Redefining the Doctorate

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DISCUSSION PAPER

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Executive summary

Many commentators and observers believe that the time is right and the sector is ready for a national debate in the UK on the nature of the doctorate, given the multiple drivers for change, multiple agendas at work, and the multiple stakeholders with an interest in both the debate and the outcome. This discussion paper is designed to help frame and inform such a debate, which will not only bring together the major stakeholder groups in a shared conversation but also provide opportunities for members of the academic community to contribute to the discussion via a series of national workshops and meetings.

The Higher Education Academy will sponsor the national debate and run it in partnership with the other key stakeholder groups (particularly the funding councils, the Quality Assurance Agency (QAA), the Research Councils (RCUK), the National Postgraduate Committee (NPC), the UK Council for Graduate Education, Universities UK and GuildHE, UK GRAD, higher education institutions, and employers). The original impetus for organising the national debate came from the work of the Rugby Team (of which I am chair). The support, encouragement and guidance of both the Rugby Team and UK GRAD have been invaluable and are gratefully acknowledged.

The paper is structured in four sections:

The Introduction explains why a national discussion on the nature of the doctorate in the UK is needed, and it outlines the context within which such a discussion should take place. It:

- charts the development of the doctorate as a research degree
- highlights sources of uncertainty and disagreement about the nature, form and purpose of the doctorate in the UK, and spells out why observers are now questioning whether the degree remains fit for purpose
- summarises the different perspectives of stakeholder groups
- proposes a national debate
- sketches out the nature of recent debates on the doctorate in Australia, the USA and mainland Europe.

Drivers of change outlines the three main sets of factors driving change in the UK doctorate, which are:

- sustaining the supply chain of researchers: important issues include recruitment, funding, efficiency and cost-effectiveness, the status of researchers, and the growth of interdisciplinary and applied research
- preparation for employment: important issues include the doctorate as a

labour market qualification, expectations of doctoral candidates, expectations and requirements of employers, transition and mobility
- internationalisation: important issues include global competition for doctoral students, the need to have internationally competitive doctoral programmes, and harmonisation with Europe, particularly through the Bologna Process.

Responses in the UK discusses the three main ways in which doctoral education in the UK is adapting to these drivers of change, which are:

- through increased formalisation: this is manifest in a number of ways, including the award of Research Degree Awarding Powers, development of institutional regulations and definitions, development of a national framework and expectations (particularly through the Quality Assurance Agency (QAA) Code of Practice, Framework for Higher Education Qualifications, and the Research Councils' Joint Skills Statement), the formalisation of research degree programmes, the development of Graduate Schools, and the formalisation of supervision
- through an increasing emphasis on skills development and training: key issues here include the doctorate as research training, the development of research training programmes, integration of training and skills development into the overall student experience, and the assessment of doctoral students
- through the emergence of an increasing diversity of doctoral awards: this section outlines the family of doctoral awards in the UK, with a particular emphasis on the development of professional doctorates.

Framing the debate summarises the reasons why a national debate on the nature of the doctorate in the UK is now needed, and it outlines what key questions should be addressed in that debate. It covers:

- the context of the debate
- key themes in the debate: including the essence of 'doctorateness', the supply chain of researchers, funding, the doctoral student experience, the nature and dissemination of research, quality assurance, and issues of autonomy, responsibility and accountability.

Introduction

The doctoral degree

The doctorate is the highest academic degree that a university can award to a student who has successfully completed a defined programme of work in a particular field of study. Most if not all UK universities also award Honorary Doctorates to particular outsiders on the basis of distinguished service or wider contributions to society, and many also award so-called higher doctorates such as the Doctor of Science (DSc) or Doctor of Letters (DLitt) to staff or alumni who have excelled in academic research careers.

The most common form of doctorate, indeed in many countries still the only recognised form of doctorate, is the Doctor of Philosophy (PhD, from the Latin *Philosophiæ Doctor*), a postgraduate research degree. Whilst the title is derived from the Greek, meaning "Teacher of Philosophy", and indeed the degree was originally awarded only for studies in philosophy, it has long been possible to study for a PhD in most if not all academic disciplines.

The doctorate has a long and interesting history (Simpson 1983, Park 2005a), key landmarks in which were its birth in medieval Europe as a licence to teach in universities, its rebirth as a research degree in Germany in the early 1800s, its redefinition in the USA from the 1860s, and its subsequent diffusion to Europe and elsewhere. The degree was first introduced in the UK in 1917, by the University of Oxford. A decade ago the Advisory Board of the Research Councils (ABRC) – now Research Councils UK (RCUK) – noted how "over the last century the PhD has established itself as a qualification recognised internationally, as the standard qualification for entry into the research and academic professions, and as an important qualification for other labour markets" (ABRC 1996).

The doctorate as a degree has certainly come of age, and it sits proudly at the top of the ladder of academic qualifications in most countries (Green and Powell 2005). The rhetoric used to describe the doctorate – for example as "the pinnacle of academic success" (Nyquist 2002), "the zenith of learning" (Lovat, Monfries and Morrison 2004), and "the pinnacle of university scholarship" (Gilbert 2004) – is often colourful. There is little doubt that, for most people in most countries, the doctorate is the research degree of choice (Park 2005a).

The doctorate takes a number of different forms in different countries (Noble 1994). In the USA, for example, a doctorate programme usually includes both taking advanced-level taught courses and undertaking academic research, with access to a range of academic advisors and supervisors along the way. In Europe (including the UK) and Australia, the doctorate is typically based largely or

exclusively on research, with the student effectively serving an apprenticeship under the guidance of a principal supervisor. In most countries, the primary emphasis within the doctorate is on developing disciplinary knowledge, in preference to applied research and knowledge transfer. A strong emphasis on preparing students any roles (within or beyond the academy) they might expect to fill after completing their doctorate remains rare.

As will become clear in the rest of this discussion paper, variability in doctoral degrees has developed over time between disciplines, institutions and countries. But, logically, there should be something identifiable and widely accepted as 'doctorateness' in all the forms. A central question, therefore, is "what is the essence of 'doctorateness'?" Put another way, "what factors must be present for any particular degree to fit into the category?". What factors allow us to discriminate between a doctorate and other degrees?

Uncertainty and change

The literature is peppered with commentaries on how the doctorate is viewed, both within and beyond universities, and here again the rhetoric is often quite colourful, but also quite revealing. In the UK the Winfield Report noted two decades back that "there is an inherent tension within the degree" and "the absence of a research-based literature on doctoral study may have contributed to the apparent uncertainty about the nature, form and purpose of the degree" (Winfield 1987). At the same time, Blume and Amsterdamska (1987) described the then "almost critical uncertainty as to what education in research, and the doctorate, should be", and Blume (1986) noted that "doctoral education today is beset by a curious paradox. On the one hand it has now become, one might almost say for the first time, the explicit object of policy concern. On the other hand its purpose no longer seems clear." Ten years later, the ABRC described the doctorate as "by no means an uncontroversial degree" (ABRC 1996), and more recently Pole (2000) has spoken of PhD graduates "who completed doctoral study during a period of change in the United Kingdom and confusion around the role and purpose of the doctorate."

The picture in the UK, already far from clear, has become even more complicated in the last five years or so as doctoral education (both across the sector and within individual institutions) has had to respond to some major drivers of change and adapt to some major changes in context. Key drivers for change include a new emphasis on skills and training, submission rates and quality of supervision, changes in the examination of the thesis, and the introduction of national benchmarking (Park 2005a). Hallmarks of the changing context include the revised QAA Code of Practice for Research Degree Programmes, the RCUK Joint Skills Statement, the Roberts Review and Roberts Funding (Rugby Team 2006). Other factors include the new emphasis on employability and career development, the need for a sustainable supply of researchers, and the growing reach of the Bologna

agenda. The ABRC (1996) were right in concluding that "changes in the nature and practice of the PhD have arisen because of 'indirect' pressures, rather than from a clearly defined study of the degree itself."

Fitness for purpose

Given this persistent uncertainty and enduring lack of consensus over the purpose of the doctorate and over the benefits a doctoral education offers, this appears to be a particularly appropriate time to take stock on what the doctorate is, in the UK.

I have recently argued that "there is a need for a wholesale revision of assumptions and expectations about what the PhD is" (Park 2005a), although this observation is not particularly novel. Two decades ago the Winfield Report noted that "the purpose (or purposes) of the PhD have not been set down in such a way as would attract unequivocal and widespread agreement" (Winfield 1987), and ten years ago the ABRC concluded that "all with an interest in the PhD, including individual students and supervisors, need to be involved in national discussion on the future of the degree … we consider a national debate on the PhD to be timely" (ABRC 1996).

