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Building Australia's Research Capacity

House of Representatives
Standing Committee on Industry, Science and Innovation

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Contents

Foreword

When the Committee embarked upon an inquiry into research training and research workforce issues in Australian universities, it quickly became apparent that the challenges we face in boosting Australia's research training capacity are not simply confined to academia.

Equally compelling in the submissions received by the Committee in response to this inquiry, was the broadly shared recognition that many of the challenges we currently face in boosting our research capacity are in large part the result of years of neglect for research training in Australia, making the task of addressing these challenges all the more urgent.

The value of research and innovation in today's 'knowledge economy' cannot be overestimated. Australia's research reputation was once well-recognised and admired around the world. Unfortunately, instead of investing further in research training, we have rested on our laurels while the international research landscape has continued to change and develop. Australia's research climate has been allowed to lag behind world standards such that we now face severe challenges in bolstering our capacity for research and innovation.

Three key issues surfaced time and again during the course of the inquiry, especially as the Committee conducted public hearings around Australia.

First, there was unanimous agreement that the path to research begins not at university but at school, as early as the primary or secondary years. The challenges of recruiting and training researchers cannot be addressed fully at the tertiary level. To be timely and effective, Australia's strategy to improve research competitiveness must address fundamental factors that prepare potential researchers, such as a comprehensive curriculum, high-quality teaching and adequate infrastructure in Australian schools.

The current declining interest in, and standard of foundational subjects like maths, sciences, history and languages, is leading to both a shortage of teachers who are suitably-qualified in those areas to teach future generations of schoolchildren, and a decrease in the standard of tertiary-ready students. If students enter university without an adequate educational grounding, skills and knowledge, the task of inspiring and attracting them to consider further higher education is made even more difficult.

Second, there needs to be greater collaboration between universities and research institutes, schools and industry more broadly. Research training is not the sole purview of academia, nor is academia the sole beneficiary of research training. Research is of value to society as a whole, be it in academia, government, or small and large businesses.

In Australia, we still do not hold research and researchers in high esteem, despite the significant contribution they make to the nation. The low status of research careers is evidenced by continuing low levels of national investment, social recognition and relative remuneration.

Third, and perhaps most important, inadequate funding for research training and research careers remains the fundamental obstacle to building Australia's full research capacity. Under-funding of research across the spectrum is reducing Australia's international competitiveness in the areas of research and innovation.

The full cost of research training, whether it is provided by a university or a research institute, needs to be funded if Australia is to have healthy and dynamic research programs. Universities and institutes cannot provide a high standard of resources or outcomes with over-stretched budgets. Yet proper research training requires high-quality supervision, adequate infrastructure or the ability to access adequate infrastructure, and national and international collaborative research opportunities.

Moreover, just as in primary and secondary schools, Australian universities must retain their research and teaching staff to train Australia's next generation of researchers. Chronic under-funding has led to increased casualisation in the academic workforce, an over-reliance on short-term grants, and low salary scales relative to industry. The challenges in attracting and retaining academic staff at universities are exacerbated by the looming retirement of a significant section of the current academic workforce.

The cost to researchers-in-training also needs to be funded properly to mitigate the disincentives and difficulties associated with pursuing research study. Put simply, the current value of the PhD stipend for research students is nowhere near adequate. The supply of potential researchers is shrinking at the same time that international demand is growing, and Australia needs to invest heavily in attracting, training and retaining high-quality students.

This report conveys the inadequacy of current research training schemes to maintain Australia's research and innovation capacity. The recommendations contained herein, if implemented, will help ensure that Australia is building its national research capacity to the level required to support future growth.

Maria Vamvakinou MP
Chair

Membership of the Committee

Chair	Ms Maria Vamvakinou MP	
Deputy Chair	Hon Fran Bailey MP	
Members	Mr James Bidgood MP	Mr Michael Johnson MP
	Mr Nick Champion MP	Mr Rowan Ramsey MP
	Mr Darren Cheeseman MP	Ms Amanda Rishworth MP
	Dr Dennis Jensen MP	Mr Mike Symon MP

Committee Secretariat

Secretary	Mr Russell Chafer
Inquiry Secretary	Mr Anthony Overs
Research Officer	Ms Natalya Wells
Administrative Officers	Ms Naomi Swann
	Mr Angus Hogg

Terms of reference

The Inquiry will examine:

1. The contribution that Australian universities make to research training in Australia, including:
    a) The contribution of research training programs to Australia's competitiveness in the areas of science, research and innovation;
    b) The effectiveness of current Commonwealth research training schemes; and
    c) The adequacy of current research training schemes to support Australia's anticipated future requirements for tertiary-qualified professionals in a wide range of disciplines.
2. The challenges Australian universities face in training, recruiting and retaining high quality research graduates and staff, including, but not limited to:
    a) Adequacy of training and support (including income support) available to research graduate students in Australia;
    b) Factors for graduates that determine pursuit of a career in research;
    c) Opportunities for career advancement for research graduates and staff;
    d) Factors determining pursuit of research opportunities overseas;
    e) Australia's ability to compete internationally for high quality researchers; and
    f) Whether Australia's academic workforce is ageing, and the impact this may have on Australia's research capacity.

List of abbreviations and acronyms

AAH	Australian Academy of the Humanities
AARE	Australian Association of Research in Education
AAS	Australian Academy of Science
AATSE	Australian Academy of Technological Sciences and Engineering
ACDA	Australian Council of Deans of Agriculture
ACDE	Australian Council of Deans of Education
ACDS	Australian Council of Deans of Science
ACED	Australian Council of Engineering Deans
ACU	Australian Catholic University
ADBED	Australian Deans of Built Environment and Design
Adelaide	Adelaide University
AEU	Australian Education Union
AINSE	Australian Institute of Nuclear Science and Engineering
ANSTO	Australian Nuclear Science and Technology Organisation
APA	Australian Postgraduate Award
APAI	Australian Postgraduate Award (Industry)
ARC	Australian Research Council
ARCCE	Australian Research Council College of Experts

ASM	Australian Society for Microbiology
ATN	Australian Technology Network
ATSE	Australian Academy of Technological Sciences and Engineering
AUQA	Australian Universities Quality Agency
Batchelor	The Batchelor Institute of Indigenous Tertiary Education
CAPA	Council of Australian Postgraduate Associations
CDNM (ANZ)	Council of Deans of Nursing and Midwifery (Australia and New Zealand)
CHASS	Council for Humanities, Arts and Social Sciences
COAG	Council of Australian Governments
CPI	Consumer Price Index
CRC	Cooperative Research Centre
CRCA	Cooperative Research Centres Association
CSIRO	Commonwealth Scientific and Industrial Research Organisation
CSU	Charles Sturt University
CTS	Commercialisation Training Scheme
CUT	Curtin University of Technology
DDoGS	Council of Deans and Directors of Graduate Studies
Deakin	Deakin University
DIISR	Department of Innovation, Industry, Science and Research
ECU	Edith Cowan University
EIF	Education Investment Fund
EU	European Union
FASTS	Federation of Australian Scientific and Technological Societies

Flinders	Flinders University
FBT	Fringe Benefits Tax
GDP	Gross Domestic Product
GERD	Gross Expenditure on Research and Development
Griffith	Griffith University
HASS	Humanities, Arts and Social Sciences
HDR	Higher Degree by Research
HECS-HELP	Higher Education Contribution Scheme- Higher Education Loans Programme
HEP	Higher Education Provider
IPRA-TICHR	Institute Postdoctoral Researchers' Association at the Telethon Institute for Child Health Research
IGS	Institutional Grants Scheme
IPRS	International Postgraduate Research Scholarship
IRUA	Innovative Research Universities Australia
JCU	James Cook University
KTP	Knowledge Transfer Partnership
La Trobe	La Trobe University
LOTE	Language Other Than English
MDANZ	Medical Deans Australia and New Zealand
Monash	Monash University
MUPRA	Macquarie University Postgraduate Representative Association
Murdoch	Murdoch University
NCGP	National Competitive Grants Program
NCRIS	National Collaborative Research Infrastructure Strategy

NHMRC	National Health & Medical Research Council
NTEU	National Tertiary Education Union
NTEU-CQU	National Tertiary Education Union (Central Queensland University Branch)
NTEU-UQ	National Tertiary Education Union (University of Queensland Branch)
OECD	Organisation for Economic Co-operation and Development
PFRA	Publicly Funded Research Organisation
PSP	Personnel Support Package
QUT	Queensland University of Technology
R&D	Research and Development
RHD	Research Higher Degree
RIBG	Research Infrastructure Block Grant Scheme
RMIT	RMIT University
RPS	Regional Protection Scheme
RSPSE-ANU	Research School of Physical Sciences and Engineering at Australian National University
RTS	Research Training Scheme
SCU	Southern Cross University
SORTI	Members of the Centre for the Study of Research Training & Impact
STEM	Science, Technology, Engineering and Mathematics
SUPRA	Sydney University Postgraduate Representative Association
SUT	Swinburne University of Technology
UND	University of Notre Dame
UniMelb	University of Melbourne

UniSA	University of South Australia
UNSW	University of New South Wales
UOW	University of Wollongong
UQ	University of Queensland
USC	University of the Sunshine Coast
USQ	University of Southern Queensland
USyd	University of Sydney
UWA	University of Western Australia
UWS	University of Western Sydney
VET	Vocational Education and Training
VU	Victoria University
WEHIMR	Walter and Eliza Hall Institute of Medical Research

List of recommendations

2 The role of education in promoting Australia's research capacity

Recommendation 1

The Committee recommends that the quality of teaching and infrastructure at Australian primary and secondary schools be improved, particularly in the fields of maths and sciences. The Committee further recommends that the Australian Government and COAG investigate innovative measures taken overseas to address this particular concern.

