Australian Government

Department of Innovation
Industry, Science and Research

DEFINING QUALITY FOR RESEARCH TRAINING IN AUSTRALIA: A CONSULTATION PAPER

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CONTENTS

ABBREVIATIONS

APA	Australian Postgraduate Award
ARC	Australian Research Council
CAPA	Council of Australian Postgraduate Associations
CRC	Cooperative Research Centre
CSIRO	Commonwealth Scientific and Industrial Research Organisation
DEEWR	Department of Education, Employment and Workplace Relations
DIISR	Department of Innovation, Industry, Science and Research
ERA	Excellence in Research for Australia
HDR	Higher Degree by Research
IPRS	International Postgraduate Research Scholarship
PhD	Doctor of Philosophy
RTS	Research Training Scheme
TEQSA	Tertiary Education Quality and Standards Agency

1. INTRODUCTION

1.1. PURPOSE

This is the first consultation paper on research training to be released as part of the implementation of the Australian Government's research workforce strategy.[1] The paper invites you to help identify what quality in research training means and how it can be measured and encouraged.

This consultation process is the initial phase in a review of the Research Training Scheme (RTS) foreshadowed in the strategy. It will be followed by a second paper that will focus specifically on the technical aspects of the RTS, including options for how the results of Excellence in Research for Australia (ERA) can form part of the funding formula.

The review of the RTS will take into account the outcomes of these two consultation processes and will result in modifications to the scheme from 2013 at the earliest. Submissions in response to this paper will also inform broader research training quality policy and program considerations.

1.2. WHY QUALITY MATTERS

The quality of research training in Australian institutions is important. It is important to our international reputation, to the careers and futures of our best thinkers and researchers, to our innovative capacity and inventiveness and to the productivity of our country. Australian research training is currently performing well – our research masters and PhD[2] graduates readily gain employment domestically and internationally, Australian universities attract talented research students from all over the world, and our researchers produce world quality research, as evidenced by outcomes from the 2010 ERA exercise.

However, there are a number of indications that the system is under pressure.[3] In this context, developments such as the implementation of the research workforce strategy, the review of the RTS and the introduction of ERA, provide an ideal opportunity to revisit our current research training arrangement. It also provides a framework to ensure that our funding programs and policy settings are appropriately encouraging and rewarding quality, and that we are adapting as necessary to the changing national and international environment.

This paper considers a range of possible quality indicators – some of which might be applied as minimum standards for research training funding.

1 Australian Government, Research Skills for an Innovative Future: A Research Workforce Strategy to Cover the Decade 2020 and Beyond, Canberra: Commonwealth of Australia, 2011.

2 There are a small number of fields where professional doctorates qualify as research doctorates under the 'two thirds rule' (where at least 66 per cent of the course must be original research) and are included in DEEWR statistics. For brevity, any mention of PhDs is also deemed to include such doctorates.

3 For discussion of some of these factors, see the Research Workforce Strategy.

2. POLICY CONTEXT

This section outlines the major characteristics of the policy environment that have shaped and continue to shape Australia's current research training system.

2.1. POWERING IDEAS

In 2009, the Australian Government released *Powering Ideas: An innovation agenda for the 21st century*[4] in response to reviews of both the higher education system and the national innovation system.

In recognition of the importance of research skills to an innovative Australia, *Powering Ideas* made a number of commitments in this area. These included:

- The development of a research workforce strategy,
- A significant increase in the number of students completing higher degrees by research over the next decade. This builds on the 2008/9 budget commitment to double the number of Australian Postgraduate Awards (APA) by 2012 and the government's objective to lift the number of 25-34 year olds with undergraduate degrees, and
- A commitment to increase the APA stipend rate. The 2011 rate of $22,860 is significantly higher than the 2009 stipend ($20,427). Additionally, from 2012, the rate will increase in accordance with the improved indexation arrangements under the *Higher Education Support Act (2003)*.

2.2. BUILDING AUSTRALIA'S RESEARCH CAPACITY

In September 2009, the government tabled its response to the final report of the House of Representatives Standing Committee inquiry into research training and research workforce issues in Australian universities: *Building Australia's Research Capacity*.

The response referred a number of the report's 38 recommendations to be considered under the research workforce strategy. These included recommendations to:

- Provide additional stipends to students in areas of national importance and skills shortage,
- Double the number of International Postgraduate Research Scholarships (IPRS) places,
- Extend the length of support under the APA, and
- Examine funding arrangements under the Research Training Scheme (RTS).

All of the recommendations referred in this way are being, or will be, considered as part of the implementation of the strategy.

2.3. THE RESEARCH WORKFORCE STRATEGY

One of the commitments of *Powering Ideas* and the resulting budget measures was the development of a research workforce strategy that would:

- Address expected shortfalls in the supply of research qualified people in Australia,
- Significantly increase the number of students completing higher degrees by research,
- Create viable career paths for Australian researchers, and
- Adequately train people for a range of relevant careers.

Research Skills for an Innovative Future – A Research Workforce Strategy to Cover the Decade to 2020 and Beyond was launched in April 2011 by the Minister for Innovation, Industry, Science and Research,

4 Australian Government, Powering Ideas: An Innovation Agenda for the 21st Century, Canberra: Commonwealth of Australia, 2009.

Senator the Hon Kim Carr. It is a ten-year strategy, which is the result of almost two years of research, consultation and development.

The strategy is shaped by five key priorities:
1. Meeting demand for research skills in Australia.
2. Strengthening the quality of supply through Australia's research training system.
3. Enhancing the attractiveness of research careers in Australia.
4. Facilitating research workforce mobility.
5. Increasing the participation of Australia's research workforce.

Under the second priority above, the strategy proposes a review of the RTS, an examination of the full cost of research training, the development of new models for research training, and the establishment and monitoring of research standards and quality benchmarks for research training.

2.4. EXCELLENCE IN RESEARCH FOR AUSTRALIA

In 2010, the Australian Research Council conducted the first full evaluation of Excellence in Research for Australia (ERA) and the results were published in January 2011.

In March 2011, the Minister for Innovation, Industry, Science and Research announced that ERA outcomes would inform the funding of research education through a modified Research Training Scheme.

More information about ERA can be found in Appendix 1. Discussion on the role of ERA in defining the quality of the research training environment can be found at 5.3.4.

2.5. THE AUSTRALIAN QUALIFICATIONS FRAMEWORK

The Australian Qualifications Framework (AQF) is the national policy framework for regulated qualifications in Australian education and training. It incorporates the qualifications from each education and training sector into a single comprehensive national qualifications framework.

The AQF describes the standards for Australian qualifications, including the learning outcomes at each level and qualification type and the requirements for issuing qualifications.

The AQF sets out descriptors and specifications for masters by research (level 9) and research doctorates (level 10). Key criteria are in **Table 1**:

Table 1: Australian Qualifications Framework (level 9 and 10)

Level	Level 9 Masters Degree (Research)	Level 10 Doctoral Degree (Research)
Purpose	Apply an advanced body of knowledge in a range of contexts for research and scholarship	Apply a substantial body of original knowledge to research, investigate and develop new knowledge
Volume of learning	Two thirds will be devoted to research, research training and independent study	Research will be typically two thirds or more of the qualification
Length	1 – 2 years typically	3 – 4 years typically

The doctoral degree (professional) – also at Level 10 – is described as 'making a significant and original contribution to knowledge in the context of a professional practice'.

To be AQF accredited, a degree awarded by an institution must meet the specifications pertaining to the qualification level as stated in the AQF qualification type specifications.

2.6. TERTIARY EDUCATION QUALITY AND STANDARDS AGENCY

The Tertiary Education Quality and Standards Agency (TEQSA) is the new national body for higher education regulation and quality assurance. TEQSA will ensure that higher education providers meet minimum standards

and will promote quality improvement of the higher education sector as a whole. Its job is to ensure that students receive a legitimate and high quality education at any of Australia's tertiary education providers.[5]

TEQSA commenced operations on 30 July 2011 and will become the national regulator for higher education on 30 January 2012. Until then, it will operate in its quality assurance capacity as it subsumes the functions of the Australian Universities Quality Agency.