In recent years other stakeholder groups have also questioned the fitness for purpose of the doctorate in the UK. The UK GRAD Programme, for example, has noted how "for some time this single-purpose qualification has no longer fitted the expectations of students and employers. Increasingly, Government, funding bodies and higher education institutions (HEIs) are questioning the nature of the PhD" (UK GRAD 2002). This uncertainty is echoed in two Government reports on postgraduate education in the UK – the Harris Report (1996), which argued that it is not always clear to students and employers what it means to have been awarded a particular postgraduate qualification, and the Roberts Review (2002) which concluded that institutions are not adapting quickly enough to the changing experiences of existing research students, the expectations of potential students, or the need to prepare students for careers beyond the academy.

There are no signs of widespread concern across the UK about the quality of doctoral education, either in terms of the academic quality of the finished product (the thesis, which is judged by peer review) or the research degree programmes that underpin it, which have recently been evaluated in the QAA Special Review of Research Degree Programmes (QAA 2006).

But there are clouds on the horizon about some key aspects of doctoral education in the UK, particularly now that there are widely articulated tensions between product (producing a thesis of adequate quality) and process (developing the researcher), and between timely completion and high quality research. Concerns have also been voiced about how the UK doctorate is viewed in other countries both within and beyond Europe, about the ability of UK universities to compete

effectively in the global market for high quality research students, and about the challenges of meeting European expectations (articulated through the Bologna Process) for harmonising degree programmes within the proposed European Higher Education Area. There are more domestic concerns, too, including access to funding for postgraduate research, the impact of undergraduate debt on student attitudes towards continuing onto postgraduate study, and the employability of doctoral graduates. A particular problem is the often wide gap between what universities are producing and what employers are looking for in terms of doctoral graduates, not just in terms of competencies and transferable skills but also in terms of attitudes and behaviours. Concerns have also been voiced (Leonard and Metcalfe 2006) about the lack of research on most aspects of the doctoral student experience which could be used to inform evidence-based decision-making. Compared with the undergraduate sector, postgraduate students in general, and research students in particular, remain a relatively unresearched group.

It is not simply a question of whether the UK PhD is fit for purpose, it is also a case of going back one step further and asking the more fundamental question "what is the purpose of the PhD in the UK?". Elsewhere (Park 2007) I have explored how the UK doctorate is likely to change over the next decade or so in response to drivers and challenges that are already either apparent or at work today. Whilst forecasting in this way is interesting as an intellectual exercise and useful for strategic planning purposes, it ducks the core question, which is whether we should expect more fundamental change in how the doctorate is defined and what is expected of it.

Stakeholder perspectives

Two key questions that underlie the debate about the doctorate as a degree are "Who owns the doctorate", and thus who is responsible for it, and "Who cares?" and therefore who is interested in the outcome of any such debate, or in changes to the doctorate.

"Who owns the doctorate?" is an interesting question, because while universities are "custodians of academic standards and have the responsibility to award the degree" (ABRC 1996), no one group has complete responsibility for defining what a doctorate is and what form it should take. As Nyquist noted for the USA, but is equally true for the UK, "although research institutions have tended to believe that they 'own the PhD' because they design the programs, recruit the students, and confer the degree, it has become abundantly clear that a PhD is the product of multiple owners or stakeholders, not the least of which are the doctoral students themselves" (Nyquist 2002).

The question "Who cares?" is also vitally important, because any significant change to the doctorate will inevitably have impacts on many different groups or stakeholders. Within doctoral education there are multiple stakeholders (Table 1)

with different interests, expectations and agendas. Inevitably, therefore, a doctoral degree when viewed through different lenses can mean different things.

Table 1. Stakeholder perspectives on the doctorate

Students: for the student a doctorate can mean many things, including an "academic passport with international reciprocity" (Noble 1994), a licence to teach at degree level, and an apprenticeship in 'proper' academic research (Armstrong 1994).
Supervisors: for the supervisor, there is the satisfaction of training apprentice researchers, a route to career progression as an all-round academic practitioner, and a supply of inexpensive research assistants.
Academic departments: for departments, having doctoral students is a mark of research status and credibility, a valuable source of income and contributor to research critical mass (for example, for RAE purposes), and a supply of Graduate Teaching Assistants (Park 2002, 2004) to help deliver undergraduate teaching.
Institutions: for the institution, doctoral students are what Mitchell (2002) calls "the army of research 'ants'" which helps to keep the research mission moving forward while many academics struggle with heavy workloads and multiple responsibilities. Having research degree awarding powers is also a serious indicator of the status and academic credibility of a university (Stauffer 1990).
Disciplines: for disciplines, doctoral students serve as important stewards (Jackson 2003) with an implied responsibility to keep the discipline not just alive, but intellectually vibrant; they also provide a supply chain of future academics and researchers.
Funding bodies: for funding bodies, such as HEFCE and the research councils, investment in doctoral programmes supports capacity building of future academics and researchers, the growth of critical mass in research teams, and a sustained output of high quality research that brings both academic and applied benefits for the nation.
Employers: for employers, doctoral graduates can offer skilled and creative human capital, and access to innovative thinking and knowledge transfer.
The nation: for the nation, the obvious benefits of an active community of scholars engaged in doctoral level research include enhanced creativity and innovation, and the development of a skilled workforce and of intellectual capital and knowledge transfer, which drive the knowledge economy and are engines of the growth of cultural capital.

Proposal for a national debate

Against this background, the time seems right if not overdue for a national debate on the doctorate in the UK. The seeds for such a debate have already been sown, with informed commentators already posing the rhetorical question "what is a PhD?" both directly (Underwood 1999; Burnard 2001, Wellington et al 2005) and indirectly (Hockey 1991).

Considering the nature of the UK doctorate provided the sub-text to the work of the 'Sector working group on the evaluation of skills development of early career researchers' – more commonly known as the Rugby Team (2006) – which was established in January 2005 with a remit "to propose a meaningful and workable way of evaluating skills development in early career researchers". The theme also provided the context for the summer 2006 European Conference of the UK Council for Graduate Education (UKCGE 2006), and informed much of the discussion at the 2006 UK GRAD conference *Profiting from Postgraduate Talent* (UK GRAD 2006c). It also lies at the heart of the recent decision by the QAA (2006) to review the doctoral level descriptors which form the basis of its Framework for Higher Education Qualifications (FHEQ).

A national debate on the nature of the UK doctorate must engage the key stakeholder groups (Table 2).

Table 2. Key stakeholder groups for a national debate on the doctorate in the UK

a.	The funding councils for England (HEFCE), Wales (HEFCW), Scotland (Scottish Funding Council) and Northern Ireland (Department for Employment and Learning)
b.	The Quality Assurance Agency (QAA)
c.	The Research Councils (RCUK)
d.	The National Postgraduate Committee (NPC)
e.	UK Council for Graduate Education (UKCGE)
f.	Universities UK (UUK) and Guild HE (formerly the Standing Conference of Principals, SCOP)
g.	UK GRAD and the Rugby Team
h.	Higher education institutions (HEIs)
i.	Employers

The Higher Education Academy will be pleased to sponsor the national debate and run it in partnership with the other key stakeholder groups (Table 2). The original impetus for organising the national debate came from the work of the Rugby Team (of which I am chair). The support, encouragement and guidance of both the Rugby Team and UK GRAD have been invaluable and are gratefully acknowledged.

Interest beyond the UK

It would be wrong to think that the UK was the only country in which concerns have been voiced about the fitness for purpose of doctoral education, because this theme has attracted lively debate in many countries. We have much to learn from how the doctorate has been reviewed and revised elsewhere; as the Winfield Report concluded two decades ago, "official UK comment on the PhD has ignored the historical background and has continued the British tendency to ignore policy, argument and practice in other countries" (Winfield 1987).

Two international reviews of the different models of the doctorate adopted in different countries provide a global context within which to reflect on the UK experience. Noble (1994) described wide variations in practice between different countries, and concluded that doctoral programmes would be improved by accepting fewer students, paying salaries to doctoral students, and removing the viva as a form of examination. More recently, Powell and Green (2007) have examined the doctorate in 17 countries, and noted significant variations in the declared purpose of the doctorate, and a general tendency to concentrate delivery of the degree in a limited number of institutions (Powell 2006a, 2006b). A much earlier report for OECD on postgraduate education in the 1980s (Blume and Amsterdamska 1987) concluded that policy development on postgraduate education was then underway in the UK.

Australia

The doctoral debate has also surfaced in Australia (Sheely 1996; Mullins and Kiley 1998, 2000; Pearson 1999) and in New Zealand (Sutherland 1999). In Australia, Gilbert (2004) asks whether the time is right to assess the capacity of the doctorate to respond to a long list of challenges, which include stronger links between academic research and real-world challenges; the growth of interdisciplinary and multi-disciplinary research; changing conceptions of knowledge and expertise; the increasing pace and spread of knowledge production and transfer; increasing emphasis on development of generic or transferable skills; changing roles of academics and experts "derived from ideas of entrepreneurship, knowledge work, the public intellectual and advocacy for science and research"; and diversification of doctoral awards and models (including professional doctorates).