3 Research funding

Recommendation 2

The Committee recommends that the Australian Government increase funding for research and development by raising incrementally the Gross Expenditure on Research and Development as a percentage of Gross Domestic Product over a ten year period until it equals the Organisation for Economic Cooperation and Development average.

Recommendation 3

The Committee recommends that the Australian Government determine and fund the number of Research Training Scheme places that will be required to meet current and future research training needs.

Recommendation 4

The Committee recommends that the Australian Government fund the full cost of each higher degree by research program at Australian universities through the Research Training Scheme and within all national competitive grant funding programs. This funding should take into account:

- the removal of the high-cost/low-cost funding differential that currently exists between research disciplines, subject to interim arrangements to ensure that no discipline is disadvantaged;
- the travel and accommodation needs of students for research collaboration, regardless of geographic location; and
- the provision and maintenance of a minimum standard of supervision and resources.

Recommendation 5

The Committee recommends that the Australian Government amend the current indexation measures for research training block grant schemes, to reflect real costs.

Recommendation 6

The Committee recommends that research training funding be disbursed, partially prospectively, to institutions according to a staggered formula: 50 per cent on enrolment, 20 per cent at a specified benchmark during the course of study, and 30 per cent at the point at which the student is informed that they have been awarded their degree.

Recommendation 7

The Committee recommends that the Australian Government retain the Commercialisation Training Scheme, currently in place until 2011, and evaluate the effectiveness of the scheme during the latter part of that period, with a view to extending the scheme.

Recommendation 8

The Committee recommends that the Australian Government develop and implement additional industry partnership programs, possibly modelled on Knowledge Transfer Partnerships, that will further facilitate connection between business and research institutions.

Recommendation 9

The Committee recommends that the Australian Government attach additional funds to research training scheme places that are secured by minority and under-represented students. This funding is for universities to provide the additional necessary assistance for minority and under-represented students throughout their candidature.

Recommendation 10

The Committee recommends that the Australian Government introduce a National Priority Postgraduate Research Scholarship Scheme that

provides competitive stipends to outstanding students in areas of national significance and skills shortage.

Recommendation 11

The Committee recommends that the Australian Government increase the funding pool for Australian Research Council and National Health and Medical Research Council grants to enable a minimum success rate for applicants of 40 per cent.

Recommendation 12

The Committee recommends that the Australian Government specify that competitive grants, in particular all National Health and Medical Research Council grants, fund the full cost of research in each program to which a grant has been awarded.

4 Funding and support for research students

Recommendation 13

The Committee recommends that the Australian Research Training Scheme PhD candidature period include the option of a six-month extension.

Recommendation 14

The Committee recommends that the duration of all federal postgraduate awards with stipends for PhD students be increased to three and a half years (full-time equivalent) with the option of two six-month extensions.

Recommendation 15

The Committee recommends that the Australian Postgraduate Award stipend value be increased by 50 per cent.

Recommendation 16

The Committee recommends that the APA stipend be fully indexed with CPI.

Recommendation 17

The Committee recommends that the Australian PhD candidature period be nominally extended beyond thesis submission until the time at which the student is informed that they will be awarded their degree.

Recommendation 18

The Committee recommends that access to Youth Allowance, Austudy or Abstudy be extended to all students enrolled in a higher degree by research, noting that:

- access to those schemes does not determine eligibility;
- candidates in receipt of a scholarship or other source of income above a determined assessment threshold would be ineligible; and
- access to those schemes should be regarded as secondary to access to a scholarship or award with an adequate living stipend.

Recommendation 19

The Committee recommends that the Australian Government work with State Governments to support postgraduate students through the reduction of certain living expenses, in particular, through the provision of concessions for public transport travel. Access to transport concessions should be made available to all full-time tertiary students, regardless of type of enrolment or the level of course in which they are enrolled.

5 Attracting students to research training

Recommendation 20

The Committee recommends that postgraduate research scholarships be exempt from assessable income for taxation, including part-time awards.

Recommendation 21

The Committee recommends a full remission of the HECS-HELP debt for successful research PhD graduates and a partial (50 per cent) remission for successful research Masters graduates, awarded upon conferral, and a tax deduction for successful research graduates who have already paid their HECS-HELP fees.

Recommendation 22

The Committee recommends that the Research Training Scheme guidelines be amended to enable higher degree by research students to enrol jointly at two institutions, with student load and completion credited to both institutions.

Recommendation 23

The Committee recommends that the Commonwealth Scholarship Guidelines be amended to give award recipients greater flexibility in undertaking all or part of a higher degree by research on a part-time basis.

Recommendation 24

The Committee recommends a review of the ranking criteria for Research Training Scheme places and Australian Postgraduate Awards for greater consistency and to account for diverse backgrounds and entry points.

Recommendation 25

The Committee recommends that the Australian Government introduce a scheme to fund relocation costs for students who choose to undertake research training in regional universities.

Recommendation 26

The Committee recommends that the Australian Government develop and implement appropriate measures to encourage the recruitment of Indigenous, regional and rural Australians to higher degrees by research.

Recommendation 27

The Committee recommends a doubling in the annual number of IPRS awards to accommodate a greater number of international students.

Recommendation 28

The Committee further recommends that the value of the IPRS be increased to fully fund the tuition fees for each course of study.

Recommendation 29

The Committee recommends that Endeavour international postgraduate scholarships be rationalised and simplified for greater accessibility and competitiveness.

Recommendation 30

The Committee recommends that international student visa policies relating to higher degree by research programs be amended to allow greater flexibility for further research and employment.

Recommendation 31

The Committee recommends that the Australian Government work with the States to ensure that the dependents of all international higher degree by research students enrolled at Australian universities are subject to the same fee levels as local students at government primary and secondary schools.

6 Research Careers

Recommendation 32

The Committee recommends that the Australian Government waive Fringe Benefits Tax incurred by businesses or institutions that employ staff undertaking higher degrees by research.

Recommendation 33

The Committee recommends that the Australian Government, in conjunction with universities and research institutes, follow the example of successful advocacy programs overseas and implement a national research career campaign to market the value of research training to schools, communities and industry, and raise the profile of research careers in Australia.

Recommendation 34

The Committee recommends that the Australian Government implement a postdoctoral fellowship scheme targeted at early-career researchers who are up to five years out from PhD completion.

Recommendation 35

The Committee recommends that the Australian Government implement a quota of 10 per cent of ARC and NHMRC successful grants to be allocated to early-career researchers who are first-time awardees.

Recommendation 36

The Committee recommends that the Australian Government implement a scheme that funds 25 per cent of the first two years of salary of postdoctoral researchers in industry areas of national skills priorities in order to promote the value of research graduates to industry.

Recommendation 37

The Committee recommends that research Centres of Excellence schemes, such as the ARC Centres of Excellence, and other research networks be expanded to continue stimulating research and industry links in areas of national importance across Australia.

Recommendation 38

The Committee recommends an expansion of fellowship schemes targeted specifically at expatriate and international researchers that offer competitive salaries and sufficient start-up support to establish research projects prior to competing for national competitive grants.

1

Introduction

1.1 High quality research training is essential for a sound innovation system in Australia.

1.2 This inquiry aimed to identify the key flaws in the current research training system and this report suggests measures to remedy those flaws.

1.3 Despite Australian researchers' high standing in the international community, many high school and university students do not see the value in a career as a researcher.

1.4 The Committee hopes that a fully-funded research training system will encourage people to pursue a research career.

1.5 The Australian Government's doubling of the number of Australian Postgraduate Awards, for example, is a key step in increasing our commitment to effective research training.

1.6 It is hoped the measures outlined in this report will boost Australia's research training capacity significantly.

Policy reviews

1.7 Two significant policy reviews were conducted in 2008:

- Review of Australian Higher Education (the Bradley review)
- Review of the National Innovation System (the Cutler review)

1.8 It is envisaged that the recommendations from this report will complement these two reviews.

Background to the inquiry

1.9 The Committee agreed on 23 April 2008 to conduct an inquiry into research training and research workforce issues in Australian universities. The inquiry was referred to the Committee by Senator the Hon Kim Carr, the Australian Government Minister for Innovation, Industry, Science and Research.

1.10 The Terms of Reference called for the Committee to inquire into the contribution that Australian universities make to Australian research training, and the challenges Australian universities face in recruiting, training and retaining quality research staff in Australia. In particular, the inquiry was to examine:

- The contribution that Australian universities make to research in Australia, including:
  - ⇒ The contribution of research training programs to Australia's competitiveness in the areas of science, research and innovation;
  - ⇒ The effectiveness of current Commonwealth research training schemes; and
  - ⇒ The adequacy of current research training schemes to support Australia's anticipated future requirements for tertiary-qualified professionals in a wide range of disciplines.
- The challenges Australian universities face in training, recruiting and retaining high quality research graduates and staff, including, but not limited to:
  - ⇒ Adequacy of training and support (including income support) available to research graduates in Australia;
  - ⇒ Factors for graduates that determine pursuit of a career in research;
  - ⇒ Opportunities for career advancement for research graduates and staff;
  - ⇒ Factors determining pursuit of research opportunities overseas;
  - ⇒ Australia’s ability to compete internationally for high quality researchers; and

- ⇒ Whether Australia's academic workforce is ageing, and the impact this may have on Australia's research capacity.

1.11 The inquiry was advertised in *The Australian* and the *Australian Financial Review* on 3 May 2008.

1.12 The Committee sought submissions from relevant Australian Government ministers and from state and territory governments. In addition, the Committee sought submissions from all of Australia's universities and a wide range of university and research peak and representative bodies.