TEQSA will regulate higher education providers against a standards framework. The framework has five domains and includes standards for research as set out in **Table 2**.

Table 2: TEQSA standards framework

Threshold standards		
1. Provider standards Based on National Protocols	**2. Qualification standards** Based on Australian Qualifications Framework	
Performance standards		
3. Teaching and learning standards	**4. Research standards**	**5. Information standards**

The minister for research has responsibility for making or varying research standards. The Higher Education Standards Panel advises and makes recommendations to the minister on the making or varying of research standards and other matters relating to the Higher Education Standards Framework if requested by the minister or on the panel's own initiative.

The findings of this consultation paper will inform the department's advice to the minister on the development of relevant standards, which the minister may refer to the Higher Education Standards Panel.

2.7. REVIEW OF HIGHER EDUCATION ACCESS AND OUTCOMES FOR ABORIGINAL AND TORRES STRAIT ISLANDER PEOPLE

In April 2011, Senator the Hon Chris Evans and Senator the Hon Kim Carr announced the establishment of a review of higher education access and outcomes for Aboriginal and Torres Strait Islander people. The review, chaired by Professor Larissa Behrendt, responds to recommendation 30 of the Review of Higher Education, chaired by Professor Denise Bradley AC (the 'Bradley Review'). The review will propose a strategic framework identifying key priorities, actions and opportunities to improve access and outcomes for Aboriginal and Torres Strait Islander students and staff for consideration by the government and the higher education sector.

The review will consider what constitutes appropriate support for Aboriginal and Torres Strait Islander students undertaking higher degrees by research and which university and government initiatives would assist to increase the number and capacity of Aboriginal and Torres Strait Islander academic and non-academic staff in universities.

A review of relevant Australian Government programs will also be undertaken to assess program impacts on the higher education outcomes for Aboriginal and Torres Strait Islander people. As part of this, the review will include an examination of Australian Government research training funding.

The review will report its findings to the Australian Government by April 2012.

2.8. INTERNATIONAL CONTEXT

International models of PhD training include the European Bologna Process model – a three-cycle degree structure comprising a three-year undergraduate degree followed by a two-year masters and three-year doctorate (the so called '3+2+3' model). A European credit transfer scheme complements the three-cycle

5 For more information, see http://www.teqsa.gov.au/

framework. Students can easily transfer from one degree cycle to the next, even across borders, and employers can have confidence that degree levels awarded in different jurisdictions are largely equivalent.

The United States generally requires a four-year undergraduate degree (the first year largely general education) before candidates can enter into graduate study. The doctorate will typically involve written and oral examinations and up to five years for research and dissertation.

Undergraduate degrees in India vary from three to four years, depending on the discipline. Entry to doctoral studies occurs based on completed postgraduate study (usually a masters degree) and an entrance examination. The average time taken for completion of a doctorate, which typically includes coursework, is around four years, with two years the minimum and seven years the maximum time allowed.

The Australian system traditionally involves three years of undergraduate study plus an honours year (or a masters degree) followed by a three to four year doctorate. Honours, as undertaken at Australian universities, are not commonly part of degree structures oversees and are therefore not well understood internationally. The difference in degree structures may create difficulties in attracting international students and in having Australian students accepted into PhD programs internationally. Some Australian universities have either adopted or are thinking of adopting models similar to Bologna. For example Macquarie University is considering moving to a 3+2+3 model in the near future.

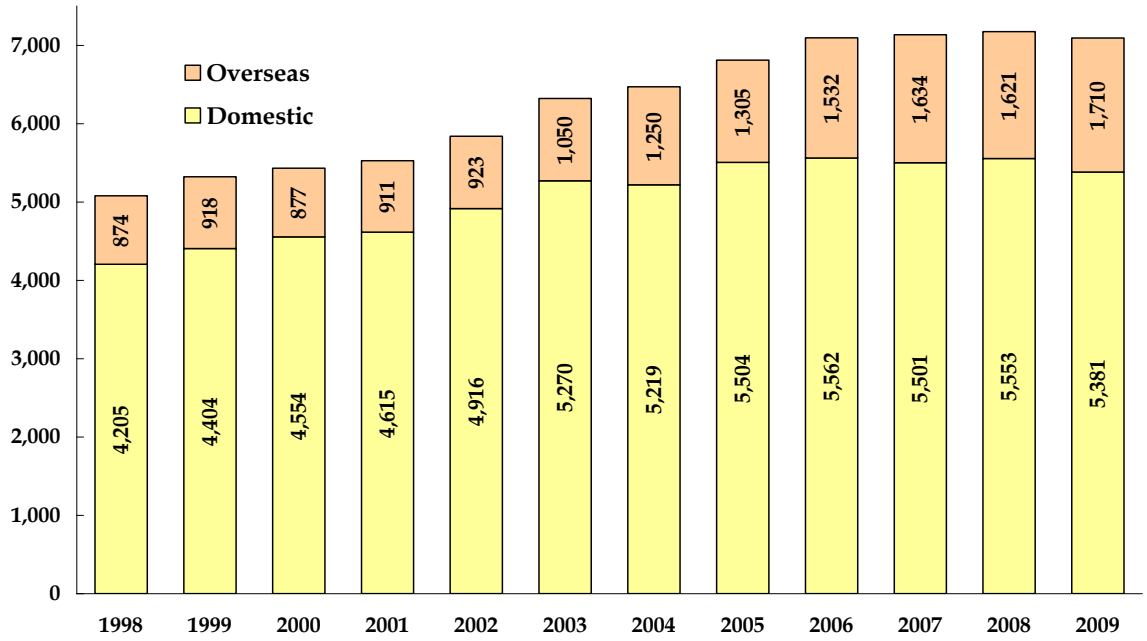
Whilst learning from international experience, Australia must devise the research training model or range of models that best suits its own particular needs and circumstances. The challenge is to ensure that our policy arrangements are sufficiently flexible to allow institutions to provide models of research training that will meet the needs of their markets whilst still ensuring quality.

3. RESEARCH TRAINING IN AUSTRALIA

Over the last decade, human resources devoted to research and development have grown significantly. [6] The Australian Bureau of Statistics (ABS) reports that there were over 90,000 researchers in Australia in 2008-09, in which more than 60,000 of them were in the higher education sector. [7] As at 2011, the Australian Government currently invests more than $840 million per annum on research training through the Research Training Scheme (RTS), Australian Postgraduate Awards (APA), International Postgraduate Research Scholarships (IPRS) and the Commercialisation Training Scheme (CTS).

In 2008, 7,174 students completed a higher degree by research (HDR), an increase of 41 per cent since 1998. This number slightly declined in 2009. Overseas students contributed significantly to the growth of the total number of HDR graduates, from 17 per cent in 1998 to 22 per cent of all HDR completions in 2009 (**Chart 1**).

Chart 1: Growth in HDR completions for domestic and overseas candidates, 1998-2009



Source: DIISR analysis of DEEWR Higher Education Statistics – unpublished data.

For the purposes of this paper, research training is defined as courses of study for HDR students. HDRs include both masters by research and doctorates by research. In 2009, there were approximately 53,000 HDR enrolments.