USA

Reflection on the doctorate has been most persistent and most intense in the USA, where two decades ago, Cude (1987) described many North American doctoral programmes as inflexible, cumbersome, restrictive and wasteful. The US Council of Graduate Schools (1990) issued a policy statement that offers guidance

for reviewing current PhD programs and for establishing new ones, although as Golde (2005) puts it, "many researchers, administrators, government agencies, foundations, professional associations, and other interested parties are casting critical eyes on graduate education in an effort to understand the ways in which the inherited system does and does not continue to function effectively …".

Recent commentaries on doctoral education in the USA (Golde and Dore 2001; Nyquist 2002; Nyquist and Wulff 2003; Golde 2005) highlight similar themes and challenges. These include an over-supply of doctoral graduates for the academic job market; lack of preparation and skills development for careers beyond the university and for careers as teachers in universities; lack of appropriate supervision, particularly for career development; a learning experience that is too deep and narrow, too specialised and academic, and too campus-based; inability to work effectively in an interdisciplinary environment; and recurrent difficulties in securing funding.

Doctoral education in the USA is also struggling with the challenge of recruiting more minority groups, particularly African-Americans (Thompson 1999) and women in many disciplines, in order to "diversify the American intellect" (Nyquist and Wulff 2003). The most intractable challenge in the USA, which Lovitts and Nelson (2000) refer to as "the hidden crisis in graduate education", is the persistently high attrition rate of doctoral students, which averages in the order of 50% across most institutions and is particularly high among females and ethnic minorities (Stewart 2006).

While the UK has much to learn from how the US has reflected on the nature of doctoral education, and from analyses of what the key challenges are, there are also lessons in how the US has sought to address some of the more important issues. Particularly important in this respect have been four major well-funded national projects designed to tackle particular challenges (Table 3).

Table 3. National projects on the doctorate in the USA

Preparing Future Faculty (no date): launched in 1993 "to develop new models of doctoral preparation for a faculty career by including preparation for teaching and academic citizenship as well as for research" (DeNeef 2002).

Re-envisioning the PhD (no date): designed "to share good practice (via a major conference and a web site) and engage stakeholders in a national and international discussion on transforming doctoral education to meet the needs of the 21st century".

Responsive PhD Initiative (Weisbuch 2002, Anon 2006b): involves collaboration between 14 leading research universities; its goals are "to spark discussion; create experiments; and disseminate successful models that introduce new paradigms and practices, engage new people, and foster new partnerships in doctoral education" (Nyquist 2002 p.15).

Carnegie Initiative on the Doctorate: funded by the Carnegie Foundation for the Advancement of Teaching (no date), focused on doctoral education as a key element in the preparation of "stewards of the disciplines … capable of generating new knowledge; conserving the most important ideas and findings of past and current work; and transforming knowledge into powerful pedagogies of engagement, understanding, and application" (Nyquist 2002 p.15).

Europe

Doctoral education has also come under scrutiny in Europe. In the Nordic countries (Denmark, Finland, Norway, Sweden), for example, drop-out rates are high, completion times tend to be long, and graduates are viewed as too specialised and poorly prepared for work outside universities (Steinwall 2006). Kyvik and Tvede (1998) note that "comparisons [of the doctorate in Nordic countries] to U.S., British, German and French systems suggest a trend toward a common international doctorate".

Change is already under way across Europe. It is evidenced, for example, in the emergence of subject-specific training, transferable skills training, support and quality assurance in many countries, and the development of doctoral programmes and Graduate Schools (Ritter 2006). Increasing harmonisation of the higher education landscape across Europe, driven by the Bologna Agenda (van der Wende 2000), will inevitably promote further convergence of national systems of doctoral education, as discussed below.

Drivers of change

In scoping and framing a national debate on the nature of the UK doctorate, it is helpful to start with a framework of key issues that must be taken into account. The typology used here is one out of many that could be constructed for this purpose; it is offered simply as a catalyst for the debate. It distinguishes between drivers of change and responses to change, and within each it flags some of the more important themes that should be addressed within the debate.

There are three imperatives or key drivers of change to the UK doctorate, and these are sustaining the supply chain of researchers, preparation for employment, and internationalisation.

Sustaining the supply chain of researchers

Few would doubt the importance of maintaining a sustainable supply of researchers, although there is less of a consensus about the profile of that supply, in terms of how many people, in what disciplines, with what careers in mind. It has been suggested (Öckinger 2006) that Europe needs an additional 700,000 researchers (postgraduate research students and young researchers) to meet foreseeable demand, though that precise number is open to debate.

From a national perspective, maintaining a reliable supply chain of researchers is crucially important, particularly in today's knowledge economy in which researchers are key knowledge workers actively engaged in knowledge transfer. As Barnacle (2005) puts it, "prevailing discourses tend to locate research education as a ready source of labour and commodities for the new economy, which is said to trade principally in knowledge". The UK Government (Diamond 2006) puts great store on sustainable investment in developing both the research base and the researcher base, fuelled by an appreciation of the impact of research and development on economic development, society and quality of life, and of the need to maintain the country's competitive position within the increasingly global marketplace for goods and services (including knowledge).

But the supply chain issue runs much deeper than this, because a throughput of productive doctoral students is vital to the health of academic disciplines. Because they are custodians of the disciplines, it is essential that we have a sustained supply of doctoral students, not just to grow the next generation of academics but to maintain vitality and research momentum in disciplines.

Key issues relating to the supply of researchers include recruitment, funding, efficiency and cost-effectiveness, the status of researchers, and the growth of interdisciplinary and applied research.

Recruitment

A critical link in the supply chain of researchers is recruitment, and all universities face the challenge of recruiting high quality candidates into postgraduate research (Ritter 2006). Recruitment of UK graduates onto doctoral programmes is becoming more and more difficult, as they graduate with mounting debts, seek early entry into the buoyant job market, and often see little benefit in postgraduate study (particularly given that in most careers doctoral graduates rarely enjoy an initial salary premium over those with Bachelors degrees). The availability of adequate funding to support full-time doctoral research is clearly a major problem, which constrains the number of UK graduates who can realistically think of progressing onto a doctoral programme, either on graduation or subsequently.

A variety of factors affect the recruitment of doctoral students, because they have multiple reasons and motives for choosing to invest time in doctoral research. Leonard, Becker and Coate (2005) point out that relatively little is known about what motivates students to enrol on doctorates in education, and about what they subsequently see as benefits gained and costs accrued. Some do it because they see it as the passport to a particular career (for example, as an academic), some as part of their professional development, and many do it out of simple curiosity and for personal satisfaction (Leonard, Becker and Coate 2005, Wood 2006).

One growth area within doctoral recruitment is part-time and distance study, by which students can study and research while they continue to work, fund themselves and meet family and other responsibilities.

Funding

A key determinant of the sustainability of the supply chain of researchers is funding to support both research and researchers. Some doctoral candidates in the UK are, strictly speaking, not students but members of staff and research assistants who are paid salaries. But most doctoral candidates in the UK are students, and they can access funding from many different sources, usually on a competitive basis. Around a third of full-time doctoral students are funded by the research councils, and this remains the largest single source of doctoral funding after self-funding. Other sources, which often cover partial costs rather than full costs of tuition and living expenses, include the Overseas Research Students Awards Scheme (ORSAS 2006), institutional funding (for example, in payment for work as a Graduate Teaching Assistant), industry, charities, bank loans and career development loans, and relatives. Most doctoral students in the UK would argue that too few fully funded studentships are available, and that there is usually intense competition for those that do exist.

Funding constraints adversely affect widening participation and access to doctoral study. A recent survey by the National Postgraduate Committee and the graduate jobs website Graduate Prospects (Rodgers 2006) found that students from poor backgrounds are much less likely to consider postgraduate study, including PhDs, underlining the need to find effective ways of encouraging more able students from all backgrounds to consider postgraduate study.

Sustained funding constraints, coupled with the benefits of developing critical mass and investing in success, are likely to drive the further concentration of research funding and activities in fewer, larger and more research-intensive institutions than at present (Haines 2006, Park 2007). Such a trend will inevitably cause many institutions to review both their research ambitions and their strategies for further developing doctoral programmes. It will also have serious implications for widening participation in doctoral study in the UK.

It is not just the availability of funding that matters, it is the form in which the funding is made available to doctoral students, particularly those who wish to study on a full-time basis. Many UK doctoral students look enviously across the water to mainland Europe, where in some countries there is strong state financial support for doctoral candidates. In Finland (Makarow 2006), for example, although the total number of doctoral students is small, they pay no tuition fees and usually receive salaries not grants from the Ministry of Education, for four years.

