

Annex I

Comparison of international practices

1 Introduction

This survey of international practice in research training has concentrated on five countries relevant to the United Kingdom in terms of research degree programmes (RDPs): the US, Canada, Australia, France and Sweden. It is based on material accessed through the web sites of universities and national higher education organisations. It is not meant to be an exhaustive review, but to highlight specific areas of similarity or difference to UK practice and to provide examples of good practice that have been identified from a selection of institutions.

In common with the UK, other countries are debating the purpose, relevance and appropriateness of RDP training. They face the same issues of increasing numbers of PhDs against a reduction in academic posts, and non-academic organisations claiming that people with PhDs do not have the range of skills they require.

There are further concerns that PhD students are not being equipped for academic roles, particularly in the US where the majority of universities teach only undergraduates. The concentration on research training leaves PhDs ill-equipped to make the transition to teaching.

The US, Canada and Australia have traditionally been the UK's competitors for international students. However, the UK is in competition with many European countries, which often offer programmes delivered in English with the added benefit of learning the local language. Increasingly, all providers are also competing with local provision in home countries.

To improve international recruitment, a consortium of UK universities is marketing a New Route PhD¹ internationally. These are integrated four-year PhD programmes incorporating taught modules, professional skills development (including teaching), and research.

The perception is that the US offers a more rigorous training with formal hurdles than UK RDPs. In practice US hurdles tend to concentrate on course requirements, rather than progress in the research: they can be seen by students as burdensome and not relevant to the programme.

Feedback from the Middle East, one of the main PhD markets, is that the principal attractions of UK postgraduate education are:

- the quality, as evidenced in the RAE
- the shorter programme, in comparison with the US
- the broader training elements, such as teaching and transferable skills.

The taught elements of the New Route PhD are seen as positive aspects of the programme, with several members of the consortium offering a Masters qualification as part of the programme.

Comparison of costs with the US is not easy. Fees may be lower in the UK, but the lack of scholarships, teaching assistantships and research assistantships for international students can be a major disincentive, particularly to self-funded students.

¹ www.newroutephd.ac.uk

2 United States of America

The US has a well established Graduate Schools structure, and an associated national organisation supporting graduate schools, The Council of Graduate Schools, based in Washington DC. This organisation has done a considerable amount of work in formulating policy and advising institutions.

The pattern of doctoral education in the US is very different from that in the UK, with considerable emphasis on specific taught programmes. The approval process for institutions to deliver doctoral programmes is well regulated and researched.

Currently the nature of the doctorate is being reviewed as research evidence is questioning the appropriateness of the PhD for many graduates. Many of the questions are familiar to UK audiences, and concern the following issues:

- The pool of students:
 - diversity – who is doing doctoral programmes and why
 - numbers produced – who manages numbers and should they be better managed
 - progress through the pipeline – problems of high failure rates and ever increasing time to degree
 - postdoctoral students – what do they do, what is their status
- Process and content:
 - breadth and depth – interdisciplinarity, innovation, and collaboration
 - advising and mentoring – ensuring supervision is well structured and delivered
 - funding – postgraduates are under supported, how can this be improved
 - quality of life – expectations, duration of programmes, long working hours, inadequate facilities
- Career preparation and PhD as training:
 - preparation for non-academic careers – alumni data
 - preparation for faculty careers
- Feedback loops and oversight:
 - review and monitoring
 - information to prospective students – on time to complete, completion rates, funding, costs of study, etc
 - student review
 - institutional and departmental reflection on programmes and delivery, self-evaluation.

Typically, the responsibility for maintaining standards in an individual's research training is different to that in the UK, in that the onus is placed firmly with the student. Student responsibilities usually include:

- completing exams in order to progress through a programme of study
- completing orientation courses
- setting up a doctoral committee
- taking part in an exit interview (pre-graduation)
- publishing
- completing progress reports
- initiating a transfer procedure.

However feedback from doctoral students in the US² found that:

- many students do not clearly understand what doctoral study entails, how the process works and how to navigate it effectively
- the training they receive is not what they want, nor does it prepare them for the jobs they take.

Institutions are being urged to give accurate information to students about PhD programmes, and to provide opportunities for students to explore and prepare for a variety of careers in and out of academia.