1.13 The Committee received 106 submissions, and six supplementary submissions. These submissions are listed at Appendix A.

1.14 Submissions were received from most Australian universities. Key submissions were received from various university and academic representative bodies, as well as student advocacy bodies. Valuable submissions were also received from individual academics.

1.15 The Committee received 13 exhibits to the inquiry, which were provided in addition to written submissions, received during public hearings or sent to the Committee by other parties. These are listed in Appendix B.

1.16 The Committee held 14 public hearings across Australia, in Canberra, Melbourne, Sydney, Adelaide, Brisbane, Townsville, Perth and Batchelor in the Northern Territory. The Committee called 64 witnesses. These witnesses are listed in Appendix C.

1.17 The Committee carried out a number of inspections at universities during the course of the inquiry. The Committee is grateful to those institutions that shared their research training experiences.

Structure of the report

1.18 The inquiry covered a wide range of research training issues, however the majority of issues related to the adequacy of funding.

1.19 Chapter Two provides a discussion on education in Australia, with commentary on developing interest in research, the quality of teaching and the value of the Honours years.

1.20 Chapter Three examines the key issues of funding for national research and development, funding for universities that provide

research training, and funding for research through competitive grants.

1.21 Chapter Four examines the critical issue of funding and support for postgraduate students, including adequate value of scholarship stipends.

1.22 Chapter Five discusses ways to attract students to research training, and the key issue of international students in Australia.

1.23 Chapter Six examines research career pathways and ways to address the ageing academic workforce issue.

2

The role of education in promoting Australia's research capacity

Introduction

2.1 There is little doubt that Australia's education system plays a significant role in underpinning Australia's research capacity and hence its national competitiveness in science, research and innovation.

2.2 La Trobe University submitted that:

> … the assessment of innovation should include the role of education … for training minds for flexible responses and lateral thinking.[1]

2.3 The South Australia Government argued that it is essential that Australia has:

> … an education system ensuring high quality teaching and learning in maths and science and the social sciences at all levels of the education system.[2]

2.4 The Committee agrees that the 'development of an interest in a research career is a process that starts in childhood'.[3] This chapter examines the role of the entire education system – at the primary and

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1 La Trobe, *submission 48*, p. 2.

2 South Australia Government, *submission 98,* p. 2.

3 Universities Australia, *submission 82*, p. 11.

secondary school level, undergraduate tertiary level, and Honours year – in promoting interest in research.

Developing an interest in research: primary and secondary education

2.5 The Committee received overwhelming evidence testifying to the importance of the primary and secondary years as a "critical window" for developing a love of learning, an interest in research and an awareness of the myriad career options available in research.[4]

2.6 The Walter and Eliza Hall Institute of Medical Research (WEHIMR) stated that 'the engine house of Australia's future innovation is its primary and secondary schools'.[5]

2.7 Australia's supply of potential researchers depends on the ability of primary and secondary education systems to encourage inquisitive and creative minds to consider the possibilities of research. This outcome can be achieved by enhancing the attractiveness of foundational curriculum subjects, the quality of teachers in Australian schools, equity in access and infrastructure, and exposure to researchers.

Curriculum

2.8 A key element in feeding the research pipeline is the availability and attractiveness of basic curricula to primary and high school students that enable them to pursue emerging interests and build further skills. A secondary element is the production of qualified teachers to underpin a strong curriculum and nurture research interest.

2.9 Australian Education Union noted that:

> In our high school years and, prior to that, in our primary years where we prepare our students for high school, we should not lose sight of the importance of a broad and balanced education and a broad and balanced individual.[6]

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4 AAS, *transcript of evidence 18 June 2008*, p. 2; Mrs Sandra Muecke, *transcript of evidence 6 August 2008*, p. 62; CSIRO, *transcript of evidence 3 September 2008*, p. 11; CRCA, *transcript of evidence 3 September 2008*, p. 13; WEHIMR, *submission 34*, p. 2; AEU, *submission 99*, p. 1.

5 WEHIMR, *submission 34*, p. 2.

6 AEU, *transcript of evidence 9 September 2008*, p. 18.

2.10 Australian Education Union further submitted that:

> We need to get it right with the science and the maths curriculum and other areas of learning. The inquisitive mind is not only restricted to science teaching and maths teaching. History can develop an inquiring mind and instil a love of research; any subject can. If we properly resource it and provide the resources in our schools to achieve it, then we will go a long way as a nation.[7]

2.11 The Committee is concerned that students currently shun subjects in the sciences, maths and humanities in favour of other subjects that appear easier or more attractive in terms of maximising tertiary entrance scores. This is likely to lead to fewer students acquiring the basic skills and knowledge that are required later in life to embark upon a research pathway.

2.12 Australian Education Union attributed changing student choices to changes in school curricula:

> Some 10- or 15-odd years ago or 20 years ago, when maths and science were simply not considered sexy, if I can use a populist term … we had a dramatic decline in the number of students participating … in the same numbers in the sciences, the maths and the humanities, including history, for example … That is largely because we saw an expansion—this is not uniform across the country, of course, but it is applicable in some ways—of a range of other subject areas that were introduced in the senior curriculum, including computing studies and legal studies. A whole series of studies were introduced in the curriculum, such as business studies. There was the whole expansion of vocational education and training subjects in the higher secondary area … [8]

2.13 The broader curriculum may have contributed to the decreasing number of high school students opting to study science subjects. The Australian Academy of Science links the declining number of science students to the current shortage of scientists and engineers.[9]

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7 AEU, *transcript of evidence 9 September 2008*, p. 21.

8 AEU, *transcript of evidence 9 September 2008*, p. 17.

9 AAS, *Research and Innovation in Australia: a policy statement*, September 2007, p. 7; <www.science.org.au/reports/aas-policy-2007.pdf>, viewed 28 October 2008.

2.14 Flinders University noted that mathematics and languages are two other areas wherein Australia's future capacity is compromised.[10] The Australian Academy of the Humanities also alleged that Australia's language capacity requires attention given the low level of foreign language acquisition skills at the postgraduate level.[11]

2.15 University of Queensland is addressing the lack of interest in these fields by offering bonus points to tertiary entrance ranks to students who successfully undertake a specific mathematics level or a Language Other Than English (LOTE) in Year 12.[12]

2.16 Australian National University noted that:

> Clearly, stimulating primary school and secondary school students to go on not only in science, technology, engineering and mathematics but also in languages other than English—those sorts of areas where we are starting to see shortages in our tertiary sector—would be very valuable, but it is something that would take considerable investment.[13]

2.17 The Committee commends the current national curriculum process which has drawn attention to much-needed changes to Australia's school curriculum, and looks forward to the National Curriculum Board's curriculum plan.

Quality of teaching and infrastructure

2.18 The Committee acknowledges the importance of highly-qualified teachers as role models and sources of inspiration in demonstrating and promoting the relevance of research to students.

2.19 The Committee is of the opinion that the quality of teaching in primary and secondary schools is a significant area for improvement and investment. The Committee expresses concern at the shortage of properly-qualified science and maths teachers, and the fact that teachers are placed in classes with little or no training in the subject matter.[14]

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10 Flinders, *submission 78*, p. 2.

11 AAH, s*ubmission 61*, p. 12.

12 UQ, *supplementary submission 100.1*, p. 3.

13 ANU, *transcript of evidence 27 August 2008*, p. 15.

14 Group of Eight, *transcript of evidence 25 June 2008*, p. 6; AATSE, *submission 6*, p. 5; see Harris, Kerri-Lee et.al., *Who's Teaching Science? Meeting the demand for qualified science teachers in Australian secondary schools*, January 2005, <www.acds.edu.au/>, viewed 29 October 2008.

2.20 Barry McGaw, chairman of the National Curriculum Board, also flagged a potential hitch in the introduction of the revised curriculum, to be launched in 2011, if the current short-fall of history, maths and science teachers is not addressed.[15]

2.21 Australian Academy of Science submitted that:

> First year university teaching now has many remedial elements, to accommodate the deficiencies arising from inadequate schooling and the less rigorous entry standards adopted to fill quotas.[16]

2.22 Australian Academy of Science believes that:

> … Australia will not be able to heighten its skills in mathematics and science until it ensures that prospective scientists are taught by teachers with degrees in the disciplines for which they are responsible … Only when programs are expanded to encourage high school students to study science and mathematics through teachers with degrees in their teaching disciplines can other issues such as tertiary level research training be fully addressed.[17]

2.23 The Committee is of the opinion that better employment conditions are necessary to attract and retain high-quality teachers in all fields and believes that this is an area that deserves further attention. The Committee is aware of innovative practices, particularly overseas, such as competitive remuneration, performance or qualification bonuses, tax deductions for further education costs, high-standard in-service training, and constant evaluation.[18]

2.24 Australian Education Union also noted the importance of adequate and well-maintained infrastructure:

> High quality teaching and learning also requires high quality infrastructure, including buildings, science facilities and equipment.[19]

2.25 The Commonwealth Scientific and Industrial Research Organisation (CSIRO) described their experience with taking science programs into schools with under-supported infrastructure:

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15 Farrah Tomazin, 'New curriculum's teacher challenge', *The Age*, 12 November 2008, p. 12.

16 AAS, *submission 45*, p. 3.

17 AAS, *submission 45*, p. 3.

18 AEU, *transcript of evidence 9 September 2008*, p. 25.

19 AEU, *submission 99*, p. 1.

> … we have to face up to the fact that unless we take equipment there, the schools often do not have it. We are looking forward to the use of broadband and so on to help that, but it is a major problem.[20]

2.26 Investment in infrastructure has been found to be applied unevenly across Australian schools; a recent study found a major per capita gap of over $1 000 between public and private school capital funding.[21]

2.27 The Committee believes that every student should have access to adequate learning facilities, and recommends the improvement of infrastructure in all Australian primary and secondary schools.