Efficiency and cost-effectiveness

Those who fund research naturally have a vested interest in the efficiency of doctoral education, in order to ensure that financial support is used appropriately and that resources are deployed to optimum advantage. In the UK such concerns are increasingly being voiced, and they are reflected, for example, in the increasingly tightly-defined expectations of research councils relating to submission rates (the percentage of doctoral students who submit within a specified period of time, usually four years), and the growing interest of the funding councils (such as HEFCE) in completion or qualification rates (the percentage of doctoral students who complete within a specified time, usually seven years). All research councils now have clearly-defined thresholds for submission rates, often set at 70% submission within four years (see, for example, Arts & Humanities Research Council 2006; Economic and Social Research Council 2004), and many threaten to impose serious financial sanctions (including withholding postgraduate funding for a two-year period) on institutions whose performance falls below threshold.

Studies have shown that submission rates are affected by many different factors – such as availability of financial and other support; discipline; and fee status – (Booth and Satchell 1996, Wright and Cochrane 2000, Park 2005b), not all of which are within the gift of an institution to control. This has fuelled concern over

the extent to which institutions can effectively manage their submission rates and ensure their performance remains above threshold and safe from sanction.

Considerations of the cost-effectiveness of doctoral study arise at two scales, that of the individual researcher and that of the institution. If prospective or current research students were to undertake an objective cost-benefit analysis of doctoral study they might find that the costs outweigh the benefits if they use a narrow monetary definition of benefits (such as salary premium). At the level of the institution, there are also questions to be asked about whether the true full economic cost of having doctoral students is balanced by the income stream they generate through fees and funding council support. A recent study of the real costs of training and supervising research students by JM Consulting (2005) concluded that "current funding for each student varies considerably, but is well below the levels of cost, leading to significant levels of under-recovery of costs, almost without exception".

Status of researchers

Funding also has a major impact on the status of researchers. Traditionally in the UK, doctoral candidates have been defined and treated as students who pay tuition fees and (if they are lucky) receive a stipend. But there is a growing move across Europe to define and treat such candidates as researchers who are paid a wage and do not pay fees. In the Scandinavian countries, for example, doctoral students now receive a salary (Steinwall 2006). EURODOC – the European Council for Doctoral Candidates and Young Researchers – would like to see a clear career structure for researchers and stable employment contracts (Ejdrup 2006, Öckinger 2006).

Growth of interdisciplinary and applied research

Compared to the factors discussed above, the changing nature of academic research has a relatively minor impact on the supply chain of researchers, but it is still relevant nonetheless. Relatively little attention has yet been devoted to the challenge to doctoral programmes in the UK posed by the growth of interdisciplinary research – which Metz (2001) characterises as "intellectual border crossing" and Gilbert (2004) views as "most productive in innovation and discovery" – and of applied research which has an emphasis on relevance to society and knowledge transfer. This underlying trend will inevitably promote changes in doctoral programmes in the years ahead (Park 2007).

Preparation for employment

The challenge for doctoral education in the UK is not simply a matter of the quantity of doctoral students passing through the supply chain of researchers; it is also a matter of quality, in the sense of fitness for purpose. How well suited are doctoral graduates for the sort of careers they want or end up in?

Key issues relating to the doctorate as preparation for employment include the doctorate as a labour market qualification, the expectations of doctoral candidates, expectations and requirements of employers, and transition and mobility.

Doctorate as a labour market qualification

When the PhD degree was first introduced in the UK, it was seen primarily as "the process of preparation for a career in the university" (Blume and Amsterdamska 1987). But the labour market for PhDs changed a great deal through the 20th century, and "as opportunities for academic employment have declined, the PhD market has broadened and increasingly vocational PhDs have emerged" (ABRC 1996 pp.13-14). Today around a third of doctoral students pursue academic careers; the rest are employed in a wide variety of jobs mainly across the corporate, government and not-for-profit sectors (UK GRAD 2004).

Nyquist and Wulff (2003) have argued that in the USA "current graduate education does not adequately match the needs and demands of the changing academy and broader society." This is equally true in the UK. The Roberts Review (2002), for example, questioned whether the training then available within doctoral programmes in the UK equipped students properly to teach in universities. More recently Ian Diamond (2006) – head of the Economic and Social Research Council, and chair of the RCUK Executive Group – has stressed the need to prepare doctoral students for the wider economy, and the need for a dialogue between universities and employers about what capabilities most doctoral students have.

This broader remit, to prepare doctoral students for careers beyond the academy, is at work in the USA as well as in the UK. In the USA, for example, Nyquist (2002) has argued that "the goal of producing researchers and scholars, while critical, is not sufficient by itself", and one of the core competencies expected of doctoral graduates is the "ability to see oneself as a scholar-citizen who will connect his or her expertise to the needs of society". The challenge of adequately preparing doctoral students for careers beyond the academy by developing their transferable skills underpins and informs the RCUK (2001) *Joint Statement of Skills Training Requirements of Research Postgraduates,* and it lies at the heart of the new skills agenda for research students.

It is generally recognised that, in the UK, there is a growing need to keep doctoral programmes under review to ensure that, as well as producing high quality research, they produce a sustainable supply of what Nyquist (2002) terms "knowledge workers who possess deep analytical skills and capacities", who are needed for careers in business, industry, government and the non-profit sector.

Fine-tuning the supply of doctoral graduates with the appropriate skills and competencies will require much better tracking of career paths, and better understanding of the links between skills, other attributes, and employability. The USA is perhaps further ahead on this project than the UK, particularly within science, engineering and medicine, thanks partly to the availability of major funding from the National Science Foundation (Nerad 2006) for a national *Survey of Earned Doctorates* (SED) (National Science Foundation 2006a) and a national *Survey of Doctoral Recipients* (SRD) (National Science Foundation 2006b). International comparisons will also be helped by the survey of the careers of doctoral holders that OECD (2004) is developing. In the UK, until recently, there was little information available on doctoral career paths, but this is changing thanks to the UK GRAD (2004) survey *What do PhDs do?*, and a more detailed regional breakdown (UK GRAD 2006b).

Expectations of doctoral candidates

Critical to the employability and career development of doctoral students is their rationale for undertaking a research degree and their expectations of what doors it is likely to open for them (Metcalf *et al* 2004). Student motives vary a great deal, although Nerad (2006) challenges common assumptions in the USA (doubtless also true of the UK) that all PhD students want to become academics and the best in fact do so.

This is echoed in the results of a recent survey of the career motivations and expectations of research council-funded doctoral researchers carried out by UK GRAD (2006c). Students declared their motives, in decreasing order, as to pursue a career in research, to research their field in greater depth, to enhance their career prospects outside the academy, and to enhance their career prospects within the academy. They listed the career options they are actually considering (again in decreasing order) as a non-academic career linked to their field of research, a post in the academy, a non-academic career unrelated to their area or field of research, and applying for a position as part of a graduate recruitment programme (for which postgraduate qualifications are not necessary).

Expectations and requirements of employers

Employers outside universities have particular expectations of what doctoral graduates should be able to offer them. According to Vandrup (2006), industrial employers are usually looking for people with multidisciplinary and ideally international experience, a flexible approach, and an understanding of business models. Sotillo (2006) puts it more bluntly in arguing that managers are really looking for "someone who will add value to the business today and in the future, and do it quickly". She adds that, as well as specific subject knowledge (though employers can often teach them what they need to know), managers are looking for brain-power, appropriate behaviour (such as a collegial approach to work, and taking ownership of and responsibility for tasks and processes), relevant work experience, and a short transition from the academy to the workplace.

It is a double-edged sword, because while doctoral graduates usually do bring added value to an enterprise – including specialist knowledge, research and analytical skills, future potential, maturity – realising this potential is often constrained by a series of potential barriers which employers must confront and find effective ways of dealing with. Doctoral students usually lack commercial awareness, are generally over-specialised, face difficulties in adapting to non-academic work cultures, and often have unrealistic expectations (McCarthy and Souter 2006)

Transition and mobility

There are two other important themes relating to preparation of doctoral students for employment, and these are the time it takes them to complete the transition from being a student into being a productive employee, and the degree of mobility they are likely to enjoy between different sectors as their careers progress.

In terms of transition, as Golde and Dore (2001) put it (describing the USA, but equally true in the UK), "PhD holders often struggle to make the transition out of the academy and into the workforce." In the UK, Sotillo (2006) has pointed out that we must find ways of making this transition shorter and less stressful (for all parties). This can perhaps best be approached by making doctoral students more aware of the transition and better prepared for it, for example by having more realistic expectations, a better understanding of their strengths and weaknesses, and a keener awareness of what employers are looking for and expect to find in them.

In terms of mobility, the received wisdom in the UK has been that most doctoral graduates find jobs as academics and then work their way up that career ladder. As Nerad (2006) pointed out (for the USA, but also true for the UK), this is

generally not the case, nor is it the case that all doctoral career paths are linear and smooth. Many holders of doctoral degrees switch sectors within the labour market, sometimes repeatedly through their career, and have a highly mobile career trajectory. It is increasingly recognised, in the UK as elsewhere, that a career beyond the academy is not second-best, the fate of those who were not good enough to secure an academic post, and neither should it be regarded as a loss in the sense that industry poaches good researchers (Defries 2006).