Typical feedback from international students who have applied to both UK and US institutions is that US institutions are considerably better at using their networks and alumni to market to potential students. It is also easier to access information about research programmes, and departments and institutions are more responsive to queries.

Alumni can have significant influence on the choices made by prospective students and may provide valuable contacts for marketing programmes.

3 Canada

Canada is currently in a period of change with regard to university research and research degree programmes. The federal Government has set a target of moving from 15th to 5th by 2010 in the Organisation for Economic Co-operation and Development (OECD) rankings for research and development investment. The emphasis is on the development of PhDs to supply Canadian universities. It is estimated that between 2,500 and 3,000 new faculty members will be needed to 2006, and that by 2010 more than 30,000 will need to have been hired or replaced. Only 35-40% of graduates with PhDs work in academia; many are lost to the US.

The Advisory Council on Science and Technology identified three conditions to enhance Canada's competitiveness:

- quality of researchers
- funds available to support the costs of research
- quality of the research environment.

Funding levels and availability continue to be suggested as reasons for recruitment problems to PhD programmes. Studentships are supported through two streams: grants from the research councils and scholarships. The Natural Sciences and Engineering Research Council of Canada (NSERC) and the Social Sciences and Humanities Research Council of Canada (SSHRC) both fund studentships in their research grant allocations. It is suggested that the number allocated is quite low, and certainly so compared with anticipated needs (NSERC 4,400 pa). There are also prestige scholarship programmes in various provinces that have a degree of autonomy in supporting PhD programmes. In Ontario, for example, 2,500 students are supported each year through the Ontario Graduate Scholarship.

The research environment has received increasing attention as funding limitations, and in particular the way in which indirect costs are attributed to institutions, have limited the development of a quality research environment.

Canadian universities provide the administrative and regulatory framework for doctorate study through Schools of Graduate Studies. They are responsible for registering students and supervising the viva process. Most universities also insist on a student completing a substantial body of taught work before registering for a PhD.

² 'At cross purposes: what the experiences of today's doctoral students reveal about doctoral education', 2001 www.phd-survey.org

4 Australia

Various quality assurance initiatives undertaken by the Commonwealth Government and the higher education sector have impacted on research degrees. The Australian Vice-Chancellors' Committee (AVVC), equivalent to Universities UK, has set out a number of criteria for institutions to gain and maintain university status, which include a statement and guidelines on research practice, and generic guidelines for student expectations and responsibilities (developed jointly with the National Health and Medical Research Council).

Sector-wide performance indicators are published in 'Characteristics and performance of higher education institutions' and provide details of commonality and diversity within the sector. There is also a core set of 'graduate attributes' shared by most universities.

There are a number of international performance indicators (share of world research papers, publication rate) which show that the quality of research by Australian universities is increasing. The 1999-2001 quality assurance and improvement plans suggest that research and research training is becoming more planned and professional.

A Postgraduate Research Experience Questionnaire has been introduced which is designed to gather information on higher degree research graduates' course experience. The questionnaire focuses on:

- supervision of research students
- thesis examination process
- facilities and services provided to postgraduate students.

The questionnaire is currently being piloted and is seen as an important tool for institutions to use in reviewing their own performance, and for the Government to assess and review quality. Moreover, universities will be able to benchmark their outcomes against national data.

Australian universities largely follow the UK model in terms of the structure of higher degrees by research. However, most institutions also offer professional doctorates, typically involving a research thesis and assessed course work.

It is interesting to compare the openness of Australian universities with the more restrictive approach adopted in the UK by some institutions with respect to accessing information. Their web sites are well designed, extremely accessible and place key documents in the public domain. It is possible to view key institutional policy statements on higher degrees and to look at the codes of practice that underpin the regulations. Most Australian universities have adopted codes of practice that amplify key issues relating to student/supervisor relationships.

External validation plays an important role in the way universities assure and maintain standards. External examiners are used for most research degrees. The Government has recently commissioned a pilot project to examine how universities determine whether their degrees are of a 'good standard'.

A key difference from UK practice is that many, if not most, Australian universities will award the degree of PhD without a viva. In fact the viva only forms part of the assessment regime if the examiners have concerns over the originality and contribution of the programme of research.