Recommendation 1

The Committee recommends that the quality of teaching and infrastructure at Australian primary and secondary schools be improved, particularly in the fields of maths and sciences. The Committee further recommends that the Australian Government and COAG investigate innovative measures taken overseas to address this particular concern.

Equity

2.28 The Committee is mindful of the need for all students, regardless of geographical location, background or socio-economic status, to have equal access to adequate curriculum, infrastructure and high-quality teachers.

2.29 Australian Education Union argued that:

> … we need to ensure that every kid has access to the same rigorous, rich and rewarding curriculum … People who talk about a different curriculum for some kids as opposed to others basically are arguing that some kids should not have the keys that open the doors of opportunity in this world of ours.[22]

20 CSIRO, t*ranscript of evidence 3 September 2008*, p. 7

21 Adam Rorris, *Rebuilding Public Schools*, June 2008, p. 14, <www.aeufederal.org.au/Publications/Rebpucschls.pdf>, viewed 17 November 2008.

22 AEU, *transcript of evidence 9 September 2008*, p. 21.

2.30 Curtin University of Technology told the Committee that:

> I think sometimes, under the guise of excellence and standards, we have actually narrowed opportunities for our young people to pursue science and math … we create an elitism in those areas. Schools do not want their [Tertiary Entrance Rank] scores to look bad, so they channel children [away from certain subjects] who might have capability but who may not do justice to the curve … [23]

2.31 The Committee is committed to the principle of equality of access to education, and encourages the availability of learning opportunities in all disciplines.

Exposure to researchers

2.32 The Committee supports efforts to link school students with researchers and professionals as a means to demonstrate the relevance of studying mathematics, hard sciences, humanities and languages. Year 10 and 12 work experience is one such program which enables students to gain an insight into career possibilities.

2.33 Several submissions to the inquiry mentioned initiatives designed to support greater industry-school linkages. CSIRO runs a 'Scientists in Schools' program which contributes to the authenticity and appeal of studying science subjects[24] as well a national Student Research Scheme which provides secondary students with research experience with scientists.[25] The Australian Nuclear Science and Technology Organisation (ANSTO) conducts school group tours and provides resources to teachers on salient topics such as climate change and water.[26] Many Cooperative Research Centres (CRCs) have developed educational resources, science kits, and workshops for pre-school, primary and secondary levels.[27]

2.34 The Committee welcomes these and similar State-funded programs, and encourages access by as many schools as possible, particularly in rural and regional Australia.

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23 CUT, *transcript of evidence 12 August 2008*, p. 31.

24 See CSIRO, *submission 83*.

25 Dr Adam Cawley, *transcript of evidence 5 August 2008*, p. 40; see also <www.csiro.au/org/StudentResearchScheme.html>.

26 ANSTO, *transcript of evidence 5 August 2008*, p. 81.

27 See CRCA, *submission 41*.

Developing an interest in research: tertiary education

2.35 The pipeline that feeds future researcher generations continues to experience problems at the tertiary level: inadequate standards of prior education; declining interest in science and mathematics degrees; and decreasing quality of teaching. The value and role of the Australian Honours degree is also under discussion.

Undergraduate education

2.36 Some submitters criticised a perceived lowering of academic standards at universities in response to falling numbers of prospective students with appropriate prerequisites and interest in subjects perceived to be difficult. The Australian Academy of Technological Sciences and Engineering warned that:

> There is a need in undergraduate courses to ensure that [they] are not overly vocational. Students must receive an adequate grounding in basic sciences if they are to successfully undertake postgraduate research studies. This is seen to be a particular problem in the applied environmental sciences.[28]

2.37 Research Australia argued that vocational training has neglected research skills development, leaving students ill-equipped to contemplate a research career.[29]

2.38 RMIT University recommended that the Australian government introduce undergraduate internships in research fields of current priority.[30]

2.39 Furthermore, the quality of teaching is at risk due to unfavourable employment trends. The University of Queensland Branch of the National Tertiary Education Union (NTEU-UQ) submitted that:

> The quality of teaching in Australian universities has suffered from funding cuts and restructuring, resulting in:
>
> - reduced numbers of tenured academics,
> - reduced range of expertise within the faculty,
> - greatly increased teaching and administrative loads on remaining academics,

28 AATSE, *submission 6*, p. 6.

29 Research Australia, *submission 70*, p. 10.

30 RMIT University, *submission 63*, p. 3.

- engagement of casual staff and graduate students to undertake teaching, including course coordination.[31]

2.40 Australian Universities Quality Agency (AUQA) argued that a high proportion of research-active academics at universities sustains the kind of 'intellectual climate' that fosters an appreciation for research.[32] The University of Western Sydney agreed that 'students catch the research bug through exposure to enthusiastic researchers as lecturers'.[33]

2.41 However, only seven Australian universities employ academic staff with a 70 per cent or greater rate of PhD qualifications, and 14 universities struggle to employ more than 55 per cent of their staff with PhD qualifications.[34] The submission from the Australian Deans of Built Environment and Design (ADBED) admitted that, although many potential employees possess excellent practical experience, finding academic staff with PhD qualifications and research backgrounds is problematic in that discipline.[35]

Honours

2.42 The Committee received evidence both supporting and contesting the role of the undergraduate Honours year in the pathway to higher degrees by research. Honours is generally considered an important step for research training to be encouraged among undergraduate students. On the other hand, there are calls to modernise the current degree structure. The Committee also recognises that post-Honours entry to higher degrees by research is no longer the primary entry point to research training and as such, the degree structure should accommodate various entry points.

2.43 Drs Zeegers and Barron claimed that there was a:

> … 12% increase of graduates going from Honours degrees to higher research degrees between 1992 and 2001, suggesting that the relevance of Honours in relation to research degrees is a salient consideration for the future of research training to

31 NTEU-UQ, *submission 59*, p. 7.
32 AUQA, *submission 14*, p. 6.
33 UWS, *submission 10*, p. 4.
34 ANU, s*ubmission 23*, p. 1.
35 ADBED, s*ubmission 39*, pp. 4-5.

> support Australia's anticipated future requirements for tertiary-qualified professionals.[36]

2.44 They further suggested that:

> … the assumption of a vibrant Honours program increas[es] the likelihood of cohorts of well trained researchers for timely, if not early, completions, and further provid[es] a pool of possible future academics to staff university programs and high level industry placements.[37]

2.45 Research Australia suggested providing Honours scholarships to attract students who might otherwise choose competitive graduate salaries over the expense of another year of study.[38]

2.46 However, the 'honours pathway to a PhD is an Australian story'[39] that has been labelled 'internationally … an anachronistic gold standard'.[40] Not only does it compare unfavourably with international norms, assessing Honours equivalence for the growing number of non-Honours applicants is problematic.[41] Griffith University advised that half their higher degree by research students possessed alternative qualifications, such as Masters by coursework.[42]

2.47 The Australian Council of Deans of Education submitted that Honours is not the preferred pathway in the education field:

> Research in education is typically applied research that requires the research student to be familiar with a broad range of professional issues, and to grasp the complex interface between theory and contexts of policy formation and professional practice. The undergraduate honours pathway, by itself, is unlikely to provide this grounded professional expertise.[43]

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36 Dr Margaret Zeegers and Dr Deirdre Barron, s*ubmission 3*, p. 2.

37 Dr Margaret Zeegers and Dr Deirdre Barron, s*ubmission 3*, p. 2.

38 Research Australia, *submission 70*, p. 3.

39 CUT, *transcript of evidence 12 August 2008*, p. 45.

40 Griffith, *transcript of evidence 18 August 2008*, p. 40.

41 CUT, *transcript of evidence 12 August 2008*, p. 45. Assessing equivalence is also inconsistent, as the Commonwealth Scholarships Guidelines give the responsibility of determining First Class Honours equivalence to each individual higher education provider: *Higher Education Support* (*Commonwealth Scholarships Guidelines) Act 2003*, p. 10.

42 Griffith, *transcript of evidence 18 August 2008*, p. 40.

43 ACDE, s*ubmission 88*, p. 2.

2.48 In 1999, European nations instituted the Bologna process to standardise academic degrees throughout Europe, and subsequently adopted the Bologna degree structure, which is comprised of a broad three- or four-year undergraduate degree, a more specialised two-year Masters degree, and a three-year research doctoral degree.

2.49 Some submissions indicated a preference for the Bologna model over Australia's shorter undergraduate-Honours-PhD framework,[44] and in fact the University of Melbourne has already instituted a Bologna-like degree structure.[45]

2.50 The Committee recognises that Australian graduates may not compete effectively against Europeans or Americans whose countries:

> … do not assume that merely by having a prior degree with some research training (e.g., Honours in Australia) that students are adequately prepared for PhD level research.[46]

2.51 The Committee supports the continuation of an assessment by an Australian Government steering group and the tertiary sector of the suitability of Australia's research training model for current globally-competitive conditions.[47]

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44 Professor Peter Drummond, *submission 58*, p. 1; Griffith, *transcript of evidence 18 August 2008*, p. 40; NTEU-CQU, *transcript of evidence 19 August 2008*, p. 2.

45 <www.futurestudents.unimelb.edu.au/about/melbournemodel.html>, viewed 12 November 2008.

46 Professor Allan Borowski, *submission 103*, p. 1.

47 <www.aei.gov.au/AEI/GovernmentActivities/BolognaProcess/NatSeminar.htm>, viewed 26 November 2008.

3

Research funding

3.1 This chapter examines several key research funding issues, namely funding for:

- national research and development;
- universities, so that they can provide research training; and
- career researchers.