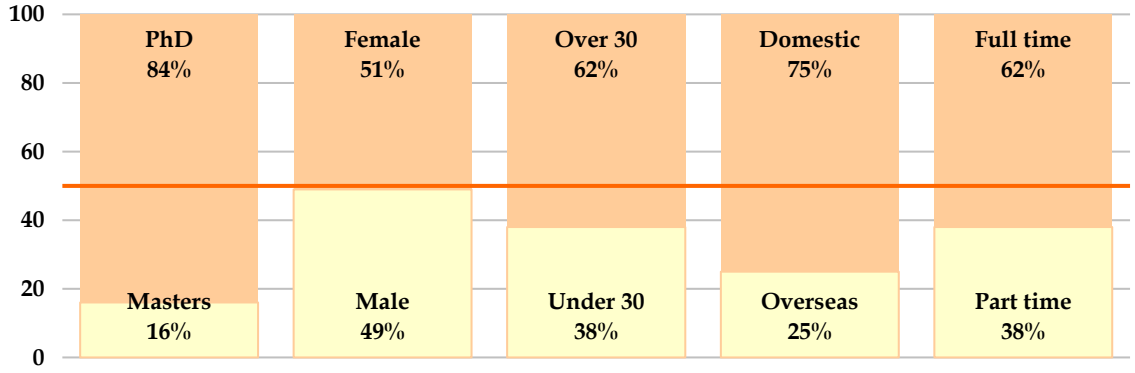
3.1. CONSUMERS OF RESEARCH TRAINING

Chart 2 shows that the vast majority of HDR students are doing doctorates (PhDs) rather than masters by research; PhDs account for 44,300 or 84% of all enrolments. While more than a third (38%) of students are under 30 years of age, a further 30% are aged 30-39, 18% are aged 40-49 and 14% are over 50 years of age.

6 Unless otherwise indicated, data in this section comes from DIISR internal analysis of DEEWR Selected Higher Education Statistics, 2009.

7 ABS Research and Experimental Development, All Sector Summary (2008-09), cat.no. 8112.0.

Chart 2: Selected features of the HDR student population in Australia, 2009

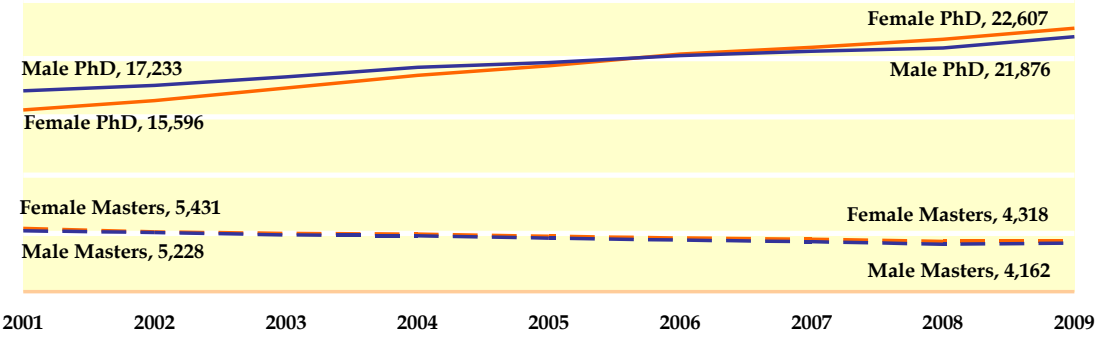


Source: DIISR analysis of DEEWR Higher Education Statistics – unpublished data.

Overseas students are much more likely to study full-time than domestic students. While on average 62% of all HDR students study full-time, 87% of overseas students study full-time, whereas only 54% of domestic students do so. Across disciplines, more than three-quarters of students in natural and physical sciences (78%) and engineering and related technologies (79%) study full-time, compared with less than a third (32%) of education HDRs.

Chart 3 shows that the gap between the number of PhD and the number of masters by research degrees is widening, and that females represent a higher proportion of students than in the past. From 2001-2009, PhDs grew by 35% while masters fell by 20%. Female students outnumbered male students for the first time in 2006. Over the four years from 2006-2009, females accounted for 50%-51% of all HDRs.

Chart 3: More PhDs, fewer masters – HDR student numbers in Australia by gender, 2001-2009



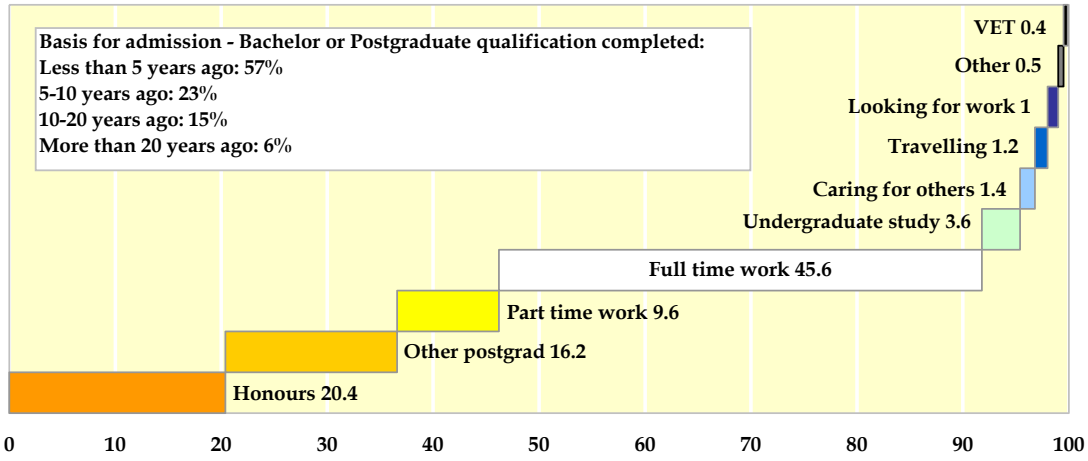
Source: DIISR analysis of DEEWR Higher Education Statistics – unpublished data.

Chart 4 shows the activities of research students prior to commencing their current studies according to the National Research Student Survey[8]. Not all HDR students follow a linear path from school through to undergraduate studies and an honours year prior to enrolling in a PhD. Around one quarter of students were engaged in undergraduate (3.6%) or honours (20.4%) studies in the year prior to beginning their research degree and 16% were doing other postgraduate studies. But a much larger proportion of students were working full-time (45.6%) or part-time (9.6%) prior to commencing their research degree.

About 95% of HDR students in 2009 used a bachelor (52%) or postgraduate (43%) qualification as their basis for admission. Of these students, over half (57%) completed that course within five years of admission and one-quarter (23%) between 5-10 prior. A further 15% earned their qualification 10-20 years prior, and 6% used a qualification that was more than 20 years old (**see Chart 4**).

8 For more information on the National Research Student Survey, see http://www.deewr.gov.au/HigherEducation/Publications/Documents/RAW_Part2.pdf

Chart 4: Where were you? Main activity of HDR students the year before beginning a research degree



Source: National Research Student Survey, DEEWR; DIISR analysis of DEEWR Higher Education Statistics.

3.2. PROVIDERS OF RESEARCH TRAINING

Australia's 39 universities provide the great majority of formal research training that takes place and confer nearly all HDR qualifications. In 2009, around half (26,369) of all HDR students were enrolled at the eight most research-intensive universities in Australia.[9]

Although the majority of formal training is undertaken within a university environment, research training can also take place in a wide variety of settings. Besides university environments, research training occurs in medical research institutes and hospitals, in the CSIRO, Cooperative Research Centres (CRC) and in office and industrial settings. Each year CRCs and the CSIRO support a large number of PhD students. In 2009-10, 1,219 full-time equivalent PhD students were supported in a CRC[10], while CSIRO sponsored 375 and supported 733 PhD students[11].

Research training is funded by the Australian government through the RTS, APA and IPRS. The Australian Research Council and the National Health and Medical Research Council also fund research training places. Universities, private research institutes, industry bodies and employers all contribute to funding research training.

3.3. RESEARCH TRAINING SCHEME

The RTS is the Government's largest source of funding to Australian higher education providers to support research training for domestic (including New Zealand) students undertaking research doctorate or research masters degrees. The RTS funding is paid as a block grant to universities according to a performance index. Universities then decide how to allocate this funding within their institution and how many places it will support. In 2009, they collectively supported 34,175 students through this scheme.

RTS students are entitled to a maximum of four years full-time equivalent study for a doctorate and two years if undertaking a research masters, calculated from the date of commencement.

9 DEEWR Higher Education Statistics, 2009 Full Year Student Summary tables See
http://www.deewr.gov.au/HigherEducation/Publications/HEStatistics/Publications/Pages/2009FullYear.aspx

10 DIISR unpublished data.

11 CSIRO Annual Report 2009-10.

A weighted performance index drives the allocation of the RTS to institutions as follows:

- HDR student completions (50 per cent),
- Research income (40 per cent), and
- Research publications (10 per cent).

