used to cover a wide variety of activities, with the context often related to a field of study; the term is used here to represent a careful study or investigation based on a systematic understanding and critical awareness of knowledge. The word is used in an inclusive way to accommodate the range of activities that support original and innovative work in the whole range of academic, professional and technological fields, including the humanities, and traditional, performing, and other creative arts. It is not used in any limited or restricted sense, or relating solely to a traditional 'scientific method'.

Annex 4: Fictitious examples of doctoral candidate profiles

Example 1

A full-time candidate with an integrated master's degree in chemistry, who has spent time working with a large pharmaceutical company as part of her master's programme, has been successful in obtaining a candidateship offered jointly by the UK Engineering and Physical Sciences Research Council (EPSRC) and the US National Science Foundation (NSF) at a research-intensive university, immediately after completion of her first degree. She is aged 22. Her research topic has already been determined by her sponsors and the principal investigator of the established research project she is joining. Her doctoral programme will involve spending time in the pharmaceutical industry, in the UK and the USA.

The candidate has three supervisors, one in her university department with whom she will have almost daily contact in the laboratory, and two industrial supervisors, one in the UK, the other in the USA. She is also a member of an EPSRC-funded doctoral training centre which means she is part of a group of about 60 doctoral candidates in physical sciences disciplines, all of whom receive structured training in research skills in parallel with pursuing their research projects.

The candidate soon forms close relationships with others in her research group, including other doctoral candidates and post-doctoral researchers. Overall, she feels she is part of a vibrant research environment - in the laboratory, in her department and in the doctoral training centre. This candidate's thesis will be assessed by a 'closed' viva examination which will have independent examiners from both academic and industrial fields. The examination is the only formal assessment of her doctoral degree, although she has to pass progress stages along the way, when there will be a chance to discuss her progress in acquiring research skills.

Example 2

A full-time international candidate, aged 42, is a mid-career professional from a developing country who has already had a distinguished career in a national government education department. His academic qualifications include a Diploma in Higher Education from his home university. The candidate has come to the UK with government sponsorship from his own country and is expected to complete the degree, a professional doctorate in education, in a maximum of four years. He is accompanied by his family - wife and two children (6 and 8).

The candidate spends the first few weeks trying to settle into his programme, and to help his wife and children establish a new life in the UK, including supporting the children in starting their new school and helping his wife (whose English language skills are limited) to find a job which will help to support the family. Their accommodation is not ideal, and part of the first term is spent finding a house to rent near the children's school, supported by the university's accommodation office.

This candidate also belongs to a doctoral training centre but on a regional scale, so he has to travel to some development events and has access to a wide range of online skills materials, including some research methods courses. He is enjoying meeting candidates in other disciplines, as well as some working in cognate areas, through the DTC events and finds this stimulates new research ideas.

As he progresses through the programme, this candidate has to pass coursework assignments and taught modules on research skills. These have to be successfully completed before he can take the doctoral examination, which is also in the form of a closed viva. The candidate is finding the work intellectually challenging yet rewarding, and at the end of his first year, with the help of his supervisor, he has finalised his research question and already had an invitation to present at a conference in his second year. His research study design is linked with a practical problem he needs to address at home, and he is planning to return to conduct his fieldwork there.

Example 3

This candidate is aged 27 with a first class BA in fine art. She has had no success in obtaining funding from the Arts and Humanities Research Council even though she obtained one of the few first-class degrees in her field in her year of graduation, because competition is fierce and few studentships are available. She has a large debt after completing her first degree. After two years doing 'non-graduate' jobs in arts administration while continuing to paint and exhibit in a minor way in local galleries, she has saved up enough money to combine with a small bequest left to her by her grandmother to apply for a self-funded, part-time place at a new university, her local institution.

The university has a highly respected emerging creative arts school that has links with some of the London galleries and academies. After her interview in the school, at which staff show they are impressed with her portfolio and her exhibition record and subsequently offer her a place, the candidate has problems persuading the university's admissions office that she has enough funding to pay her own fees and almost loses her place. Undeterred and with this hurdle overcome, the candidate begins her degree, feeling that she has already struggled to get started, let alone begin on the long and difficult, yet enjoyable, path to her doctorate.

The creative arts school is not part of any doctoral training centre, either local or regional. A few high-quality research training events are available. The candidate takes the initiative and identifies a course concerning restoration of ceramics at one of the private arts organisations which would be useful. Her supervisor agrees this is a valuable opportunity for her and the school offers to contribute towards the cost of this extra course, which means the candidate still has enough money to visit continental Europe to undertake field work.