Greater flexibility of career paths for researchers, including the possibility of moving freely in both directions between the academy and the world beyond it, would be widely welcomed. It would bring a number of benefits, including helping to foster effective knowledge transfer and disseminate creativity and good practice, and making the prospects of a research career look more attractive (thus boosting recruitment onto doctoral programmes).

Increasing the geographical mobility of researchers, by making it easier for them to develop careers across national boundaries, is a key objective of the European Researchers Charter and Code (European Commission 2005).

Internationalisation

The UK PhD is also facing major challenges relating to internationalisation, in two particular ways – increasing global competition in the recruitment of doctoral students, and increasing pressure to harmonise with proposed European models of the doctorate, informed particularly by the Bologna agenda.

Global competition for doctoral students

Like all developed countries in the English-speaking world (particularly the USA and Australia), the UK is engaged in trying to attract high quality doctoral students in an increasingly competitive global market. As Kemp (2006) points out, traditionally the UK and USA have been lead destination countries for international research students, but the global market place is changing as many nations seek to become 'knowledge economies' and new challenges and competitors are emerging with more flexible approaches to the delivery of study and research programmes. The UK can no longer rest on its laurels and expect international research students to flock here in large numbers.

Harmonisation with Europe

The structure, length and organisation of doctoral programmes have traditionally varied a great deal between countries across Europe. Ritchie (2006) accounts

this diversity as a result of the interplay of multiple factors, reflecting national heterogeneity in such things as the history of university development, state traditions, and variations in the structure of professions, institutional organisation, supervisory arrangements, and disciplines.

Since the early 1990s the momentum has grown to harmonise doctoral education across Europe, fuelled by a series of initiatives that began in May 1998 with the signing in Paris of the so-called Sorbonne Declaration (Sorbonne Joint Declaration 1998) on the harmonisation of the structure of the European Higher Education System, by the ministers in charge of higher education in France, Italy, Germany and the UK. The Sorbonne Declaration envisaged, among other things, the creation of a common degree level system for undergraduates (Bachelor's degree) and graduates (Master's and doctoral degree).

Bologna

The Sorbonne Declaration led directly to the Bologna Declaration (1999) which was signed on 19 June 1999 by 29 European ministers in charge of higher education. The two main objectives of Bologna were to establish a European Area of Higher Education by 2010, and to promote the European system of higher education world-wide. Key elements in the strategy for achieving these objectives were the adoption of a system of easily comparable degrees with two main cycles (undergraduate/graduate); establishing a system of transferable credits for degree programmes; promoting mobility of students between member states by overcoming obstacles; promoting European co-operation in quality assurance; and promoting European dimensions in higher education.

Progress in delivering against the Bologna agenda has been reviewed every two years at meetings of ministers in charge of higher education. The first, in Prague in 2001, saw representatives from 33 member states issue the Prague Communiqué (2001) in which they set directions and priorities for the coming years, including emphasising the importance of lifelong learning, involving students, and enhancing the attractiveness and competitiveness of the European Higher Education Area to other parts of the world. The second follow-up meeting was held in Berlin in 2003 (Berlin Communiqué 2003), and it reviewed progress on Bologna, proposed the inclusion of doctoral studies as the 'third cycle' in the Bologna Process, and emphasised the importance of the European Higher Education Area and the European Research Area (European Commission no date) as "two pillars of the knowledge based society". The principles for a 'third cycle' were further developed at Bergen in 2005 (Bergen Communiqué 2005), and will be discussed further at the 2007 London Bologna Ministers' meeting. The Bergen Communiqué also emphasised that "over-regulation should be avoided" in the third cycle.

Doctoral programmes

As the Bologna Process has evolved, so too has an interest in the doctorate or 'third cycle'. This interest was first voiced before Bologna was born, when in 1992 the Ministers of Education of five EU member states (Belgium, Denmark, Germany, France and the Netherlands) agreed on improving the transparency and adjusting the existing systems of doctoral studies (Berlin Academic Exchange Service 2003). These ideas were developed further at the Bologna meetings in Berlin (2003) and Bergen (2005), and this European discussion has been championed by the European Universities Association (EUA) (Floud 2006). EUA's thinking and proposals have been informed by a Doctoral Programmes Project it sponsored during 2004-5 (European Universities Association 2006) which examined doctoral programmes across Europe and discussed ways of enhancing their structure, functioning and quality to improve their fitness for purpose.

The final report of the Doctoral Programmes Project (European Universities Association 2005a) helped the European Universities Association (2005b) to define ten 'Salzburg principles' (agreed during the 2005 Salzburg seminar) including, amongst other things, the principle of defining and treating doctoral candidates as early stage researchers, and the principle that, while the advancement of knowledge through original research should be the core component of doctoral training, "doctoral training must increasingly meet the needs of an employment market that is wider than academia". The same themes are also echoed in the Glasgow Declaration which was adopted by EUA Council in April 2005 (European Universities Association 2005c). The EUA has been given responsibility for moving forward the European discussion about the doctorate.

In 1991, the confederation of European Union Rectors' Conferences proposed the creation of a European Doctorate, for which doctoral students would be expected to spend at least a year studying in another European country. This, it was argued, would both improve the education of young scientists and support the networking of European universities and research institutes (Berlin Academic Exchange Service 2003). Progress has been slow in designing and introducing European Doctorate programmes, although pioneering initiatives – such as the European Doctorate on Social Representations and Communication (de Rosa 2004) – offer useful role models for other disciplines to learn from.

Other European initiatives

As well as confronting the challenge of harmonisation that underpins and informs the Bologna agenda, the UK is also having to keep an eye fixed firmly on two other European initiatives that are already starting to have an impact upon doctoral education. These are the so-called Lisbon Agenda, and the European Charter for Researchers and Code of Conduct for the Recruitment of Researchers.

The Lisbon Agenda arises from an agreement by the EU Heads of States and Governments in March 2000 to aim to make the European Union "the most competitive and dynamic knowledge-driven economy by 2010" (Anon 2006a), by developing a strategy to prepare the transition to a knowledge-based economy and speeding up the process of structural reform to increase competitiveness and innovation. Key aims of the Lisbon agenda are to strengthen the research base and competitiveness of Europe (Ritchie 2006), and to increase the training and production of doctoral students (Nilsen 2006). It seeks to achieve this partly by increasing investment in research and development across Europe to 3% of Gross Domestic Product (GDP).

The European Commission (2005) has adopted a European Charter for Researchers, and a Code of Conduct for the Recruitment of Researchers, which are designed to help make research a more attractive career and increase mobility by giving researchers the same rights and responsibilities across Europe. The Charter defines the roles, responsibilities and entitlements of researchers and their employers or funding organisations. The Code aims to improve recruitment and to make selection procedures fairer and more transparent, and it proposes different means of judging merit.

Implications for the UK doctorate

A core tenet of Bologna is the recognition of three 'cycles' within higher education, starting with a Bachelor's degree, followed by a taught Masters, and then a doctorate. This has two significant implications for doctoral programmes in the UK.

First, students are expected to move up the cycle of qualifications, through the three cycles in sequence. As a result, doctoral candidates would be expected to have first completed a taught Masters, as is the norm in the USA. Having completed a Masters is not necessarily currently a requirement for entry into most UK doctoral programmes. Critics of Bologna have voiced concerns that to introduce this requirement, or have it imposed on the UK, could have serious knock-on effects. These include reducing the supply of otherwise well qualified students into doctoral study, making it difficult for many graduates to return to postgraduate study after some years out, and compromising current practices in accrediting prior learning and relevant experience.

The second major implication is the recognised length of doctoral study. In most European countries a doctorate involves at least four yearss full-time study, whereas in the UK three years has been the norm at least over the last two decades, as recommended in the Swinnerton-Dyer Report (1986). The Roberts Review (2002), acknowledging that most UK doctoral candidates take longer than three years to complete their thesis and submit it for examination, recommended

that the research councils provide funding for 3.5 years on average. Extending a programme of doctoral study to four years would have significant cost implications for both funders and self-funded students. Across Europe the view prevails that the three-year UK doctorate is too short and thus of inadequate quality compared with the more common four-year doctorate (Haines 2006). Whether or not the UK is forced into adopting the four-year period that is explicit within the Bologna agenda remains to be seen. One view is that the emphasis should be on achieving agreed learning outcomes rather than length of study, and if that can be done in three years of full-time study in the UK, then at least the spirit if not the letter of Bologna is met.