The completions part of the formula functions as a proxy measure for quality, whilst the research income and research publications elements function in part to assure that high quality research is being undertaken in the institution in which the research training is taking place.

The original policy intent for including HDR completions in the RTS funding formula was to reduce completion times when these were becoming unsustainable, and to reduce attrition. Completions are a proxy measure because it is assumed that if students are completing their HDRs within the required timeframe they are doing so by receiving high quality research training supervision.

Whilst the inclusion of completions in the RTS formula has been effective in reducing completion times, there have been some concerns that in some cases higher completion rates might have been achieved at the cost of quality. The next paper in this series will consider whether completions should be retained as part of the RTS formula – the purpose of this paper is to consider what other quality measures might be useful or appropriate.

3.4. AUSTRALIAN POSTGRADUATE AWARDS

The APA scheme provides financial support directly to postgraduate students who undertake their research degree at an Australian higher education provider. Awards are available for a period of two years for a research masters or three years for a doctorate (with a possible extension of six months). In 2011, the government is supporting 3,270 commencing APA places, with a further 3,500 commencing places supported in 2012. In doing so, it will meet its commitment to double the number of APA places by 2012.

The IPRS are open to international students from all countries (except New Zealand) and are available for a period of two years for a masters by research degree or three years for a doctorate by research degree. The scholarship covers tuition fees, health cover costs for scholarship holders, as well as health cover costs for their dependants. From 2011, eligibility for APA scholarships has been extended to commencing IPRS recipients.

4. EXISTING QUALITY FRAMEWORKS

4.1. NATIONAL

The *Australian Code for the Responsible Conduct of Research*[12] is managed by the National Health and Medical Research Council, the Australian Research Council and Universities Australia. It guides institutions and researchers in the responsible conduct of research.

The code contains a section devoted to the supervision of research trainees. This section places responsibility on:

- Institutions – to set standards for supervision, mentorship and induction of trainees,
- Researchers and supervisors – to ensure that training, mentoring and support of trainees takes place, ensuring valid and accurate research and appropriate attribution, and
- Research trainees themselves – to undertake induction and training and to seek guidance.

Mainly, however, the code describes how *research* itself should occur; it does not establish standards for how *research training* should occur, what constitutes quality in research training, and what should happen if standards are not met.

4.2. INSTITUTIONAL

Most Australian universities have written guidelines for research training, minimum standards for support of postgraduate students or similar internal policies. The Council of Australian Postgraduate Associations (CAPA) recently reported that 32 out of 38 institutions evaluated had minimum resource policies or requirements in place.[13]

Institutional-level guidelines on research training generally cover all or most of the following requirements:

- Physical requirements, equipment and facilities,
- Support services and entitlements for students,
- Occupational health and safety requirements,
- Qualification and minimum entry standards,
- Minimum attendance requirements,
- Information and intellectual property policies,
- Supervision requirements including alternate supervision,
- Training requirements and expectations,
- Mentoring and monitoring standards and services,
- Feedback and reporting requirements,
- Examination standards and procedures, and
- Appeal and dispute resolution processes.

They also typically describe the rights and responsibilities of the candidate.

12 National Health and Medical Research Council, Australian Research Council and Universities Australia, Australian Code for the Responsible Conduct of Research, 2007.

13 Palmer, N., Minimum Resources for Postgraduate Study 2010. Melbourne, Australia: Council of Australian Postgraduate Associations (CAPA), 2010

5. DEFINING AND MEASURING QUALITY

This section asks what constitutes quality in research training and how this might be measured and encouraged.

5.1. GUIDING PRINCIPLES

The research workforce strategy concluded that research training should:

- Take place in high quality physical and intellectual environments,
- Adequately equip students for their careers, whether in universities or other publicly funded research organisations, the private sector or elsewhere in the economy, and
- Be sufficiently flexible to encourage and support participation by all suitably qualified candidates.

The development of standards that embody these principles will assist in guiding both policy and practice with respect to research training. In particular, these principles will be used to inform the development of the research standards that the Tertiary Education Quality and Standards Agency will use to guide its quality assurance and improvement activities.

Consultation Question 1:
Should there be national minimum quality requirements for higher degrees by research? Should an institution only be eligible for funding schemes in fields where it meets minimum requirements?

5.2. CRITERIA FOR QUALITY

Development work for the strategy and a review of existing literature suggest that the following elements play a key part in quality research training:

- The environment in which the research training is conducted. This may include:
  - Physical resources, including research infrastructure,
  - Opportunities for fieldwork, international exposure, conference attendance etc.,
  - Supervision, and
  - Depth and breadth of the scholarly environment.
- The research training program itself, including the provision of:
  - Deep, subject specific knowledge, and
  - Broader skills, including generic or 'employability' skills.

5.3. RESEARCH TRAINING ENVIRONMENT

In a report prepared for the development of the strategy, the Council of Australian Postgraduate Associations (CAPA) found that higher degree by research (HDR) students benefit from a vibrant collegiate research environment in which they feel included as part of the research community.[14] Students also valued sufficient flexibility in support arrangements to allow the most efficient use of available time and resources, opportunities to develop a broad range of skills and adequate financial and infrastructure support for the production and dissemination of high quality research.[15]

14 Palmer, N., Council of Australian Postgraduate Associations (CAPA), The Research Education Experience, Report for the Department of Innovation, Industry, Science and Research, 2009.

15 Ibid.

Research training arrangements need to reflect and accommodate the diversity of the HDR student population. It follows that quality standards and measures should also support this diversity, in particular where they hold implications for funding or regulation.

5.3.1. PHYSICAL RESOURCES

The CAPA report *Minimum Resources for Postgraduate Study 2010* outlines basic requirements in terms of infrastructure. The report argues that:

The quality of university infrastructure is integral to the culture of the university, and the overall student experience. If universities are unable to provide students with adequate work spaces, equipment or other basic facilities, the entire campus culture and student experience suffers.[16]

The report identifies a range of required resources, including:

- Information technology (IT), including computer access, technical support, specialist software and the facility to securely store large amounts of data,
- Access to research facilities including high quality research infrastructure and laboratory or other facilities required across a range of disciplines, and
- A secure desk and study space.

Whilst most universities strive to provide adequate facilities for their research students, evidence suggests that this can be inconsistent both between universities and between different faculties within a university.

Consultation Question 2:
Should institutions be required to provide a minimum standard of physical resources in order to receive Research Training Scheme funding?

5.3.2. STUDENT OPPORTUNITIES

It is important that research students have the opportunity for exposure to a variety of fora that will enrich and extend their research training experience. Depending on the field of study, this might include opportunities to study, conduct or present fieldwork overseas or participate in professional events.

There are very few areas of research conducted solely in Australia, so the capacity to liaise or collaborate with researchers from different backgrounds bringing differing methodologies to research problems should be an essential part of high quality research training.

Consultation Question 3:
Should universities providing research training be required to ensure that students have sufficient access to opportunities such as conference attendance and international study?

5.3.3. SUPERVISION

The supervisor-student relationship is the foundation of research training. What makes for quality research supervision?

A 2004 report on the pedagogy of research supervision found that 'supervisors who are more 'hands-on' in their approach to supervision tend to be associated with faster and more completions'.[17] Keywords were availability, reliability, trust, reciprocity and teamwork.

In 2009 (see **Table 3**), students had the following to say about research training supervision[18]:

16 Palmer, N., Minimum Resources for Postgraduate Study 2010. Melbourne, Australia: Council of Australian Postgraduate Associations (CAPA), 2010.

17 DEST (2004), The Pedagogy of 'Good' PhD Supervision: A National Cross-Disciplinary Investigation of PhD Supervision.

18 Palmer, N., Council of Australian Postgraduate Associations (CAPA), The Research Education Experience, Report for the Department of Innovation, Industry, Science and Research, 2009.