5 France

Following the government review of research training in 2000, the *écoles doctorales* became the sole institutions with a capacity to oversee the research training of all new research students and to award doctoral research degrees, including the DEA (*diplôme d'études approfondies*). The experiment with the *écoles doctorales* was introduced in the late 1980s to strengthen the research training of PhD students and to offer them wider research opportunities. From 1998 onwards, the Ministry of Research widened the scope of the *écoles*

doctorales to make them centres for research excellence and also to attract more research students. Currently, 315 *écoles doctorales* exist in France.

The *écoles doctorales* are responsible for recruiting research students, enrolment in the DEA and enrolment of PhD students. The reforms of the French research training aim to improve the quality of research training for students. The objectives are to:

- ensure that research students undertake research within adequately resourced research centres, hence the focus on the *écoles doctorales*
- ensure that there is monitoring of research training and progress throughout the research process
- reinforce the employability of research students not only in the public sector but also within business and consultancy sectors.

The restructuring of the research training programme into the '*doctoriales*' (troisième cycle) aims to encourage research students to contribute/participate in projects that would strengthen not only their research training, but also their employability. This is mainly achieved through seminars and regular meetings with local authorities and practitioners. Furthermore, the aim of restructuring the training of research students is to improve the status and image of PhDs. (There are 10,000 to 11,000 vivas per year, and up to 4,000 researchers are recruited within the public sector.)

The Ministry of Research provides research grants to students wishing to pursue research within the *écoles doctorales* (4,000 grants per year). This is perceived as critical to support research students during their training and to ensure good quality theses.

The *troisième cycle* in France is the equivalent of the British research training programmes. There are two routes within this context:

- one year training leading to a DESS (*diplôme d'études supérieures spécialisées*) which enables graduates to undertake employment within their area (equivalent to the UK Masters)
- one year research training leading to the DEA (*diplôme d'études approfondies*) which would entitle students to undertake PhD training (equivalent to the UK MRes).

Only students holding a DEA can register in one of the *écoles doctorales* for a PhD. They are expected to complete within 3 to 4 years.

In 1993 a DRT (*diplôme de recherche technologique*) was introduced and geared towards technological innovation and high-tech industries. This research training falls within the category of collaborative training between universities and leading-edge businesses (*thèses en co-tutelle*). This training is undertaken during an 18 to 24 month period.

6 Sweden

A notable feature of the Swedish system³ is that practices vary between disciplines and institutions. The notes below are not intended to obscure differences but rather to present a general picture.

An RDP in Sweden is usually made up of a programme of research training, research, and a doctoral dissertation. In Sweden there is also what is known as a 'Licentiate Degree'. This is effectively both a step on the path to a PhD and an alternative path. It may equate to an MPhil in the UK.

³ The National Agency for Higher Education is the central authority for institutions of higher education in Sweden, <http://www.hsv.se/>. Much of this information is drawn from its web site.

To earn a PhD a student must pass the courses that form part of the programme, and write a doctoral dissertation acceptable to the department or faculty that is defended successfully in public. This involves defending the thesis against an opponent in front of the examiners (from the host and external universities) and colleagues, and family and friends, in an open forum where anyone is allowed to ask questions after the interrogation is completed.

The dissertation may be on a unified theme (monographs), most common in non-laboratory subjects, or a collection of previously published articles by the candidate (compilation).

Compilation dissertations comprise a number of papers (normally 3 to 6) published in peer reviewed journals during the period of postgraduate training, and a summary of the articles. In laboratory and clinical subjects, dissertations are almost exclusively in the form of compilations. Some of the papers in the dissertation may have been written by several individuals, but the PhD student must normally be the principal author of a major part of the dissertation. This continuous quality assessment of publication by peer review is seen to render the public defence of the dissertation less crucial than in the case of a monograph.

A very clear distinction is drawn between research degree training and taught course study. A PhD student has a supervisor for support, but the delivery and assessment methods that are features of undergraduate work are all virtually absent in doctoral programmes. It is recognised that 'PhD students have to drive their own studies forward under their own steam'. In these ways the distinction between taught and research degrees is very similar to that made in the UK.

A postgraduate training programme has a 'general curriculum' determined by the faculty board and institutional regulations, and an 'individual curriculum' that describes the contents of the programme drawn up for each research student with their supervisor.