Responses in the UK

While there is widespread agreement that the time is right for a national debate about the nature of the doctorate in the UK, it would be wrong to assume that the doctorate has stood still in the face of the drivers outlined above. Doctoral education in the UK has proved to be both vibrant and dynamic, and particularly over the past decade it has responded in a variety of ways to try to ensure that it remains fit for purpose. I have argued elsewhere (Park 2005a) that this adaptation can be viewed in Darwinian evolutionary terms as the 'survival of the fittest', and that such adaptation to a constantly changing environment will inevitably continue in the future (Park 2007).

Adaptation of UK doctoral education is apparent in three particular ways – through increased formalisation, an increasing emphasis on skills development and training, and the emergence of an increasing diversity of doctoral awards.

Formalisation

Doctoral education in the UK has become much more formalised over the last decade or so. This is manifest in a number of important ways, including procedures for granting Research Degree Awarding Powers, institutional regulations and definitions, national framework and expectations, the development of doctoral programmes and Graduate Schools, and supervision.

Research Degree Awarding Powers

Without doubt the most formal dimension of doctoral education in the UK is the licence under which a particular institution can award its own research degrees, including the doctorate. Traditionally this has been a matter for the Privy Council to decide, and in the past this was typically dealt with when the Statutes of an institution were approved. More recently, legislation has allowed former colleges of higher education to be granted university status and title, provided they meet a set of defined criteria, which in Scotland and Northern Ireland but not in England include first having been awarded Research Degree Awarding Powers by the QAA. As the QAA (no date) emphasise, "once granted, degree-awarding powers and university title cannot, in practice, be easily removed."

Institutional regulations and definitions

Although, as noted above, no one stakeholder has overall responsibility for defining what a doctorate is and what form it should take, institutions deliver the doctoral programmes and award the degrees so they have a major stake in such decisions. While all universities in the UK work within the same higher education system and face the same strategic and operational challenges, each is an autonomous institution and so it can exercise a fair amount of discretion in many things.

Because of this discretion, the diversity of ways in which university regulations define the doctorate – to which the Winfield Report drew attention two decades ago (Winfield 1987) – is not really surprising. In essence, a doctorate is what the regulations of a particular university say it is. Little wonder, then, that "considerable variations in statutes and practices exist, for example, in relation to: the period of study (minima and maxima); the requirements to be met for award of the degree; and whether there is a specified length for the thesis (although most universities which do specify this put the maximum length at 100,000 words)" (ABRC 1996 p.12).

Some common threads appear in most university regulations for the doctorate, including the need for original research as a contribution to knowledge, which reflects the definition of research (as "original investigation undertaken in order to gain knowledge and understanding") that HEFCE uses for the Research Assessment Exercise and the QAA (2004) uses for defining postgraduate research programmes. Many regulations embody similar expectations to those for Lancaster University (no date), for example, which state that "a successful candidate for the degree of Ph.D. must show convincing evidence of the capacity to pursue scholarly research or scholarship in his or her field of study on a scale which can be completed during three years of full-time research. The results of this research must then be embodied in a thesis which makes an original contribution to knowledge and the completed thesis must contain material of a standard appropriate for scholarly publication."

While universities throughout the UK continue to enjoy a great deal of autonomy, they are increasingly being subject to external scrutiny and finding themselves accountable to external agencies such as the funding councils, research councils and the QAA. A key element in this scrutiny and accountability is the extent to which the institution has embraced both the spirit and the letter of external requirements.

National framework and expectations

Formalisation of doctoral programmes in the UK is manifest in a number of ways, particularly through having to meet externally-defined expectations or requirements:

a. Having institutional procedures and policies for doctoral studies that are 'aligned with' the precepts of Section 1 of the QAA *Code of practice for the assurance of academic quality and standards in higher education* (QAA 2004) which deals with postgraduate research programmes
b. Ensuring that doctoral programmes meet the appropriate level descriptors defined in the *Framework for Higher Education Qualifications in England, Wales and Northern Ireland* (QAA 2001a) and its Scottish equivalent (QAA 2001b)
c. Providing opportunities for doctoral students to develop an appropriate range of generic skills and competencies that is informed by the Research Councils' *Joint Statement of Skills Training Requirements of Research Postgraduates* (RCUK 2001).

Research degree programmes

One quite profound way in which institutions throughout the UK have adapted to changing circumstances has been through the development of doctoral programmes, which in some ways reflect the US model of doctoral education (Council of Graduate Schools 1990). This formalisation reflects adaptation to meet particular sets of needs – the need for institutions to meet external requirements or expectations, and the need for greater harmonisation, transparency, responsibility and accountability of institutional investments in doctoral education.

Doctoral programmes vary in character and content between institutions across the UK, but what they have in common is a more formalised, institutional, strategically-oriented approach, replacing what was previously often a rather localised and opaque approach, dominated by the attitudes and practices of departments and individual supervisors.

Indicative of this new approach, for example, is the attention now being paid in many universities to ensuring that students have a successful transition into their doctoral programmes, or what Barnacle (2005) calls 'doctoral becoming'. Common transition problems as doctoral students adjust to their new status as novice researchers include intellectual solitariness, professional and social isolation, new network organisation requirements, anxiety concerning time and productivity, intellectual life, and supervision (Hockey 1994).

Another manifestation of the new programme-based approach is a greater awareness of the particular needs of part-time and distant students, and a resolve to provide them with a similar quality of student experience to full-time students. Common challenges include the difficulties such students often face in actively engaging with the research culture and 'community of practice' of the institution (Wikeley and Muschamp 2004), of being reflective and developing active awareness of their own learning practices and achievements (Wisker et al 2004), and of making effective use of online delivery (Adams and DeFleur 2005) and mediated communication (Dooley, Kelsey and Lindner 2003).

The new approach is also evident in the programmes of skills development and research training courses which are often well integrated into institutional processes and procedures for registering new students and monitoring student progress. It is also underlined in the growing concentration of doctoral activities (and support for them) into disciplines or areas that are of particular strategic importance to the institution. In institutions which offer Professional Doctorates and/or New Route PhDs, the integrated package of activities that inform the research student experience (which includes taught courses and assessments en route) are typically co-ordinated through particular discipline-based doctoral programmes.

Graduate Schools

Another dimension of structural change in how institutions are adapting to the new world order of doctoral education is the development of Graduate Schools, which have long existed in the USA and are now starting to appear across Europe.

Ten years ago the ABRC (1996) noted that, in the UK, "other forms of organising graduate study – the graduate school – have also been discussed in the science policy arena (linking with mechanisms for resource allocation), and in the higher education policy sphere (to counter the social and intellectual isolation of students)." Since then many UK institutions have developed their own Graduate Schools (Woodward and Denicolo 2004), although there is no consensus about the most appropriate form these should take. As a result, there is great variability between institutions in the form of Graduate Schools, from the virtual to the physical, and from the institutional to the faculty-based. Some include work and social space for graduate students but many don't. Some include registry functions and staff but many sit alongside formal administrative structures. Some have cross-institutional responsibilities while others are broadly or tightly discipline-specific.

Reluctance to embrace a 'one size fits all' approach to Graduate Schools reflects the diversity of institutional structures, missions and niches, and it reinforces the 'survival of the fittest' approach mentioned earlier. While structures and approaches vary from institution to institution, most Graduate Schools share common objectives, including to co-ordinate institutional provision and practices, ensure alignment and compliance with external requirements, identify and share good practice, monitor quality and standard of doctoral awards, and enhance the research student experience.

Supervision

From an operational point of view, one of the most obvious areas in which procedures and practices have become much more formalised is in the supervision of research students. Traditionally, most supervision was based on the 'secret

garden' model (Park 2006), in which student and supervisor worked closely together without a great deal of external scrutiny or accountability.

The secret garden is no more. Supervision must now be more transparent and more accountable, and it must be aligned with the precepts of the QAA Code of Practice (2004), which among other things expects institutions to have clearly defined roles and responsibilities of both supervisors and research students, and clear criteria for defining who is eligible to act as a supervisor. Attitudes towards eligibility remain fairly accommodating in the UK, certainly viewed against countries like Japan where only a small sub-group of approved individuals are allowed to supervise doctoral students (Powell 2006a).

Under the Roberts (2002) agenda, supervisors are also expected to take a much more active role than previously in guiding and helping the personal development and skills training of their research students, in order to enhance their employability. Holligan (2005) notes that "received wisdoms about supervision" have "implications for intellectual originality and the nature of research-based knowledge production", but the current UK context for supervision also has implications for the broader development of the researcher. This shift in emphasis poses real challenges to received wisdoms about the nature of the student-supervisor relationship (Hockey 1996a, 1996b) and the motives of supervisors (Hockey 1996c), and is manifest in widespread inertia which reflects the reluctance of many supervisors to fully and positively engage with the new skills agenda.