Table 3: Student views on research training supervision

What works well	Room for improvement
° Regular contact with supervisors ° Availability and responsiveness ° Collegial approaches ° Mentoring as opposed to simply training ° Access to independent support and advice	° Lack of consistency in supervision ° Undue pressure on completion times ° Administrative frameworks for managing research supervision ° Supervisors who are unable to devote adequate time and resources to their students

HDR students may have just one or several supervisors, depending on institutional policy and the requirements of the research project. A panel of supervisors may be important where students are undertaking cross-disciplinary research, or where cross-industry supervision is required. This model may be beneficial in creating increased support networks for students and an increase in expertise across disciplines.

Many institutions will only allow academics to supervise HDR students if they have been registered as being competent to do so. Supervisor training is usually available, and this may be compulsory or voluntary. Less-experienced supervisors may be limited to supervising smaller numbers of students or to supervising pre-doctoral students.

Supervision practices should ideally be tailored to the student's ability, the nature of the research and the discipline – for example a student that is part of a team doing laboratory-based research may require different support than one working on an independent project.

Examples of individual institutional policies for student supervision

The University of Sydney has created a *Code of practice for supervision of postgraduate research students* and a policy on *Postgraduate research higher degree training supervision* at the University of Sydney. These documents define the minimum responsibilities of all parties concerned with the supervision of postgraduate research candidates. The aim is to guarantee an appropriate intellectual and academic environment for students and to demonstrate the duty of care of the university towards research trainees.

Murdoch University defines supervisor eligibility and standard practise clearly in its *Research Student Supervision Policy*. A research student is normally supervised by a principal supervisor supported by either a supervision panel or a co-supervisor. Both early career supervisors and experienced supervisors receive training.

Murdoch acknowledges its responsibility to ensure that students receive high quality supervision. This involves ensuring that students have adequate access to supervisors, that students are protected from adverse impacts when a supervisor has extended leave or resigns, and that early career supervisors are assisted to learn good practices in supervision.

Consultation Question 4:

What is the best way of ensuring that PhD supervisors provide high quality support to students? Should requirements be nationally consistent?

5.3.4. THE RESEARCH ENVIRONMENT

A key part of providing HDR students with a quality training experience is ensuring that they are learning in an environment where quality research is taking place. Excellence in Research for Australia (ERA) provides an improved mechanism to assess the quality and scale of the research activity undertaken at higher education institutions, and, as previously noted, ERA outcomes will be applied to the RTS in future years.

ERA is an excellent indicator of recent research performance at the discipline level at a particular institution and has broad acceptance across the sector. However, the research environment at an institution may change rapidly, or there may be pockets of excellent research occurring at, or, below the threshold required to attract an ERA rating. It is worth considering which other indicators, in addition to ERA outcomes, might be used to ensure that research training occurs in areas of high quality research in a changing research environment.

For example, institutions could provide evidence to indicate potential research excellence. This might include investment in staff or research infrastructure etc. University compact documentation may provide a useful indicator of forward investment in support of an institution's research directions.

Assuming quality requirements for the research training environment can be set, there may be options for institutions which are not able to meet these requirements to a sufficient level. These could include offering HDR programs in partnership with institutions with a proven track record in that particular field.[19] Alternatively institutions could collaborate in other ways, for example, joint supervisory arrangements or other arrangements where students could access expertise or other relevant resources. The onus would be on the institution to demonstrate that it has established arrangements, such as partnering arrangements with another institution, that effectively compensate for its inability to provide a quality research environment without such arrangements.

Consultation Question 5:

Given that positive Excellence in Research for Australia (ERA) results provide evidence of a quality research training environment at an institution, should an institution be able to provide alternative evidence of a quality research environment when positive ERA results are absent (for example in an emerging area of research). If so, what alternative evidence should be provided?

Consultation Question 6:

If an institution is unable to provide robust evidence of a quality research environment, should it be able to submit evidence of arrangements, such as partnering arrangements with another institution, that effectively compensate for its inability to provide a quality research environment without such arrangements?

5.4. THE RESEARCH TRAINING PROGRAM

5.4.1. SUBJECT SPECIFIC KNOWLEDGE

The primary function of HDR training is to produce graduates capable of conducting cutting-edge research in their chosen field. This requires that candidates obtain a high level of specialist expertise in a narrow area.

The traditional research-based, three to four-year PhD is well suited to providing HDRs with an excellent, if at times narrow; understanding of their own discipline and the quality of Australian PhDs is well regarded internationally.

However, our need for new knowledge is increasingly driven by challenges requiring multidisciplinary solutions. This in turn requires the ability to broaden one's own understanding, to engage with researchers in other fields, to understand a variety of disciplinary viewpoints and to collaborate productively. There are mounting concerns that our current research training arrangements do not sufficiently support research training in multidisciplinary environments, and that we need to do more to encourage and reward multidisciplinary research.

Consultation Question 7:

Should government do more to enable research training in multidisciplinary environments? What barriers are there and how might they be overcome?

5.4.2. BROADER SKILLS

The strategy recognises the necessity to more explicitly embed the development of both 'soft' or generic skills and innovation capabilities in university research training programs, to support students' productivity in a wide range of employment contexts. Approximately 40 to 50% of HDR graduates take up careers in academia, with the remainder employed in the private, not for profit and government sectors.

A recent report on employer demand for researchers in Australia found that problem solving, communication, self-management, initiative and enterprise, and teamwork were the most sought after non-technical skills.[20]

19 The Australian Government has recently put into place measures to assist universities who wish to offer joint PhDs. For more information, see http://www.innovation.gov.au/Research/ResearchBlockGrants/Documents/Principles_Joint_HDR.pdf

20 The Allen Consulting Group, Employer Demand for Researchers in Australia, 2010.

Employers rated problem solving the most important non-technical skill, with over 90% of respondents rating it *highly* or *very highly* important. Communication, self-management, initiative and enterprise, and teamwork were rated similarly by more than 80% of respondents.[21]

It is worth noting that the need to include broader skills training in research training is not confined to private sector employers—the nature of academic careers themselves is changing, with a greater emphasis on multidisciplinary research, project management, the ability to attract research income, quality teaching and community engagement.

Institutions are taking a number of different approaches to incorporating broader skills training in HDR programs. The box below gives some examples.

Examples of innovative models for doctoral training

ATN Industry Doctoral Training Centre (Mathematics and Statistics)
The Australian Technology Network of Universities (ATN) is piloting a new model of PhD education in Australia, where students will undertake a four-year program that includes high-level research, coursework and the development of industry related skills. The mathematics and statistics centre will commence with a cohort of 20-25 students in 2012 and is seen as a pilot for similar centres in other discipline areas.

The centre will host 20 to 25 PhD students a year, with the aim of a third to a half being funded by industry. The PhD programs will have an industry context and will be four years long. The Australian government provided $1m in seed funding towards the establishment of the centre.

The University of Queensland Career Advantage PhD program
This program, commencing in 2012, is designed to provide students with an enhanced skill set that is transferable across a wide range of careers. Students are able to choose between three pathways, Higher Education Practice and Leadership (for candidates looking to pursue a career in academia), Research Innovation, Translation and Commercialisation (focused on careers in commercialisation and consultancy) and Global Collaborations (designed for those intending to pursue international research or academic careers). Students make their choice of pathway approximately 12 months into their candidature.

All of the options involve training targeted to that stream, including a three-day intensive workshop and a number of other academic and applied training activities. The program is designed to be completed within the normal candidature period, and students may undertake more than one pathway if they wish. The University of Queensland consulted widely in developing this program, including with students, staff, industry partners and overseas institutions.

NewRoute PhD program (United Kingdom)
The NewRoute PhD is a doctorate with built-in generic skills development and discipline-specific training. It is run by a consortium of thirteen UK universities and offers PhDs in thirteen disciplines, including physical and social sciences, arts, law and computing. Its aim is to integrate in-depth study (often inter-disciplinary), research training, and high level professional skills training. There is a strong emphasis on employability in a range of settings. The degree comprises four years full time study, rather than the traditional three years.