The general curriculum contains:

- the principal contents of the programme and in relevant cases the compulsory reading for the subject
- the general arrangement of the various parts of the programme
- requirements of previous knowledge and other conditions in addition to the basic eligibility (special eligibility)
- the selection rules applicable in relation to admission
- the tests and exams that form part of the programme
- where applicable, the possibility of completing a part of the programme with a Licentiate degree.

The individual curriculum has been in place since 1993 though it was not precisely delineated until 1998 when detailed regulations were written. They are intended to make it possible to successfully complete a programme of postgraduate training within four years of full-time study. This curriculum makes clear what the rights, duties and expectations are between faculty, supervisor and postgraduate.

An individual curriculum must contain:

- a timetable for the programme of education (showing the courses the PhD student is to take and preliminary dates for a projected article, manuscript or dissertation)
- a description of the PhD student's and the faculty board's respective obligations during the period of postgraduate training
- other matters needed for an effective programme of study.

The following aspects might also form part of an individual curriculum:

- the specific objectives, both short and long term, of the PhD programme
- a detailed description of the research assignment
- a preliminary title for the dissertation

- courses and reading for the programme
- the future plans of the supervisor in so far as they might affect the PhD student's studies.

In recent years, regularly held faculty-wide research assessed training programmes have been developed in many institutions. Courses in scientific theory, methodology, ethics and statistics are often included in these programmes. The basic courses should be completed during the first two or three terms of training, and it is usually recognised to be a good thing for most courses to have been completed during the first half of postgraduate studies.

The following sections highlight examples of good practice within the sections of the framework from specific US, Canadian and Australian institutions.

7 Research environment

The University of Florida actively encourages student publication and extensive student-professor co-publishing.

James Cook University, Australia, has implemented a competitive Doctoral Research Merit Scheme that provides funding to support research by PhD students. It focuses on encouraging students to submit their work for publication before their thesis is assessed.

Charles Stewart University in Australia has implemented a research publication points-based grant scheme to encourage researchers to register and publish their material on the university's web site. For each point, a researcher qualifies for a grant of AUS\$300.

8 Selection, admission, enrolment and induction of students

The University of Florida has a proactive approach to student recruitment, to identify and cultivate the best students. It supplements the usual methods of recruitment (advertising material, use of the internet), with more direct marketing appeals. For example, it obtains the list of students who have achieved high first degree scores and targets them with an initial contact, letter and brochure, and contacts departments and chairs at other institutions.

There is an 'orientation' course for all new students. Students are required to take a one-credit orientation course regarding curriculum, faculty and responsibilities. A mentor programme matches incoming students with veteran students. All incoming students receive the Department Graduate Student Handbook which details deadline dates, course options and policies.

International postgraduate research students at Adelaide University are required to complete an integrated bridging programme that forms part of the structured programme of study.

University of Tasmania candidates are required to sign a supervision agreement as part of the application process to join the PhD programme. It sets out the supervision arrangements and details of any special conditions that apply to the programme of research.

9 Project approval and registration

At Lakehead University, Canada, a student's PhD project or study must be endorsed by a Thesis Committee prior to registration.

University of Florida students form an Advisory Committee by the end of the first semester and meet with their committee for programme approval and direction at the beginning of the second semester.

Once students at the University of Pennsylvania have completed all course work, they register for 'dissertation supervision', which designates them as an active doctoral student and allows them to meet with their supervisor, sit exams and use the university facilities for research.

10 Supervisory arrangements

The University of Queensland operates a system of supervision excellence awards. Each year three awards are made available to supervisors nominated for consideration.

The University of Florida actively encourages regular meetings with the major supervisor (2 to 3 times a week).

The University of New Mexico strongly encourages each doctoral student to assemble a committee to assist in planning a programme of studies. The committee generally includes three faculty members approved by the student's graduate unit. The chairperson is usually the student's major adviser.

The basic role of the committee is to plan, with the student, an integrated individual programme of study and research, meeting general university and specific graduate programme requirements.

The committee may also establish prerequisites when needed, recommend transfer of credit, certify proficiency in a foreign language or alternative skill, and approve significant changes in the programme of studies. It may also serve as the core of the doctoral comprehensive examination committee and/or the dissertation committee.