One knock-on effect of this changing context of supervision, and the changing expectations and requirements of supervisors, is the need for appropriate personal and professional development of those who supervise. With supervisor buy-in to this new agenda at best patchy and often rather sluggish, most institutions face major challenges in encouraging or incentivising supervisors to make use of the supervisor development opportunities that are now fairly widely available, for example through UK GRAD (2006d), programmes in individual institutions (Fell 2006), and self-help books for doctoral students (for example, Phillips and Pugh 2000, Grix 2001, Wellington et al 2005).

Skills development and research training

The introduction in recent years of formal requirements for generic skills development to be included in doctoral education in the UK has caused attention to be focused on a number of important themes, including the doctorate as training, the development of research training programmes, integration of training into the doctoral experience, and assessment of the doctorate.

Doctorate as training

In reviewing recent developments in research training in England, Coate and Leonard (2002, p.24) noted a view among the Research Councils that "the PhD provides neither a rigorous enough methodology training for those who go into academia, nor an appropriate initial and continuing professional development for those who go outside". A very tangible response to that perception has been a significant increase in the amount and range of skills development now widely embedded within the doctoral student experience, to such an extent that "the traditional model of a doctorate based on the concept of three years of independent (but supervised) full-time research is no longer the norm" (Wellington et al 2005). The change has been rapid and sweeping. As Collinson (1998) has noted, in recent years the UK doctorate has been reconceptualised as a training period for future researchers, rather than a piece of work that changes the course of human knowledge.

Research training programmes

The same drivers that have led to the development of formalised research degree programmes, with the added impetus of the Roberts (2002) agenda and funding, have led most institutions to develop formalised skills development and research training programmes. Within these programmes many institutions have introduced formal procedures for training needs analysis (TNA) to inform decisions about skills training and personal development, and personal development planning (PDP) to encourage doctoral students to be reflective and self-aware and to take responsibility for their own personal development (Pearce 2006).

Doctoral programmes in the UK have traditionally included training in research skills, particularly those most relevant to research in individual disciplines or fields of study. But this new skills agenda seeks to go much further and embraces broader generic personal and professional skills that are transferable to a range of different career paths, within and beyond research. Developing this broader range of skills and competencies is expected in the QAA *Code of Practice* (2004). It seeks to produce the type of people that the world beyond the academy, in the private, public and voluntary sectors, wants and needs. It is seen as increasingly critical to employability in a global market (Diamond 2006), and to sustaining the supply of scientists and researchers within the UK economy (Cameron 2006).

Many institutions are now actively developing skills programmes that are informed by the Research Councils' *Joint Statement of Skills Training Requirements of Research Postgraduates* (RCUK 2001). This covers research skills and techniques, research environment, research management, personal effectiveness, communication skills, networking and team-working, and career management. Most institutions across the UK now use the Joint Statement to map their provision of training

opportunities against what was recommended in the Roberts Review (2002), and to inform the development of their PDP and TNA systems.

Integration

Fully integrating appropriate skills development activities within research degree programmes, so that they are not viewed and treated as an add-on or a separate stream which can be ignored, is a major challenge in most institutions. Particular challenges surround the development of skills in leadership, knowledge transfer, and the commercialisation of discovery if doctoral programmes are to produce graduates who can make a real difference in the wider economy, beyond the academy.

Developing skills development programmes that are relevant for and readily accessible to part-time doctoral students is another major challenge. Smith (2006) uses the metaphor of an iceberg; above the waterline are the full-time research students, many of whom are funded by the research councils and study in research-intensive institutions with well-developed skills development and research training programmes, but the part-time students who mostly sit below the waterline often cannot access such programmes very readily. More appropriate ways must be found of providing such students with access to skills development opportunities, including e-delivery (McCulloch and Stokes 2006).

Assessment

The development of the skills agenda has potentially major implications for how the doctorate is examined. Traditionally in the UK the examination has focused almost exclusively on the thesis submitted by the student, through an oral examination (the *viva voce*) (Park 2003), although as Tinkler and Jackson (2000) emphasise, "close inspection of institutional policy suggests that the PhD examination is in fact conceptualized and operationalized in diverse ways". Mullins and Kiley (2002) feel the need to remind examiners that "it's a PhD, not a Nobel Prize".

As doctoral programmes broaden to encompass skills development and research training, as well as actually doing the research and writing it up in the form of the thesis, questions are being asked about how best to accommodate this broader remit into the examination process. The theme arose during the sector-wide consultation undertaken by the Rugby Team (2006 p.15), for example, which concluded that "the sector should consider whether the time is appropriate to instigate a debate on the assessment of the PhD."

There are at least five obvious questions that such a debate should seek to address:

a. Should the primary emphasis in examining the doctorate be on the product (thesis) or the process (developing the researcher), or what is an appropriate balance might be between the two?
b. Should the examination process be adjusted to take into account the special circumstances of work-based professional doctorates (Johnson 2005), and if so, how?
c. Is the traditional UK closed examination (open only to the two or at most three examiners and the student, sometimes with the supervisor present as a silent witness) still appropriate, given the much more open process favoured through most of Europe, which involves an 'examination' to which outsiders (sometimes even including members of the public) are invited?
d. Should the focus rest only on the thesis as evidence of scholarly output, without also requiring evidence of other scholarly outputs such as evidence of publications in peer-reviewed academic journals (Floud 2006)?
e. Given the emphasis on generic and transferable research skills training, should evidence of their development beyond that specifically required to complete the thesis be sought as part of the final assessment?

Diversity of awards

One way in which doctoral education in the UK has adapted to changing market conditions is by developing a range of new doctoral degrees tailored to particular niche markets. This approach, based on diversification and differentiation, is proving quite successful. It does pose some challenges for the sector in terms of ensuring comparability of quality and standards, particularly because some of the new doctoral models incorporate elements such as taught modules, work-based learning, and novel forms of output rather than relying solely on the traditional thesis. This is one reason why the QAA (2006) has recently embarked on a review of postgraduate level descriptors, conscious – as Thorne and Francis (2001) have pointed out – of the ambiguity of the current level descriptors for different types of doctorate programmes.

Family of doctoral awards

The most common types of doctoral award in the UK are outlined in Table 4. The traditional PhD remains the most popular, in terms of student registrations, although the range of professional doctorates and the number of students registered on them continue to grow.

Table 4. Summary of the most common types of doctoral award in the UK

Award	Characteristics
Traditional PhD	Based largely on the supervised research project, examined on the basis of the thesis.
PhD by publication	Based largely on the supervised research project, but examined on the basis of a series of peer-reviewed academic papers which have been published or accepted for publication, usually accompanied by an over-arching paper that presents the overall introduction and conclusions.
New route PhD	Contains significant taught elements (which are examined and must be passed), and initially developed in 2001 to provide international students with an integrated doctoral training scheme including programme-related research training and personal and professional development.
Professional doctorate	Includes a significant 'taught' element, and as such most have specific 'learning outcomes'. Based on a combination of taught modules (which are examined and must be passed), and the supervised research project, which is often smaller than the traditional PhD, is more applied and is work-based or -focused.
Practice-based doctorate	Based on a supervised research project, usually in the performing arts, where the output involves both a written piece (which is usually much shorter than the traditional PhD thesis, and includes both reflection and context), and one or more other forms, such as a novel (for Creative Writing), a portfolio of work (for art and design), or one or more performance pieces (for theatre studies or music). Both forms of output are examined.

Professional doctorates

The UK is not alone in developing professional doctorates in response to perceived gaps in doctoral education; such a trend is also evident in the USA (Hambrick 1997) and Australia (Pearson 1999). In all cases, the research is informed by real world problems in professional practice, and the students are typically experienced professionals who take the degree to advance their career and/or to acquire the high level skills they need to tackle work-based challenges. At their best, professional doctorates are "based on development projects which result in substantial organizational or professional change and … a significant contribution to practice" (Lester 2004).

Professional doctorates have developed in quite distinctive ways in the UK, particularly over the last decade or so, and Bourner, Bowden and Laing (2001) have identified 20 features that are common to most such degrees in English universities. Even in the early days, Evans (1997) noted how in the UK "professional doctorates enable the practice of research in ways that have wider benefits. Universities are becoming more flexible about what constitutes doctoral programs and how they are conducted."

The first professional doctorate in the UK was in engineering, where the Doctorate in Engineering (DEng) was developed in response to criticisms from engineering companies that the traditional PhD did not adequately prepare graduates in research training and technology transfer, nor give them all of the skills they would require. The development was championed by the [then] Science and Engineering Research Council (SERC), in a report on the engineering PhD, which concluded that "a distinct PhD was required, which would include a broad range of training, partnership with industry in the project, teamwork and management training" (ABRC 1996).

Some UK universities have also introduced the Doctorate in Education (DEd), often delivered on a part-time basis to education professionals (Butcher and Sieminski 2006). There are mixed views about the need for a specialised doctoral degree in education. In Australia, for example, it is welcomed as "a means of reconstructing the relationship between theory and practice … [which] requires that universities change their conceptualization and teaching of research" (Brennan 1995), although there is a view in the USA that it should be eliminated because it has few significant differences from traditional PhDs (Deering 1998). In the UK, Gregory (1995) has questioned "the need for differentiation between doctor of education and doctor of philosophy degrees and the misassumption that doctoral study is primarily academic apprenticeship."