In order to achieve appropriate professional skills development in HDR graduates, a compulsory skills based coursework component could be introduced to complement current HDR course requirements. Any broader skills training should be sufficiently flexible to take into account the differing needs, life experience and capacities of research students as well as the diverse needs of employers from differing sectors.

The introduction of course work or other skills training components to HDR studies may have repercussions for the term of a HDR and therefore any relevant funding arrangements (e.g. RTS, APA) would need to have the flexibility to accommodate this.

An alternative model is to incorporate course work into a two-year masters prior to a three-year PhD, giving a 3+2+3 structure. This is the approach currently under consideration by Macquarie University, where broader skills training will be expected to take place during the masters, leaving the PhD as an intensive three year research project.

21 Ibid.

It is likely that various HDR models will continue to emerge as universities work to adapt to the changing domestic and global environments and the needs of their students.

Consultation Question 8:
Should Australian higher degrees by research include broader skills training? If so, should this be through compulsory coursework or through some other mechanism?

6. OTHER QUALITY CONSIDERATIONS

This section addresses a number of other considerations that influence the overall quality of research training.

6.1. SUPPORT UNDER THE AUSTRALIAN POSTGRADUATE AWARDS

6.1.1. LENGTH OF SUPPORT

Currently, funding provided to students under the Australian Postgraduate Awards (APA) scheme is capped at a maximum of 3.5 years (three years with the possibility of a six month extension), whilst Research Training Scheme (RTS) funding is provided for a maximum of four years.

During the development of the strategy a number of considerations were raised by stakeholders suggesting that it might be desirable to extend the maximum length of the APA to a maximum of four years (including extensions). This would ensure consistency with the duration of RTS funding. It would also address time pressures associated with the inclusion of more coursework within the PhD, either for skills broadening in the candidate's research areas or to allow teaching of generic or employability skills.

6.1.2. SUPPORT FOR PART-TIME STUDENTS

The strategy recognises that 'flexibility to undertake studies on a part-time basis may be a key determinant of individual capacity to engage in a research degree and that this issue may be particularly pronounced for women and indigenous Australians seeking to balance studies with family, professional and community responsibilities'.[22]

With approximately 75% of higher degree by research (HDR) students over the age of 30, many students are approaching studies in conjunction with family, professional and financial responsibilities. This requires flexibility for students to undertake part-time studies to balance these responsibilities. Research undertaken by the Council for Australian Postgraduate Associations (CAPA) confirms that research students place great importance on access to part-time study, including the ability to move between part- and full-time study as needed.[23] This was seen as essential for the participation of students with family, caring or financial responsibilities. It was also seen as a valuable time management tool in circumstances ranging from personal crisis such as ill health to unavoidable lulls or delays in research projects.

One barrier to part-time study, identified during the strategy's development, concerns section 2.10.10 of the *Commonwealth Scholarships Guidelines (Research) 2010*, which specifies that part-time APA funding should be approved in 'exceptional circumstances'. Exceptional circumstances must relate to 'significant caring commitments or a medical condition which limits the student's capacity to undertake full-time study'.[24] Priority 7.1 of the research workforce strategy calls for the removal of impediments within research training support programs for part-time HDR candidature.

Differing interpretations of what can count as an exceptional circumstance have led to a disparity between institutions in the level of flexibility they provide to students to undertake part-time studies.

It should be noted that some courses of study are more amenable to part-time candidature than others (for example disciplines requiring intensive blocks of laboratory time may be more difficult on a part-time basis). Concern has also been expressed that part-time HDR students may have greater levels of attrition and

22 Australian Government, Research Skills for an Innovative Future: A Research Workforce Strategy to Cover the Decade 2020 and Beyond Canberra: Commonwealth of Australia, 2011.

23 Palmer, N., Council of Australian Postgraduate Associations (CAPA), The Research Education Experience, Report for the Department of Innovation, Industry, Science and Research, 2009.

24 Commonwealth Scholarships Guidelines (Research) 2010, Higher Education Support Act 2010, 2.10.10 (2).

disproportionally long completion times.[25] Institutions may have to consider how to ameliorate these factors in facilitating access to part-time study.

6.1.3. TOP UPS TO AUSTRALIAN POSTGRADUATE AWARDS

Currently, there are restrictions on other income students can receive in conjunction with APA scholarships. Students cannot receive an equivalent award, scholarship (excluding an International Postgraduate Research Scholarship) or salary providing a benefit greater than 75% of the APA stipend rate. Income from sources unrelated to the course of study is not taken into account.

Evidence collected during the development of the strategy suggested that in some cases it might be desirable to provide more attractive scholarships to students in particular areas. This might include, for example, areas where it is very difficult to attract HDR students because undergraduates in those areas are in great demand and attract high salaries, or where there is a shortage of researchers in areas of national demand.

Consultation Question 9:
Should the rules associated with Australian Postgraduate Award scholarships be amended or increased in flexibility? If so, in what ways?

6.2. RESEARCH MASTERS

There has been a steady decline in commencements for masters by research degrees since 2001, notwithstanding the continued popularity of the degree in some disciplines (notably architecture). At current projections there will be less than 1,000 domestic research masters commencements by 2020, whilst PhD enrolments are expected to continue to grow. The slow growth in overseas students enrolling in masters by research degrees is in contrast with the rapid growth in overseas students commencing PhDs.[26]

The decline in masters by research degrees has raised questions about the role of these degrees in the HDR pathway. At the same time, there has been an increased focus on the role of the masters by coursework as a precursor to undertaking a PhD. For example, the US doctoral system often awards a masters by coursework degree as the preliminary stage before confirming candidature for a PhD. The European Union introduction of the Bologna Process has further entrenched masters by coursework as the precursor to a PhD. In Australia there may be a future role for masters by coursework, with a significant research component, to be the optimal entry point for PhD study.

There is also support for flexible arrangements where a research masters might be awarded to students whose work is not of the standard required for a PhD. The masters by research is seen by many as an acceptable exit point for a thesis which is unlikely to achieve the required doctoral standard.

Consultation Question 10:
What is the role of the research masters degree in the Australian research training system? Is its decline a cause for concern?

6.3. STUDENT SELECTION AND ADMISSION

In order to meet the growing needs for research-trained graduates under an innovation economy, we need to ensure that high standards are maintained for PhD training. The selection and admission of students is currently subject to the Australian Code for the Responsible Conduct of Research, in addition to individual institutional policies. The Tertiary Education Quality and Standards Agency is set to develop research standards in the future.

Historically, most domestic students have been admitted to HDR studies on the basis of a first class honours degree. However, increasingly, pathways to HDR studies are becoming more varied, both between and within institutions. Differences in admission pathways depend in part on the discipline.

25 Whilst there is some evidence of a correlation (e.g. Education has both a high level of part-time students and a longer average completion time), the data across the system is inconclusive and is not sufficiently robust to support a causal relationship.

26 The decline in international students might be partly explained by the fact that the degree is not well understood outside former British Commonwealth nations, where the distinction between research and masters by coursework is often not well defined.

Currently, universities undertake individual processes for selecting and admitting students into a HDR degree and apply institutional standards in their admission processes. This may even differ within an institution, based on discipline.

The increasing demands for HDR students will require robust methodologies of assessing applicant suitability to ensure that students have the capacity to undertake quality research through HDR studies. Onus is currently placed on the universities to ensure effective selection processes; however, the addition of national standards may support the assurance of consistent quality standards in student selection and admission. It may also be beneficial for requirements to be placed on universities to provide postgraduate students with formal inductions on commencement of their studies.[27] The UK Code of Practice currently identifies several key standards around the selection and admission of students, which could be used as a basis for admission standards in Australian institutions. The standards are outlined in Appendix 2.

Although selection and admission of students is not the primary focus of this consultation paper, it is prudent to take this into consideration to ensure that quality research training builds on a cohort of appropriately qualified and prepared students capable of effectively contributing to Australia's innovation system.