11 Review and progress

Southern Cross University in Australia requires PhD candidates to undertake a probationary period of one year. At the end of the year, the institution must determine whether the candidate is upgraded to full PhD student status, whether the probationary period should continue, or whether the candidate's enrolment should be ended.

All University of Pennsylvania doctoral students are regularly reviewed by the faculty to evaluate their progress. Evaluation is based on a review of course work, fieldwork, progress and other relevant criteria. It is expected that all students will make steady progress toward completion of degree requirements unless a leave of absence has been granted. Lack of significant progress in completing degree requirements for two consecutive years will automatically terminate candidacy or eligibility to apply for candidacy if not already attained. Students submit an annual progress report on line.

Massachusetts Institute of Technology (MIT) PhD students must pass the general examination (usually taken at the end of the second year of graduate study). The examination is composed of the subject requirements, a research-oriented paper, and an extensive oral examination.

The Committee on Graduate School Programs (CGSP) monitors minimum academic standards for all graduate students in accordance with the rules and regulations of the faculty. The CGSP reviews the academic records of all graduate students at the end of each term (including the summer session).

Recommendations for action by the CGSP are made by departmental graduate committees. In addition, departmental graduate committees may recommend to the CGSP that a student be allowed to register only for a less advanced degree. Continuing registration of graduate students from term to term is contingent upon satisfactory academic performance.

The University of New Mexico doctoral students must pass a Doctoral Comprehensive Examination in the major field of study. This examination, which may be written, oral, or both, is not limited to the areas of the student's course work, but tests the student's grasp of the field as a whole.

The University of Pennsylvania has a 'dissertation status' that signifies that the student has completed all requirements for the doctoral degree except for the dissertation. A student who has not maintained active status by registering each term will be considered withdrawn.

Doctoral students who have reached dissertation status will not be granted a leave of absence except in exceptional circumstances.

12 Final examination

At the Queensland University of Technology, Australia, PhD candidates are obliged to attend a final seminar that determines whether the thesis is acceptable, before it is formally examined. A panel of three academics nominated by the faculty conducts the seminar. The principal supervisor chairs the proceedings and the discussion is conducted in a public forum.

At Murdoch University, Australia, supervisors must prepare and sign a statement that confirms the quality of the thesis and highlights any special circumstances relevant to its assessment.

Laurentian University, Canada, stipulates a timetable for the viva: examiners have a minimum of 4 weeks to read a thesis and the viva must be held within 6 weeks of the thesis being submitted. The university also allows teleconferencing of vivas.

At McGill University in Quebec and Brock University, Ontario, the final examination takes the form of an open seminar given by the student, which is then followed by a closed viva. Students take part in a public seminar of 30 to 40 minutes, which is then followed by a period of open questioning. At the end of this session, the examination committee decides whether the student should undergo any further questioning.

Many Australian universities allow PhD candidates the right to challenge or question the nomination of examiners. For example, at Monash University the regulations allow students to challenge the appointment of an examiner if they believe it is likely to be prejudicial to the fair assessment of the thesis. At the University of Sydney candidates are permitted to indicate in writing to their head of department or the dean of the postgraduate committee, the reason why any person should not be appointed as an examiner of their thesis. Candidates may also initiate a discussion with their head of department as to the range and composition of the examination panel.

At James Cook University, Australia, when assessing a PhD thesis each examiner can prepare and submit written questions to which the candidate must respond in writing. A copy of any questions must be sent to the other examiners.

The University of New Mexico requires all doctoral students to have their dissertations published through University Microfilms International.

13 Development of research and other skills

Professional development is a high priority at the University of Florida. Seminars are conducted to assist further academic pursuit and graduate students are encouraged to participate in activities of relevant professional societies.

The institution encourages the completion of an annual activity report that details courses, teaching activities and goals.

At the University of New South Wales, structures are required to develop mentoring paths and career planning for researchers in the early stages of their careers (including post doctorates).

Alberta University regulations stipulate that all PhD students must have teaching experience before completing their PhDs.

14 Feedback mechanisms

The University of Florida requires formal feedback from students throughout the programme. Departments will meet with all students on the day prior to graduation for exit feedback.

As part of the University of New South Wales' drive to increase the number of female postgraduate students, the university conducts exit interviews with any female postgraduate student who discontinues the programme of study/research without giving the reason or reasons for leaving.