National Research and Development funding

3.2 Universities Australia provided comments and significant summarised data on Australia's commitment to Research and Development (R&D):

> While Australia's science and technology system is strong, it has failed to reach its full potential because of insufficient public and private investment. Gross Expenditure on Research & Development (GERD) as a percentage of Gross Domestic Product (GDP) is at 1.76 per cent, well below the OECD average of 2.26 per cent.[1]

3.3 The estimated 'gap' between 1.76 per cent and 2.26 per cent is approximately $5 billion (based on Australia's GDP of approximately $1 000 billion[2]).

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1 Universities Australia, *submission 82*, p. 5.

2 The Australian Bureau of Statistics listed Australia's GDP for 2007-08 at $1037.027 billion; <www.abs.gov.au/AUSSTATS/abs@.nsf/mf/1345.0>, viewed 11 November 2008.

3.4 Universities Australia added:

> … the government contribution to research funding has diminished considerably from 76.5 per cent in 1978-79 to just 41.4 per cent in 2004-05. Industry financing of GERD as a percentage of GDP is also very low by OECD standards (Australia 0.91 per cent, OECD average 1.4 per cent, and Sweden, Finland and Japan in excess of 2 per cent).[3]

3.5 University of Notre Dame commented on limited research and development funding and its impact on Australia's international standing:

> I think it is very difficult to innovate if you are dealing with a very small pie. By way of comparison, look at a country like Japan, where I understand there are over 700 institutions of higher education and they have a very different culture, I think, around R&D. You can see that with the success that they have achieved. Very roughly factoring in the population differential between Japan and Australia, that still leaves them with around 500 higher education institutions—an overservicing, if you like—around which the benefits of incredible investments into R&D can be seen. That sort of comparison places us so far behind countries like Japan, and I would argue it comes back to the sort of value we place on education and R&D. You really need to be prepared to put your money where you want your outcomes to be.[4]

3.6 University of South Australia commented on international examples of R&D expenditure, and recommended that Australia set a similar target:

> In Lisbon, March 2000, EU heads of state and government agreed on making the EU "the most competitive and dynamic knowledge-based economy in the world, capable of sustainable economic growth with more and better jobs and greater social cohesion". The Lisbon Summit agreed that this required a necessary investment in R&D – 3% of GDP. Between 1991 and 2004, total investment in R&D in China grew thirteen-fold and India passed the 1% threshold for GERD as a percentage of GDP in 2004. Australia should set a target of 3% of GDP for investment in R&D (GERD) recognising that research productivity and high calibre research training is driven by investment and a strong competitive system that rewards excellence wherever it occurs.[5]

3 Universities Australia, *submission 82*, p. 5.

4 UND, *transcript of evidence 12 August 2008*, p. 39.

5 UniSA, *submission 32*, p. 9.

3.7 Innovative Research Universities Australia (IRUA) stated that the Australian Government has acknowledged that Australia's R&D spending, at 1.8 per cent of GDP in 2004, is not adequate for Australia to maintain its international competitiveness.[6]

3.8 NTEU-UQ suggested that Australia spends less on R&D than almost all other OECD countries, adding that limited public funding has had a profound impact on universities:

> In 2006, Government budget appropriations for R&D were just 0.54% of GDP, compared to 0.72% for the UK, 1.03% for the US, and 0.8% for the entire OECD. Not only has Australia failed to keep pace with its international colleagues, it has substantially withdrawn public funding to the tertiary sector over the past decade, resulting in damaging downsizing of most teaching and research units.[7]

3.9 Dr Adam Cawley provided open and frank comments on university involvement in and approach to R&D:

> Australia has a unique distribution of R&D in comparison to other modern economies with nearly two-thirds conducted by universities compared to half in the United Kingdom and one-third in the United States. This poses both opportunities and challenges to differentiating ourselves by developing niche capabilities. Universities need to develop their own strategies towards long-term sustainability of research programs. These institutions should be considered to have appropriate foresight in terms of strategic direction, not the unresponsive nature of governments … Australia's innovation system needs universities to play to their strengths and not be consumed by the idealism of being all things to all students. This approach will benefit both established metropolitan universities and contemporary regional universities.[8]

3.10 The final report of the *Australia 2020 Summit* recommended a doubling of R&D investment by 2020.[9]

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6 IRUA, *submission 51*, p. 1; Senator the Hon Kim Carr, address to National Press Club of Australia – *Science Serving Society*, 19 Mar 2008, <minister.innovation.gov.au/Carr/Pages/SCIENCESERVINGSOCIETY.aspx>, viewed 11 November 2008.

7 NTEU-UQ, *submission 59*, p. 3.

8 Dr Adam Cawley, *submission 92*, p. 1.

9 Australia 2020 Summit (2008) *Final Report*. Department of the Prime Minister and Cabinet, Barton, p. 31.

3.11 Ideas concerning R&D expenditure put forward by participants during the Summit discussion included:

- Commit to a long-term national R&D expenditure that is substantially above the OECD average as a fraction of GDP.[10]
- The average OECD spend on research and development is 3 per cent of GDP. Australia should spend 3.6 per cent of GDP on R&D to catch up—1.6 per cent from direct government expenditure and up to 2 per cent from dollar-for-dollar matching (1 per cent from government and 1 per cent from the private sector).[11]
- After we catch up with the OECD average we should maintain expenditure at 3.6 per cent to ensure that we remain among the top nations for innovation.[12]

3.12 The Committee is deeply concerned that Australia is well behind other countries in terms of expenditure on R&D. The Committee agrees that expenditure needs to be raised dramatically and recommends that the Australian Government increase funding for R&D by raising incrementally the GERD as a percentage of GDP over a ten year period until it equals the OECD average.

Recommendation 2

The Committee recommends that the Australian Government increase funding for research and development by raising incrementally the Gross Expenditure on Research and Development as a percentage of Gross Domestic Product over a ten year period until it equals the Organisation for Economic Cooperation and Development average.

10 Australia 2020 Summit (2008) *Final Report*. Department of the Prime Minister and Cabinet, Barton, p. 11.

11 Australia 2020 Summit (2008) *Final Report*. Department of the Prime Minister and Cabinet, Barton, p. 25.

12 Australia 2020 Summit (2008) *Final Report*. Department of the Prime Minister and Cabinet, Barton, p. 25.

Universities and funding for research training

3.13 The majority of submissions to the inquiry commented on the fact that research training in Australia is chronically under-funded.

3.14 Australian National University commented on the funding situation that Australian universities face:

> … we are chronically partially funded for everything we do. We are partially funded for research, we are partially funded for PhDs, we are partially funded for undergraduate programs, we are partially funded for infrastructure, and the assumption is that we can make do. Sooner or later partial funding is just incremental, not even very genteel, decay. We have got to change that.[13]

Government support for research training

3.15 The Australian Government Department of Innovation, Industry, Science and Research (DIISR), in its submission to the inquiry, outlined the funding programs that currently support research training in Australia.

3.16 DIISR administers the following 'block grant' programs:

- Research Training Scheme;
- Australian Postgraduate Award;
- International Postgraduate Research Scholarships; and
- Commercialisation Training Scheme.[14]

3.17 DIISR explained that block grant program funds are allocated to universities using program-specific formulae that reward the performance of universities in attracting research income, disseminating research results in mainly peer-reviewed publications and through the successful completion of research degrees.[15]

3.18 DIISR further explained that the Australian Research Council (ARC) administers the Australian Postgraduate Award (Industry) scholarships.[16]

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13 ANU, *transcript of evidence 27 August 2008*, p. 24.
14 DIISR, *submission 50*, p. 3.
15 DIISR, *submission 50*, p. 3.
16 DIISR, *submission 50*, p. 3.

3.19 DIISR outlined other research training support mechanisms:

> Publicly funded research agencies, such as the Commonwealth Scientific and Industrial Research Organisation (CSIRO), play a key role in the training of research students in collaboration with the higher education sector as do Cooperative Research Centres (CRCs).[17]

3.20 DIISR further explained that other portfolios support research training:

> … through competitively funded research programs and by dedicated mechanisms such as the National Health and Medical Research Council scholarships, the Endeavour program, the Australian Development Scholarships and Australian Leadership Awards provided by AusAID.[18]

3.21 The Australian Government also supports the funding of research training through:

- Research Infrastructure Block Grants Scheme, which provides block grants to eligible higher education providers to enhance the development and maintenance of research infrastructure.[19]
- Institutional Grants Scheme, which provides block grants to eligible higher education providers to support research and research training activities.[20]
- Regional Protection Scheme, which helps to protect designated regional higher education providers from losses of income against their indexed 2001 Research Training Scheme and IGS combined grants.[21]

3.22 In addition to research funding, the Australian Government supports the funding of education infrastructure, through the Education Investment Fund (EIF). This fund, a 2008-09 Federal Budget initiative, absorbs the $6 billion allocated to the Higher Education Endowment Fund and receives an additional $5 billion from the 2007-08 and 2008-09 Budgets. The EIF will be focused on capital expenditure and renewal and refurbishment in

17 DIISR, *submission 50*, p. 4.

18 DIISR, *submission 50*, p. 4.

19 <www.dest.gov.au/sectors/research_sector/programmes_funding/general_funding/research_infrastructure/research_infrastructure_block_grants_scheme.htm>, viewed 12 November 2008.

20 <www.dest.gov.au/sectors/research_sector/programmes_funding/general_funding/operating_grants/institutional_grants_scheme.htm>, viewed 13 November 2008.