There are only seven doctoral candidates in total in the creative arts school. Most of them are self-funded, part-time candidates so they do not meet as a group very frequently, although the school has set up the virtual learning environment they use to enable all the research candidates to communicate easily with one another on academic topics. The general research environment is stimulating, and the candidate feels she has opportunities to contribute to the research activities in her school, such as 'work in progress' seminars, where all researchers (staff, postdoctoral researchers and postgraduates) in the department are invited to present. The candidate is encouraged by the way that presenting at these events helps her research to develop.

Part way through her second year, the candidate realises she has the option of completing her degree early and being considered for an MPhil instead at the end of year two. This is an attractive proposition in some ways, because her part-time gallery work is becoming more demanding, although she would then not be successful if in the future she wished to pursue an academic career. If she does stay on to complete the doctorate, the degree will be assessed on the basis of her portfolio of work, including some done before she registered for her doctoral degree. The portfolio will include examples of both pictures and ceramic painting, some of which will be provided in multimedia format. She must write an overarching

commentary, providing a critical evaluation of her work and setting it in the field of research. The commentary and artefacts will be assessed at a viva examination which is open to external observers.

Example 4

This candidate is 74 and has been retired since the age of 60, after working all his life as a curator and guide in regional museums and historic houses, with a brief period spent working in Italy when his family was young. He has acquired a wide range of knowledge of fine art in different periods and is taking a full-time PhD in Renaissance art at his local university because of a passionate interest in his subject. He and his wife have taken holidays that reflect their interest in art and have accumulated an impressive collection of slides which they are now enjoying digitising in their spare time.

This candidate has no traditional qualifications, but this is immaterial because of the wealth of professional and practical knowledge he possesses. He has no experience of academic writing, though, so he and his supervisor have identified some sessions run in the university that are already helping him to complete the assignments set by his supervisor. They both agreed he would need to complete assignments during the first year, to help the candidate get into writing for academic purposes and also to help his supervisor to support him in progressing.

The candidate has no intention of taking up employment after his degree, but his supervisor, who is young and very committed to skills training, is enthusiastic that all students complete the full range of transferable skills training provided for new doctoral candidates in the graduate school, most of whom are taking 1+3 doctoral degrees, effectively including a master's degree in research methods in the first year. The candidate is keen to participate in these sessions, especially the module on academic writing skills, recognising that this will give him useful opportunities to practise writing for his thesis. His supervisor has also arranged special sessions with the graduate school librarian for the first time this year. The sessions are open to all research degree candidates and are designed to help with online searching as part of undertaking the literature review. The candidate is finding this helpful as he knows that reading and reviewing the literature is one of his weaker areas but is eager to get started on engaging critically with the literature in his field.

As the first year draws to an end, both candidate and supervisor are pleased with progress. At the end-of-year progress review they hope to take stock of what has already been achieved and what further support might be needed in the coming year.

Example 5

A full-time student with an integrated master's degree in manufacturing and mechanical engineering with management and 5 years' experience working in the manufacturing industry decides to return to academia to undertake a PhD in the area of automotive safety at the age of 29. She is married and settled in the city where she took her first degree and looks for an opportunity at her home university, which is research-intensive and well renowned in the field. She is offered a studentship from the UK Engineering and Physical Sciences Research Council (EPSRC) within the School of Mechanical Engineering.

The candidate's research topic is broadly defined, and with the help of her supervisor she soon finds a particular area of interest in optimisation. This leads to a publication with the IMechE within two years.

Eighteen months into her doctorate, the candidate's supervisor offers her a Research Associate position working on a European Commission funded project on a topic very close to her doctorate. She accepts this opportunity and amends her thesis plan to accommodate the slight change in direction. This project requires her to attend regular meetings across Europe and write several technical reports which, although time consuming, greatly enhance her overall doctoral experience. During her doctoral studies, she does a small amount of lecturing to gain experience and is involved in promoting public engagement with engineering.

The candidate finds some of the doctoral journey challenging, particularly the last six months when her funding has ended and she is working within the department on unrelated projects while writing up her thesis in the evenings and weekends, but she eventually submits after four years. Her thesis is assessed by a 'closed' viva examination which includes one internal academic examiner and two external examiners (one from academia and one from industry), due to her status as a member of staff.

The candidate is awarded a doctorate subject to minor corrections. Her contract within the research group ends six months after submission, when she is offered an 18-month postdoctoral research fellowship in a different field of research, still within the School of Mechanical Engineering. She accepts this but finds due to the radical change in research area that she is almost back at 'square 1' in terms of knowledge and track record. Despite this, she is a named researcher on a subsequent three-year project and increases her lecturing responsibilities. She never feels as confident or interested in the new field as she did in her doctoral research field and doesn't publish as much as she needs to in order to secure a lectureship. During her 'post-doc' she publishes some more of her PhD work in two journal papers and attempts to move back towards research areas in which she is more interested through networking and writing her own funding proposals.

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