Consultation Question 11:
Given the trend towards more diverse entry pathways for higher degrees by research, how prescriptive should overlying principles be? How should institutional arrangements for student selection and admission be measured?

27 Palmer, N., Council of Australian Postgraduate Associations (CAPA), The Research Education Experience, Report for the Department of Innovation, Industry, Science and Research, 2009.

7. CONCLUSION

Patterns of participation in research training have changed over the ten years since the Research Training Scheme was introduced, not because of the scheme, but in parallel with it.

For the first time in history, there are now more women than men doing higher degrees by research. On average, students are older, with more life and work experience behind them when they commence research training. There is a diverse – and rapidly growing – international market for Australian PhDs.

Ideas about what research training should comprise are evolving. Where once, institutions offering higher degree by research qualifications controlled their design and delivery, consumers and end-users of research training are increasingly having a say. For example, students are looking for more flexibility in timing, and employers want to see more breadth in skill development. Universities are competing with each other – including overseas institutions – for the best new research talent, and continually looking for new ways to be distinctive.

The policy environment is changing too. In just the last few years, the Australian government has introduced many changes that affect the research policy landscape. These include changes to the Australian Postgraduate Awards scholarships rules, expanding options for international students, and the introduction of Excellence in Research for Australia and Tertiary Education Quality and Standards Agency.

The next decade of research training in Australia is full of promise and possibility. We can aim high: produce all of the researchers we need, and have high confidence in their abilities. But to achieve these aims, we need to describe the characteristics and features of quality higher degrees by research. What training experiences should they encompass? Should they be broader or narrower in scope; more or less regulated?

The key questions are: What do we want the Australian PhD to look like? What should a higher degree by research student be entitled to expect from their research training experience? And what should a research graduate be able to do, for themselves and their many future employers?

Every year, hundreds of millions of dollars is invested in research training by the Australian government, higher education institutions, employers and students.

This paper invites consideration of the type of research training we want that investment to deliver.

8. CONSULTATION QUESTIONS

Consultation Question 1:

Should there be national minimum quality requirements for higher degrees by research? Should an institution only be eligible for funding schemes in fields where it meets minimum requirements? (page 15)

Consultation Question 2:

Should institutions be required to provide a minimum standard of physical resources in order to receive Research Training Scheme funding? (page 16)

Consultation Question 3:

Should universities providing research training be required to ensure that students have sufficient access to opportunities such as conference attendance and international study? (page 16)

Consultation Question 4:

What is the best way of ensuring that PhD supervisors provide high quality support to students? Should requirements be nationally consistent? (page 17)

Consultation Question 5:

Given that positive Excellence in Research for Australia (ERA) results provide evidence of a quality research training environment at an institution, should an institution be able to provide alternative evidence of a quality research environment when positive ERA results are absent (for example in an emerging area of research). If so what alternative evidence should be provided? (page 18)

Consultation Question 6:

If an institution is unable to provide robust evidence of a quality research environment, should it be able to submit evidence of arrangements, such as partnering arrangements with another institution, that effectively compensate for its inability to provide a quality research environment without such arrangements? (page 18)

Consultation Question 7:

Should government do more to enable research training in multidisciplinary environments? What barriers are there and how might they be overcome? (page 18)

Consultation Question 8:

Should Australian higher degrees by research include broader skills training? If so, should this be through compulsory coursework or through some other mechanism? (page 20)

Consultation Question 9:

Should the rules associated with Australian Postgraduate Award scholarships be amended or increased in flexibility? If so, in what ways? (page 22)

Consultation Question 10:

What is the role of the research masters degree in the Australian research training system? Is its decline a cause for concern? (page 22)

Consultation Question 11:

Given the trend towards more diverse entry pathways for higher degree by research, how prescriptive should overlying principles be? How should institutional arrangements for student selection and admission be measured? (page 23)

9. HOW TO MAKE A SUBMISSION

Please keep responses concise and address the questions posed in the paper. Where possible, please identify in your response which specific question you are addressing. You may attach additional material to your response if you wish.

Please email submissions to: rws@innovation.gov.au

Email is the preferred mode of submission. Written submissions can be mailed to:

Research Workforce Strategy – Submission
Research Funding and Policy Branch
Research Division
Department of Innovation, Industry, Science and Research
GPO Box 9839
CANBERRA, ACT 2601

The deadline for submissions is close of business on 28 November 2011. Earlier submissions are encouraged.

Important note: Unless otherwise requested in writing, submissions will be made publicly available on the DIISR website shortly after they are received.

APPENDIX 1 – EXCELLENCE IN RESEARCH FOR AUSTRALIA

Excellence in Research for Australia (ERA) is the first comprehensive assessment of research activity and research quality in Australian universities. The first full ERA evaluation of research disciplines in Australian universities was completed in 2010. The results of that evaluation were published in the *ERA 2010 National Report* in January 2011. The next ERA exercise will be in 2012.

The objectives of ERA are to:

- Establish an evaluation framework that gives government, industry, business and the wider community assurance of the excellence of research conducted in Australia's institutions,
- Provide a national stock take of discipline-level areas of research strength and areas where there is opportunity for development in Australia's higher education institutions,
- Identify excellence across the full spectrum of research performance,
- Identify emerging research areas and opportunities for further development, and
- Allow for comparison of Australia's research nationally and internationally for all discipline areas.

The low volume threshold for ERA 2010 was set at 50 indexed apportioned publications over the six year period in fields of research where citation analysis was used. Where citation analysis was not used, the threshold was set to 30 weighted apportioned research outputs. Where the thresholds were not met, the data submitted was not assessed. The institution, therefore, was not considered research active for that discipline for the purpose of ERA. For ERA 2012, the low volume threshold for disciplines using peer review is 50 weighted apportioned research outputs, in line with the threshold for disciplines using citation analysis.

ERA evaluates the quality of research in universities by discipline. Research Evaluation Committees broadly mapping to the 8 discipline clusters assessed the data submitted. These evaluation committees comprised 149 distinguished researchers of Australian and international renown.

All 41 higher education institutions participate in ERA evaluations. ERA uses a five point rating scale (1-5, with 5 being the highest rating for excellence). Disciplines are assessed at both a broad level (2-digit Field of Research codes) and at a more specific level (4-digit Field of Research codes).

The Rating Scale for ERA[28]:

Rating	Descriptor
5	Well above world standard
4	Above world standard
3	World standard
2	Below world standard
1	Well below world standard
NA	Not assessed due to low volume of research outputs

Note: In order to achieve a rating at a particular point on the scale, the majority of the output from a Unit of Evaluation in ERA is normally expected to meet the standard for that rating point.

ERA will be used to determine funding in the Sustainable Research Excellence program from 2012, and the Minister for Innovation, Industry, Science and Research has indicated that it will be used in the future to inform the Research Training Scheme.

[28] More information on Excellence in Research for Australia can be found at http://www.arc.gov.au/era

APPENDIX 2 – LITERATURE REVIEW

A2.1. FEATURES OF HIGH QUALITY DOCTORATE PROGRAMS

The Council of Australian Deans and Directors of Graduate Studies released a *Framework for Best Practise in Doctoral Research Education in Australia* in 2007[29]. The framework identified the following points as part of its Guidelines for Best Practise in regards to quality research training environments:

- The generic skills component of a best practice doctoral program should include a generic skills program that is designed to extend the capabilities of a doctoral graduate as a person who is employable, can work well with others and can contribute beyond the area of their immediate research training. It may be tailored to the candidate's individual needs and/or the needs of their cohort group.
- Candidates should have an open, collegial and productive learning environment including a coordinated program of activity to integrate them into their university and faculty, school and/or department.
- A principal supervisor should be appointed to coordinate the research of each candidate. This person should be assisted by a colleague (such as an associate supervisor) or colleagues (such as an advisory team, supervisory panel) who may have different roles in the supervision process.
- Each candidate should be provided with the appropriate resources and facilities to enable the successful and timely completion of the degree.
- Each institution should have a readily-accessible policy on resources for research doctoral candidates.
- The progress of each candidate should be transparently monitored via a structured process with significant milestones, and regular monitoring/reporting of progress throughout candidature, including prior to submission for examination
- Each university should have a code of practice outlining the rights and responsibilities of doctoral candidates, their supervisors and the university.
- Candidates should be made aware of their university's policy relating to intellectual property before embarking on their program.
- If the research project involves assignment of intellectual property, the candidate should have access to independent legal advice, which should be paid for by the university through a third party such as the postgraduate candidates' association.