21 <www.dest.gov.au/sectors/research_sector/programmes_funding/programme_categories/professional_skills/Regional_Protection_Scheme_2007.htm>, viewed 13 November 2008.

universities and vocational institutions as well as in research facilities and major research institutions.[22]

3.23 Discussion and analysis of these schemes can be found further in this chapter.

Research Training Scheme

3.24 DIISR outlined how the Research Training Scheme (RTS) works:

> The RTS provides block grants, on a calendar year basis, to eligible universities to support research training for domestic students undertaking PhD and Masters degrees by research. RTS students are entitled to a maximum of four years full-time equivalent study if undertaking an eligible PhD degree by research and a maximum of two years full-time equivalent study if undertaking a Masters degree by research. RTS students study in a fully-subsidised place during this period, with no HECS-type liability accrued and no tuition fees to pay.[23]

3.25 DIISR explained that the objectives of the RTS are to:

- enhance the quality of research training provision in Australia;
- improve the responsiveness of universities to the needs of their research students;
- encourage universities to develop their own research training profiles;
- ensure the relevance of research degree programs to labour market requirements; and
- improve the efficiency and effectiveness of research training.[24]

3.26 In Appendix A of its submission to the inquiry, DIISR explained that each higher education provider's RTS grant amount is determined using particular formulae.[25]

3.27 Some of the key elements of the funding formulae are as follows:

- Completions, research income and publications data make up the RTS performance index where:
  - ⇒ HDR student completions are weighted at 50 per cent;
  - ⇒ Research income is weighted at 40 per cent; and

22 Universities Australia *submission 82*, p. 9; Education Investment Fund, <www.heef.deewr.gov.au/EIF/>, viewed 12 November 2008.

23 DIISR, *submission 50*, p. 4.

24 DIISR, *submission 50*, p. 4.

25 DIISR, *submission 50*, pp. 32-33.

⇒ Research publications are weighted at 10 per cent.

- High-cost disciplines are funded at 2.35 times the rate of low-cost disciplines.[26]

The need for more RTS places

3.28 Several submissions to the inquiry commented on the number of RTS places at Australian universities, suggesting that there are too few. Many submissions recommended that the number of places be increased to meet demand.

3.29 The Council of Deans and Directors of Graduate Studies (DDoGS) commented on the state of the RTS, submitting that the total pool of funded higher degree by research places had not increased:

> In the absence of additional funded places, many universities over enrol their RTS allocation and since the numbers of completions have also increased very substantially, the funding per capita for enrolments and completions has diminished significantly.[27]

3.30 Southern Cross University also stated that there are too few RTS places:

> … the total pool of funded places has not kept pace proportionately with the increase in enrolments and completions … Like other universities wanting to meet demand and increase completion rates, we have had to significantly over-enrol postgraduate students: currently we have 232 equivalent fulltime enrolments for 166 funded places which means our funding per capita is inadequate, with serious implications for the resources we can provide to postgraduate students.[28]

3.31 University of New South Wales also commented on the poor state of the RTS:

> … the level of funding to Universities via the RTS and IGS has dropped to a level that is unsustainable and is so low that it is now a real disincentive to recruit more new PhD students.[29]

3.32 Deakin University discussed the basis on which RTS places are allocated to Australian universities:

> The current RTS system is based on a formula which began from an arbitrary base of the number of HECS exemptions allocated to

26 DIISR, *submission 50*, p. 32.
27 DDoGS, *submission 72*, p. 4.
28 SCU, *submission 12*, p. 2.
29 UNSW, *submission 31*, p. 5.

> universities for HDR candidates prior to the introduction of the RTS scheme, rather than the actual number of Commonwealth funded places. At that time a cap of 21,500 funded places was placed on the system.[30]

3.33 Deakin University stated that, at the introduction of the RTS, the university lost a significant number of federally funded places:

> By operation of the formula which was introduced in 2000 and phased in over a number of years, Deakin's allocation of HDR places decreased from 525 Commonwealth places agreed through profile discussions to a target of 301.[31]

3.34 Deakin University commented on the advantage for some universities:

> The greatest weight in the formula (50%) is the number of completions. Because the number of completions is clearly related to the number of HDR enrolments, the universities which started from a higher base were in a much better position to make gains.[32]

3.35 Deakin University also commented on improvement of performance and the difficulty in getting more federally funded places:

> At the same time, a cap on improvement was imposed so that no university could make an improvement of more than 5% over the previous year. The cap on the number of places for the sector and the restrictive formula makes it difficult for a younger and more innovative university like Deakin University to reach the share of Commonwealth funded places needed to support its rapidly growing research effort.[33]

3.36 University of New South Wales suggested that declining RTS returns have had the effect of driving international recruitment in the sector:

> … to both increase funding received in the RTS (via increased HDR completions) and to raise income via full fee tuition costs from international students. As a result, the distribution of RTS income no longer correlates with total research income, arguably the most important indicator of the research environment for delivery of high quality research training.[34]

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30 Deakin, *submission 73*, p. 1.
31 Deakin, *submission 73*, p. 1.
32 Deakin, *submission 73*, p. 1.
33 Deakin, *submission 73*, p. 1.
34 UNSW, *submission 31*, p. 6.

3.37 University of Western Australia stated that many universities are subsidising their research training of higher degree by research students through other sources of income, and recommended that there be an increase in the number of RTS places available to Australian universities.[35]

3.38 Australian Catholic University stated that a significant increase in the number of RTS places is needed in order to:

- ensure that suitable well-qualified graduates have the opportunity to attain higher level qualifications in research and therefore make their maximal contribution to the research effort of the country; and
- develop the potential workforce which needs to be replaced in the University sector.[36]

3.39 DDoGS stated that the current system of partial RTS funding with subsidy coming from undergraduate and graduate coursework activities is unsustainable and recommended an increase in the number of RTS places available to Australian universities.[37]

3.40 Southern Cross University also recommended an increase in the number of RTS places available to Australian universities which can fill them.[38]

3.41 DIISR stated that, for the period 2001-08, RTS funding has increased marginally per annum due to indexation. There has been no increase in the RTS base funding over this period.[39]

3.42 The Committee is concerned that there are too few RTS places, particularly given that many universities are able to fill places and resort to funding postgraduate students from other sources.

3.43 The Committee is also concerned that the number of RTS places has not increased adequately on an annual basis since the scheme's inception.

3.44 The Committee is of the opinion that the Australian Government should conduct a review into the number of RTS places that will be required to meet current and future research training needs, with a view to funding a substantial number of additional places in the near future.

35 UWA, *submission 96*, p. 5.
36 ACU, *submission 97*, pp. 1-2.
37 DDoGS, *submission 72*, p. 4.
38 SCU, *submission 12*, p. 2.
39 DIISR, *submission 50*, p. 4.

Recommendation 3

The Committee recommends that the Australian Government determine and fund the number of Research Training Scheme places that will be required to meet current and future research training needs.

Full cost of research training

3.45 Many submissions to the inquiry called for the Australian Government to fund the full cost of all research training programs.

3.46 The Group of Eight stated that high quality research training outcomes cannot be achieved unless resources (both for students and institutions) are sufficient to task, and explained that:

> Current Australian Government funding rates for HDR student training bear no relation to actual costs of providing supervision, training, infrastructure, consumables and support services to students across different disciplines.[40]

3.47 The Group of Eight discussed the urgent need for funding to cover the full cost of research training:

> If we do not significantly increase the funding for research in Australia there will be a decline in the quality of research training. Graduate students need the best quality labs, the best support structures for PhD training; they need high quality professional development programs and they need trained academic staff and infrastructure to support their PhD training. We do not fund the full cost of research and this is the most urgent issue for us.[41]

3.48 The Group of Eight, in its submission to the Review of the National Innovation System, recommended that a systematic study of the full costs of research training, drawing on methodology used internationally, be commenced in 2009 (alongside a study of the full costs of research).[42]

3.49 Universities Australia stated that, as well as a significant increase in research block grant funding, it supports the introduction of funding mechanisms that provide support for the full cost of research, and suggested that:

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40 Group of Eight, *submission 55*, p. 2.

41 Group of Eight, *transcript of evidence 25 June 2008*, p. 2.

42 Group of Eight, *submission 55*, pp. 2-3.

> This could be achieved through the development of a transparent institutional-level process that takes into account specific costing for project grants. This is necessary for institutions to avoid having to cross-subsidise projects from other revenue sources.[43]

3.50 Fourteen key submissions to the inquiry also recommended that the Australian Government fund the full cost of each higher degree by research program and abolish the high-cost/low-cost funding model.[44]

3.51 The Committee agrees that continual under-funding of research training will place undue pressure on universities and ultimately lead to poor research training outcomes.

3.52 The Committee is of the opinion that the high-cost/low-cost funding model is outdated and does not take into account advances in technology, or the actual costs of supervision, resources and infrastructure required to train our researchers.

3.53 The Committee agrees that the full cost of research training should be funded by the Australian Government.

High-cost and low-cost disciplines

3.54 A considerable number of submissions to the inquiry commented on a key part of the RTS funding formula, which concerns the division of particular disciplines into high-cost and low-cost categories. High-cost disciplines include primarily the sciences and engineering, and some health and medical studies.[45]

3.55 DIISR explained that high-cost disciplines are funded at 2.35 times the rate of low-cost disciplines.[46]

3.56 Australian Academy of the Humanities discussed problems with the RTS and the perceived impact on particular fields:

> Whatever the merits of the RTS at the institutional level, it has been problematic at the national level: some disciplines or discipline clusters cannot compete effectively, and some have been

43 Universities Australia, *submission 82*, p. 8.

44 SCU, *submission 12*, p. 2; ACDS, *submission 13*, p. 2; JCU, *submission 22*, p. 4; ANU, *submission 23*, p. 4; UNSW, *submission 31*, p. 3; FASTS, *submission 37*, p. 9; Murdoch, *submission 38*, p. 3; NTEU, *submission 53*, p. 4; UniMelb, *submission 56*, p. 2; Research Australia, *submission 70*, p. 11; Deakin, *submission 73*, p. 2; USC, *submission 74*, p. 1; UQ, *submission 100*, p. 1; CAPA, *transcript of evidence 24 September 2008*, p. 11.