Similar debates surround the development in the UK of the Doctor of Business Administration (DBS) degree (Bourner, Ruggeri-Stevens and Bareham 2000) and Australia (Sarros, Willis and Palmer 2005), and practice-based research degrees in

art and design (Macleod and Holdridge 2004, Collinson 2005).

Professional doctorates pose some interesting challenges within doctoral education in the UK. As Elkins (2004) says of the PhD in studio art, "they raise all sorts of philosophic, economic, practical, and institutional problems". Work-based professional doctorates require carefully thought-out procedures for protecting the intellectual property of the student (Gibbs 2004), for properly defining the locus of ethical responsibility for the student (Costley and Gibbs 2006), and for providing appropriate support systems for students studying at a distance, usually in their normal workplace (Butcher and Sieminski 2006).

Professional doctorates also challenge the received wisdom of how to examine doctoral-level work. As Stephenson, Malloch and Cairns (2006) point out, demonstrating 'doctorateness' is not always easy "when people are given centre stage in the design and completion of doctoral programmes based on their own professional work". Macleod and Holdridge (2004) comment on the challenge of "showing a keen knowledge and criticality of the subject field has been achieved" in the doctorate in Fine Art.

Despite the success of the professional doctorate in attracting students, some commentators infer that, because it involves more coursework and less research than the traditional PhD, it must be of lesser quality, although this contention has not been properly tested and is rarely voiced explicitly.

Framing the debate

This paper is designed to support a sector-wide debate on the nature of the doctorate in the UK. There are clearly many different perspectives on this debate, and different stakeholder groups will bring different agendas, concerns and issues to the table. They will also have different priorities, and will privilege different possible solutions.

Context of the debate

Most if not all of the stakeholder groups agree on the need to review the UK doctorate and evaluate whether it remains fit for purpose and effective in practice. What Nyquist (2002 p.14) concluded for the USA is equally true for the UK: "rapid and transformative changes are under way in all aspects of our society: in business and industry, in government and politics, in our society as a whole, and certainly within education. These circumstances require us to address the question, 'How can the PhD meet the needs of the society of the 21st century?' … changes in society create new requirements, and we need to honestly assess the efficacy of the PhD now to ensure that its recipients continue to make the kinds of contributions in the public and private spheres that the nation needs to remain strong."

While the merits of having such a debate in the UK are largely uncontested, the debate itself is hampered by an enduring lack of tangible evidence (particularly research) which could be used to inform decision-making, particularly on strategic change. The ABRC (1996) noted ten years ago that "there has been relatively little research which could underpin explicit policy-making on the subject" of doctoral education in the UK, and this remains true today (Leonard and Metcalfe 2006).

What has improved significantly over the past decade has been the formal monitoring of some aspects of doctoral education, particularly submission and completion rates, and more recently the alignment of institutional procedures with the QAA *Code of Practice* (QAA 2006), and institutional provision of research training and skills development in the light of funding that flowed from the Roberts Review (2002), including the searchable online UK GRAD *Database of practice* (no date). Monitoring and tracking of the employment and career development of doctoral graduates has begun (UK GRAD 2004), but much more work needs to be done on this. One of the most important areas in which the lack of research is hampering the development of both policy and practice is on the links between research training, skills development, employability and the preparation of doctoral students for particular career paths. Until recently, relatively little was also known about the research student experience, but the Postgraduate Research Experience

Survey (PRES) being developed by the Higher Education Academy (Park and Kulej 2006) for use by institutions promises to help plug that gap and inform both institutional and cross-sector decision-making designed to improve the quality of the student experience.

Key themes in the debate

A number of themes are clearly worth including in the debate about the nature of the UK doctorate, and these include (in no particular order of importance):

Doctorateness: what is the essence of 'doctorateness'? What factors must be present for a particular degree to fit into the category of 'doctorate'?

Purpose: what is the doctorate for, or what needs does it serve? Within this over-arching theme sit a number of important questions, including:

a. Is the doctorate really about the product (thesis) or the process (developing the researcher)? This has implications for how time is spent during the doctoral degree, and about how the degree is examined.
b. Is the doctorate about education or training? How important are research training and the development of generic skills compared with actually doing the research and learning more about the subject?
c. Should the doctorate be broad or specialised? Is the proliferation of different models of the doctorate producing graduates with experiences that are too specialised, compared with the more traditional PhD?
d. Should there be greater uniformity in the format of the doctorate, and in the doctoral student experience, within and between HEIs in the UK, and with universities elsewhere (particularly in Europe, Australia and North America)?
e. Should more attention be paid to issues of equity and widening participation in the UK doctorate? Most national strategic decision-making (and funding) is dominated by the "big science" model of research, and it privileges the full-time fully-funded research student. How can the particular needs of part-time and distance students be properly taken into account? How can recruitment from these groups be increased? And in what ways do the needs of such groups challenge received wisdoms about research funding, research training, skills development, and preparation for subsequent careers?

Supply chain: how can the supply chain of well-trained and appropriately experienced doctoral graduates be sustained? The two key elements within this theme are:

a. How can the recruitment of doctoral students in the UK be sustained and improved, given funding constraints and student debt in the UK, and increasing global competition for well-qualified applicants?

b. How can the employability of doctoral students be enhanced? How can they acquire the right mix of skills, competencies and experiences to make them more attractive to appropriate employers? How can the transition between being a doctoral student and adding real value to their employer be made shorter, easier and less stressful?

Funding: what are the implications for research funders of the changing context of doctoral education in the UK? A number of important questions sit within this broad theme, including:

a. What proportion of national GDP should be invested in research and development in order to make the nation competitive in world markets?
b. Do the research councils, which fund about a third of doctoral students, exert a disproportionate influence on the nature of doctoral education in the UK?
c. Is it appropriate to increase the availability of funding to doctoral education, which would make it possible to increase the number of full-time doctoral students in the UK?
d. Is it appropriate to concentrate research funding in a small number of institutions in order to build critical mass, reward and promote excellence, and ensure greater strategic management of doctoral activities?
e. Are the resources currently being invested in doctoral education in the UK being used in the most effective ways? What do institutional submission and completion rates reveal about variations in efficiency, and what do these variations imply? Are institutions taking into account the full economic cost of their doctoral programmes when they make strategic decisions?

Doctoral student experience: in what ways are the current and emerging drivers of change having an impact on the nature and quality of the student experience? Particularly important here are the questions:

a. Should doctoral candidates be defined and treated as students (as in the UK currently) or employees (with attendant rights and responsibilities)?
b. In what ways, and how quickly, might the European Charter for Researchers change the way in which doctoral candidates are defined and treated?
c. In what ways are the development of Graduate Schools, Research Degree Programmes and Research Training Programmes improving the quality of the doctoral student experience?
d. In what ways is the revised QAA Code of Practice improving the quality of the doctoral student experience?
e. In what ways are part-time and distant students disadvantaged by current institutional provisions and arrangements?

Nature and dissemination of research: how might the demands and expectations of the new knowledge economy impact upon doctoral education in the UK? For example:

a. How can doctoral programmes in the UK become more applied and inter-disciplinary in the types of research they cover?
b. How can UK doctoral programmes increase the amount of knowledge transfer that doctoral students and graduates engage in?

Quality assurance: how effective are current systems for assuring the quality and standard of UK doctoral awards? In particular:

a. How appropriate are the current QAA level descriptors for postgraduate awards in general, and for doctoral awards in particular?
b. Given the growing diversity of doctoral awards in the UK, how can we make sure that all are operating at the same academic standard, and that they produce graduates with similar qualities and competencies?
c. What does the Bologna agenda imply about the suitability of the UK doctorate in a European context? Are learning outcomes more relevant and important than period of registration in determining whether doctoral programmes meet European expectations?

Autonomy, responsibility and accountability: given that individual universities approve their own regulations and award their own degrees, albeit in ways that are informed by and aligned with formal national requirements, to what extent is convergence on a standard type of doctoral education inevitable or to be welcomed? This question can be posed at two levels:

a. Must every institution meet fully all of the formal expectations both implicit and explicit in national frameworks such as the QAA Code of Practice, the Roberts Agenda, and the RCUK *Joint Statement of Skills Training Requirements* (2001)? What sanctions would be appropriate if a particular institution failed to meet a particular external expectation or requirement?
b. Must all UK institutions revise their doctoral programmes to fit the expectations and requirements of the Bologna agenda? Again, what sanctions would be appropriate if they failed to do so? What are the implications for HEIs across the UK of the development of the European Higher Education Area and the European Research Area? What are the implications for doctoral education in the UK of the development of the European Doctorate?

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