A2.2. INDICATORS OF QUALITY IN HIGHER DEGREE BY RESEARCH TRAINING

To answer the question "How might we measure quality in higher degree by research training?" the Group of Eight Directors and Deans of Graduate Studies (2011) have categorised outputs of research training as follows:

- Student learning outcomes: the graduates themselves (e.g. admission criteria, student load, number completed, graduate destination); outcomes – student satisfaction, completion rates/attrition,
- The research output: the contributions to knowledge generated by graduates, such as theses, publications, exhibitions, grants, inventions; outcomes – examination outcome, quality of examination, quality of outputs,
- Enhanced attributes and skills: research training programs undertaken leading to graduate know-how (program quality); student satisfaction, and

29 Council of Australian Deans and Directors of Graduate Studies, Framework for Best Practise in Doctoral Research Education in Australia (updated 2008), 2007.

- The quality of the HDR environment: evidence of the effectiveness of the HDR experience (critical mass in areas of research strength; mentoring and supervising structures, infrastructure for research and research training, international engagement, interdisciplinary research experience); student satisfaction; research environment.

A2.3. MINIMUM STANDARDS FOR RESEARCH TRAINING ENVIRONMENTS

In 1997, the Council of Australian Postgraduate Associations (CAPA) released the *Model Code for the Conduct of Postgraduate Research and Statement of Minimum Resources*. In 2004, CAPA released revised guidelines for minimum resources for postgraduate study, which have been widely adopted by Australian universities.[30] In November 2010, CAPA released a discussion paper outlining university performance in providing minimum resources for postgraduate students and the progress to date on the implementation of minimum resource policies.[31]

The paper indicates that 32 of the 38 universities now have minimum resource policies or statements in place, which will provide universities with the opportunity to identify and promote examples of best practise in minimum standards in resources for postgraduate study. However, CAPA indicates that the progress has been slow in many cases and a number of institution research policies remain under development. CAPA recommends that 'clear and transparent standards for Minimum Resources should be in place for all postgraduates at every higher education institute'.

Minimum resource standards are generally included as part of audit reports undertaken by the Australian Universities Quality Agency.

A2.4. INTERNATIONAL APPROACHES – UNITED KINGDOM

The UK's *Quality Assurance Agency for Higher Education Code of Practice for the assurance of academic quality and standards* (2004)[32] outlines requirements in more detail. It addresses the following:

- Institutional arrangements (including appropriate academic standards, enhancing the quality of postgraduate research programs and providing transparent regulations),
- The research environment (including providing support for doing and learning about research and an environment where high quality research is occurring),
- Selection, admission and induction of students (including clear admission procedures and process, only appropriately qualified and prepared students admitted; entitlements and responsibilities of a research student defined and communicated clearly; information about the academic and social environment),
- Supervision (including that supervisors should be appropriately skilled and with relevant subject knowledge; a minimum of one main supervisor; responsibilities of supervisors clearly communicated, supervision not put a risk by excessive volume and range of responsibilities),
- Progress and review arrangements (including clearly defined mechanisms for: monitoring and supporting student progress; formal reviews of student progress; and guidance on monitoring progress and providing appropriate records),
- Development of research and other skills (including opportunities for personal and professional development),
- Feedback mechanism (including that institutions will put in place mechanisms to collect review, and respond to feedback), and

30 Palmer, N., Minimum Resources for Postgraduate Study 2010. Melbourne, Australia: Council of Australian Postgraduate Associations (CAPA), 2010.

31 Ibid.

32 The Quality Assurance Agency for Higher Education, Code of Practise for the assurance of academic quality and standards in higher education: Section 1: Postgraduate research programmes, 2004.

- Assessment (including that clear and available criteria will be used for assessing research degrees that enable definition of the academic standards of different research programs and the achievements of graduates; clear procedures operated fairly and clearly communicated).

A2.5. INTERNATIONAL APPROACHES – GERMANY

In Germany, research and postgraduate study standards are measured by the Centre for Higher Education (CHE), which operates as a not for profit organisation to develop models to 'modernise' Germany's higher education systems and institutions.[33]

The centre undertakes a ranking of institutions each year based on a study of one third of disciplines (institutions must have been examined over three years to be included in the ranking). The centre has also extended this ranking to include Austrian and Swiss higher education institutions.

The ranking examines teaching, equipment, research and student evaluations about the study conditions at their institution. The academic research ranking is based on the level of third-party funding spent on individual subjects; the number of doctorates; the number of publications and citations; and the number of patent registrations or inventions. Citations per publication are also used as a research quality impact measure.

Students are able to use this information to search universities based on discipline and more detailed criteria such as infrastructure, teaching evaluation, reputation for academic studies and teaching and research details such as third party funding, amount of doctorates and number of publications. This provides incentive for institutions to perform well in such categories in order to attract high calibre students.

The centre is also currently undertaking an 'excellence ranking' of institutions across Europe to allocate departments or research fields within institutions membership of the Excellence Group, indicating a department's research strength, particularly in their higher degree programs.[34] This ranking commenced in 2007, and reviews several research fields periodically.

The CHE-Ranking Principles include:

- Neither an aggregation of individual indicators nor an overall score for an entire higher education institute, but rather a subject-related presentation of results.
- No weighed overall score for the research performance of a faculty, but rather a consideration of each indicator separately.
- No league table or ranks, but rather profiles of excellent institutions.

These principles represent a system that has a strong focus on individual indicators for separate subjects rather than aggregated or weighted overall results.

A2.6. THE STUDENT PERSPECTIVE

The Council of Australian Postgraduate Associations hosted a workshop in 2009, specifically targeting the research education experience.[35] Workshop attendees consisted of 37 participants from around Australia, the majority being current HDR students. Key themes discussed at these workshops included the research training experience; career pathways; and challenges faced in completing a research degree.

In discussions around the research training experience, participants highlighted the importance of the student-supervisor relationship, noting that supervisors were directly responsible for the very best and the very worst of the research training experience. The need for mentoring was emphasised, as was the importance of students being able to seek advice and support from outside of their supervisory team.

33 For more information on the Centre for Higher Education, see http://www.che-ranking.de/cms/

34 Centre for Higher Education Development (CHE), Identifying the Best: The CHE Excellence Ranking 2010, Germany, 2010.

35 Palmer, N., Council of Australian Postgraduate Associations (CAPA), The Research Education Experience, Report for the Department of Innovation, Industry, Science and Research, 2009.

Students noted the need for adequate resources to support the production and dissemination of their research, with some limitations currently experienced in this area, such as poorly resourced facilities, inadequate office space and inconsistencies in accessing funds to support research related costs.

Collegiality, the value of being treated as a colleague, and the experience of being part of an academic community were identified as positive aspects of the research student experience, including in relation to the development of career opportunities and prospects for a timely completion. The importance of academic freedom and the opportunity to pursue genuinely original research is also strongly valued by students.

In relation to career pathways, students highlighted skills development opportunities and career pathway opportunities for research students as key factors in research training.

However, students reported that they encountered ‘mixed messages’ around career options, with a perceived tension between teaching and research as part of the pursuit of an academic career. This was a negative factor, as many students already actively engage with both, and believe both are closely related.

In the completion of research degrees, students noted the importance of various forms of support and flexibility in helping reduce stress during candidature, especially around personal circumstances and time pressures associated with completing a research degree. Scholarships and top-up scholarships were seen as particularly valuable in supporting students to focus on research and successfully complete their degree.

With respect to the duration of a research degree, flexibility and support were key factors in the research training experience for students and were identified as having a direct influence on the time taken to complete a HDR.

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