45 <www.dest.gov.au/NR/rdonlyres/F8BE38C6-8BB2-4369-BEBA-CD5C7116CE36/19773/2008RTSandRPSProcessCalculations.pdf>, viewed 19 November 2008.

46 DIISR, *submission 50*, p. 32.

> significantly disadvantaged by it. The humanities disciplines have suffered due to knock-on, iterative and proxy effects of the RTS funding formulae. As disciplinary winnowing is not one of the objectives of the Scheme, the RTS has proved to be poorly suited to its objectives to the extent that it has disadvantaged particular research fields.[47]

3.57 Australian Academy of the Humanities stated that its greatest concern with the RTS is the low-cost/high-cost differential:

> Dividing the entire research education enterprise in Australia into two categories – expensive and cheap – fails to have regard to the fact that there is significant variation in the actual cost of delivery (supervision, resources, infrastructure, etc.) within each of these categories. This 2.35:1 funding quotient is an exceedingly blunt instrument that has little relationship to the actual costs incurred within the research training activities it is designed to fund.[48]

3.58 University of New South Wales stated that the high-cost/low-cost funding model is now outdated:

> … in a climate fostering innovation through highly cross-disciplinary research programs that span the Humanities, Arts and Social Sciences (HASS), Science, Technology, Engineering and Mathematics (STEM) and Health Sciences.[49]

3.59 University of New South Wales explained some of the anomalies it see in funding particular disciplines:

> For example, Community Health is currently in a "low-cost" band, but frequently involves "high-cost" preventative interventions. Computer Science which is currently a "lowcost" band, frequently involves high-cost specialised equipment and facilities, while Communications Technology is classified as "High-cost". While many research areas in the Humanities and Social Sciences are classified as "low-cost" this classification does not recognise the significant costs associated with extensive fieldwork as an essential component of research in some areas.[50]

3.60 NTEU suggested that the high-cost/low-cost differential funding model is outdated as it is based on data collected in the late 1980s. NTEU added

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47 AAH, *submission 61*, p. 7.

48 AAH, *submission 61*, pp. 8-9.

49 UNSW, *submission 31*, p. 6.

50 UNSW, *submission 31*, p. 6.

that this approach does not take into account changes in technology and research over the last two decades.[51]

3.61 University of Queensland stated that the high-cost/low-cost differential funding model ignored the actual cost of supervision, resources and infrastructure, and suggested that if the dollar value allocated by RTS to low-cost disciplines was passed on without additional funding from universities, research training in those disciplines would cease to be viable.[52]

3.62 DDoGS commented on funding levels and the high-cost/low-cost differential funding model:

> … there is strong local and international evidence that the levels of RTS funding falls well short of the full cost per student of delivering HDR programs, both at the high band and the low band levels. The arbitrary division between "high-cost" and "low-cost" disciplines is not based on any recent analysis of the costs of supervision and research.[53]

3.63 Several submissions recommended that further review is required to ascertain the relevance of the current high-cost/low-cost categorisations.[54]

3.64 University of New South Wales recommended that the high-cost/low-cost funding model should more appropriately reflect the costs of research in collaborative disciplines, and recommended that the model be reviewed and a four-step cost band model be introduced, with a weighting ratio of 2:3:4:5 across the four bands.[55]

3.65 Australian Technology Network recommended that there needs to be a closer alignment of funding to match the real costs of PhD study:

> … a simple high cost/low cost binary doesn't relate to actual costs … This inequitable funding model presents a barrier to encouraging diversity amongst students considering a research degree while acknowledging that a diverse workforce is required within and beyond universities.[56]

51 NTEU, *submission 53*, p. 14.

52 UQ, *submission 100*, p. 8.

53 DDoGS, *submission 72*, p. 3.

54 CUT, *submission 18*, p. 2; IRUA, *submission 51*, p. 16; DDoGS, *submission 72*, p. 4; UWA, *submission 96*, p. 5.

55 UNSW, *submission 31*, p. 6.

56 ATN, *submission 54*, pp. 5-6.

Regional universities

3.66 Several submissions to the inquiry discussed the disadvantages that regional universities face.

3.67 University of the Sunshine Coast explained its situation at length, particularly with regard to access to Research Training Scheme funds:

> … the really serious limitation for us in relation to research training is the fact that we are new and small. Our capacity to compete on a level playing field under the research block grants and particularly the Research Training Scheme is impossible. Each year we are dropping back by the maximum five per cent in our Research Training Scheme allocation because we do not have critical mass with our higher-degree-by-research student body, so we are sort of trading ourselves out of existence each year at the moment.[57]

3.68 University of the Sunshine Coast further explained how the RTS funding formula impact on small institutions:

> The formulas that drive the Research Training Scheme are about having equity in the pool of funds that are available to support research training. Our equity is sufficiently small, lacking in critical mass, that we cannot compete with the formulas. We just do not have the size and the number of completions each year which are really the primary driver to increase the monetary source that we are able to get out of the pool … It is not possible for us to get from where we are to critical mass in order that the formulas start to work for us instead of against us without us using all of the resources that we can from other sources to cross-subsidise our research training enterprise.[58]

3.69 The Central Queensland University Branch of the National Tertiary Education Union (NTEU-CQU) discussed issues that affect regional universities and the impact of low funding levels:

> Regional universities face particular challenges in building strong research capacity … Developing from teaching institutions prior to 1990, regional universities require strong support and nurturing to contribute meaningfully to their region and build a credible reputation in research. Lack of adequate Federal government funding over the past decade has forced regional universities such

57 USC, *transcript of evidence 18 August 2008*, p. 30.

58 USC, *transcript of evidence 18 August 2008*, p. 31.

> as Central Queensland University to focus its core business on revenue-raising from teaching to the detriment of its fledgling research.[59]

3.70 NTEU-CQU discussed the perception of regional universities:

> I think regional universities are often regarded as second-rate institutions … They are regarded by some of our cousin universities, the metropolitan universities, in that way, but individual scholars may or may not be … The PhDs that come out of our regional universities are no less than anywhere else, but there is a perception that in some way what we do is less than what other people do. In some ways they are right, because in a regional university you do not have access to the same sorts of resources that you may have in a large university … [60]

3.71 When asked what specifically would be required for regional universities in an overhaul of funding models, particularly considering a weighting or directed funding, NTEU-CQU stated that it would:

> … make sure that research areas that need to be looked at, that have a regional impact, are done through regional universities rather than through metropolitan universities. Perhaps there needs to be a weighting.[61]

3.72 NTEU-CQU elaborated on the need for assistance for regional universities:

> Governments need to recognise that the cost of doing research at a regional university could be much higher than that in the cities. The impacts of isolation and the lack of adequate research infrastructure need to be factored into funding arrangements with regional universities. A locality weighting similar to that adopted in allocating other government grants should be considered.[62]

3.73 NTEU-CQU stated that the regional isolation factor presents a formidable obstacle to pursuing a career in research, and provided an example, quoting a research student:

> Even though my Faculty would like to support my research, I'm having some trouble getting money to go to a conference to present a paper. It could cost as much as $3000 to get there because of air fares and accommodation (it's in Sydney). It is a lot of money

59 NTEU-CQU, *submission 62*, p. 1.
60 NTEU-CQU, *transcript of evidence 19 August 2008*, p. 3.
61 NTEU-CQU, *transcript of evidence 19 August 2008*, p. 6.
62 NTEU-CQU, *submission 62*, p. 1.

> with little return for the university. But how else does one build a research profile and career if one doesn't go to conferences and try to publish papers?[63]

3.74 James Cook University also discussed the need to cover greater expenses for travel:

> … everywhere is a very long way from here, and collaborating with people in bigger centres is always very expensive. Even collaborating across our campuses is expensive.[64]

3.75 James Cook University further explained the challenges faced by a regional university in operating without being funded the full cost of research:

> The additional costs of operating in a region extend to the supervisory teams, which are also having to dip into their pockets for a fair amount of the research training because, as we know, the RTS system does not meet the full costs; we are dipping into other pots to subsidise or pay for that training. When you then ramp that up and say that the entire costs of doing business in a place like this are much higher, as they are, it just escalates … [65]

3.76 When asked about the issue of defining what is regional, James Cook University stated:

> … there is a complexity there that needs to be resolved. I think it has been done very arbitrarily, and I would say that there is actually a degree of cynical rorting of the system, quite frankly.[66]

3.77 IRUA discussed the importance of regional areas to national development:

> … our future economic, social and environmental development is inextricably linked to the future success of rural and regional communities. Around two thirds of Australia's export earnings come from regional industries such as agriculture, tourism, retail, services and manufacturing. Many of Australia's key topics of national interest or concern … are closely associated with the regional and rural areas of the country. It is vitally important that research training in regional Australia be supported by government.[67]

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63 NTEU-CQU, *submission 62*, p. 4.

64 JCU, *transcript of evidence 19 August 2008*, p. 23.

65 JCU, *transcript of evidence 19 August 2008*, p. 23.

66 JCU, *transcript of evidence 19 August 2008*, p. 24.

67 IRUA, *submission 51*, p. 9-10.

3.78 Research Australia explained that the Regional Protection Scheme (RPS) is provided to regional institutions to compensate for lost income resulting from previous funding reforms.[68]

3.79 The RPS helps to protect designated regional higher education providers from losses of income against their indexed 2001 RTS and Institutional Grants Scheme (IGS) combined grants. The RPS Grant may be used at the higher education provider's discretion for any RTS or IGS objective.[69]

3.80 The Committee recognises the contribution made by regional universities to Australia's research community and acknowledges that regional universities face particular challenges in delivering high quality research training.

3.81 The Committee, while acknowledging the Regional Protection Scheme, does not want any particular regional university to be disadvantaged when compared with larger metropolitan universities.

3.82 The Committee is of the opinion that funding the full cost of research will remove any disadvantages universities face due to geographic location.

Minimum resource standards

3.83 Several submissions to the inquiry discussed the issue of minimum resource standards for postgraduate students.

3.84 The Council of Australian Postgraduate Associations (CAPA) in particular provided extensive comment on the issue, initially suggesting that resource standards vary significantly, both across and within universities.[70]

3.85 CAPA stated that many universities make a minimum level of funding available to all students to fund consumables, fieldwork, lab or research costs, or attendance at conferences.[71]

3.86 However, CAPA claimed that many postgraduates draw significantly on their own funds to support the costs of their research, and quoted research that indicated that candidates are likely to have spent around $5 000 of their own funds on research related activity within the first 18 months of candidature.[72]

68 Research Australia, *submission 70*, p. 5.

69 <www.dest.gov.au/sectors/research_sector/programmes_funding/programme_categories/professional_skills/Regional_Protection_Scheme_2007.htm>, viewed 13 November 2008.

70 CAPA, *submission 90*, p. 37.

71 CAPA, *submission 90*, p. 37.

72 CAPA, *submission 90*, p. 37.

3.87 When asked if students have access to adequate resources, Sydney University Postgraduate Representative Association (SUPRA) stated:

> … there are disparities depending on which project you happen to be on, let alone which faculty you happen to be in, about the kind of resources that are available to you. At the University of Sydney we have students who have designated desks or communal offices with their own desk, their own computer, all that stuff and we have other students in other faculties who can not get a designated desk except for on a competitive basis in their final six months to a year.[73]

3.88 CAPA also discussed the distinct lack of resources for postgraduate students:

> … in many cases research higher degree students that are full time and compelled to be on campus to do research do not have access to the basics—a desk space and the opportunity to maintain their research data and records in a secure environment. These sorts of things are basic to doing high-quality research. So it is more than just access to stationery and highlighters.[74]

3.89 CAPA provided an example from University of Melbourne:

> ... approximately 10 per cent of arts and education research higher degree students have access to a workstation, so 90 per cent of them do not. That is only the students who are in full research degrees—master's or PhD by research—and there are a number of other research students doing minor theses who of course are not even included in that equation and are not given any work space for doing that research. So it is an extreme problem. Part-time students in the arts and education areas cannot even apply for an office usually, because there simply aren't any.[75]

3.90 SUPRA explained that it raised minimum resource issues because:

> … we feel that it is exploitative of universities to take on students for whom they cannot provide the minimum resources for the completion of their degree in order either to get their research output or to get their RTS funding.[76]

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73 SUPRA, *transcript of evidence 5 August 2008*, p. 36.

74 CAPA, *transcript of evidence 24 September 2008*, pp. 2-3.

75 CAPA, *transcript of evidence 24 September 2008*, pp. 2-3.

76 SUPRA, *transcript of evidence 5 August 2008*, p. 36.

3.91 SUPRA also discussed minimum resource issues for students not funded through the RTS:

> … there are increasing numbers of research places which are not funded through the RTS but are funded by industry or in other ways. It is particularly important to us to ensure that those postgraduates who have places funded in that manner receive the same resources and receive the same entitlements as those who are funded through the RTS.[77]

3.92 CAPA discussed its production of guidelines for the provision of resources for postgraduate students:

> One of the most effective initiatives CAPA has been involved in is the development of the 2004 *Statement of Minimum Resources for Postgraduate Study*. This has proven to be an extremely successful initiative in providing universities with a reasonable benchmark for the provision of resources for research postgraduates. Many universities now have effective measures in place to help support students with the costs and resources for doing research based on a consistent, transparent, institution-wide policy.[78]

3.93 CAPA recommended that the implementation of a clear and detailed policy on minimum resource standards for research higher degree students be an Australian Government requirement of higher education providers for the receipt of funding for research places.[79]

3.94 SUPRA also recommended that the implementation of minimum resource policies across the entire sector should be made compulsory so that no student is left without basic and minimum infrastructure, adding that such an initiative must be supported by increased funding commitments from the Australian Government to ensure that universities are able to meet requirements.[80]

3.95 AUQA stated that some but not all universities have a policy on resources for research students, adding that even those that do are not always implementing their own policy consistently.[81]

77 SUPRA, *transcript of evidence 5 August 2008*, p. 37.

78 CAPA, *submission 90*, pp. 37-38.

79 CAPA, *submission 90*, p. 38.

80 SUPRA, *submission 66*, p. 3.

81 AUQA, *submission 14*, p. 4.

3.96 CAPA commented on the need for all universities to have a minimum resource policy:

> … we would just be very happy to see a basic statement of compliance on resourcing standards from every institution. That is not something we have at this stage, but I think it is entirely achievable.[82]

3.97 The Committee is of the opinion that a minimum resource standard should be implemented for all higher degree by research students, and that this standard should be as part of funding the full cost of research training.

Recommendation 4

The Committee recommends that the Australian Government fund the full cost of each higher degree by research program at Australian universities through the Research Training Scheme and within all national competitive grant funding programs. This funding should take into account:

- **the removal of the high-cost/low-cost funding differential that currently exists between research disciplines, subject to interim arrangements to ensure that no discipline is disadvantaged;**
- **the travel and accommodation needs of students for research collaboration, regardless of geographic location; and**
- **the provision and maintenance of a minimum standard of supervision and resources.**

Indexation of block grant funding

3.98 DIISR stated that the Higher Education Indexation Factor, which is about two per cent per annum, is used to index the total funding allocated under the APA scheme and other research block grant funding.[83]

3.99 As stated earlier, DIISR explained that, for the period 2001-08, RTS funding has increased marginally per annum due to indexation.[84]

82 CAPA, *transcript of evidence 24 September 2008*, p. 2.

83 DIISR, *submission 50*, pp. 19-20.

84 DIISR, *submission 50*, p. 4.

3.100 A review of indexation arrangements for the Commonwealth funding of universities was completed in April 2005. After considering the review, the Government concluded that there was not a strong case for a change to the indexation arrangements at that time.[85]

3.101 IRUA stated that a shortfall in research training funding can be partly attributed to the accumulated impact of the lack of adequate annual indexation of funding.[86]

3.102 University of Southern Queensland discussed the lack of indexation for research training funding:

> [It] has been a very difficult problem for universities for many years now. I think that for most universities, if we were relying only on student and block funding income, you could probably show a graph that would show revenue rising at about two per cent and expenditure at about 5½ per cent, dominated by academic salaries. That is a disastrous position to be in. We cannot lift our salaries any further; we would just give ourselves enormous operating problems.[87]

3.103 University of Western Australia argued that better indexation of Commonwealth block grants would allow universities to keep salaries closer to those available in the private sector, and thus retain quality staff.[88]

3.104 The National Tertiary Education Union (NTEU) stated that, to ensure that the quality of research training is not compromised, it is essential that the real value of future RTS funding is maintained through an appropriate indexation.[89]

3.105 The Committee is of the opinion that an indexation of two per cent per annum is not sufficient to maintain a healthy research training sector.

85 <www.dest.gov.au/sectors/higher_education/policy_issues_reviews/reviews/index_arrange_in_highered_sector/>, viewed 13 November 2008; <www.dest.gov.au/Ministers/Media/Nelson/2005/04/n1090190405.asp>, viewed 13 November 2008.

86 IRUA, *submission 51*, p. 16.

87 USQ, *transcript of evidence 18 August 2008*, p. 8.

88 UWA, *submission 96*, p. 4.

89 NTEU, *submission 53*, p. 4.

Recommendation 5

The Committee recommends that the Australian Government amend the current indexation measures for research training block grant schemes, to reflect real costs.

The way RTS payments are made

3.106 The structure of RTS payments to universities was raised in several key submissions, and discussed at length during the evidence-gathering phase of the inquiry.

3.107 DDoGS stated that the system of payment of RTS funds in arrears makes it difficult for universities to invest in research training in new areas.[90]

3.108 SUPRA explained how research training funding is paid to universities:

> That funding comes in two blocks. The first block is at the beginning. Half of it comes at the beginning. You are a research student, the university gets half of the money in order to offset I suppose some of the costs of allowing you to use their resources to complete your degree. The second lot comes on submission of the thesis.[91]

3.109 Southern Cross University also stated that the system of payment on completion of RTS funds makes it difficult for investment in new areas of research training:

> For instance, SCU is one of the few universities with a commitment to Indigenous research, but because so few students have yet completed, there is no funding to pay either for supervision or infrastructure support for postgraduate students. Thus the university has to subsidise research training in this vital area.[92]

3.110 University of New South Wales explained that the current funding model for research training funds completions more heavily than enrolments. However, the university stated that there is a need for more of the allocated funding during a student's course of study:

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90 DDoGS, *submission 72*, p. 4.

91 SUPRA, *transcript of evidence 5 August 2008*, p. 28.

92 SCU, *submission 12*, p. 3.

> While funding should be tied to completions as evidence of the successful delivery of research training, there are significant ongoing costs that are not being met throughout the candidature. In the current model, this is made even more difficult as, for example, completion funds for a student who commenced a PhD in 2006 will not appear in the RTS funding received by the University until 2011-2012.[93]

3.111 University of New South Wales added:

> Furthermore, the current model provides no direct incentives to drive high quality research training; the heavy emphasis on only completions has improved the number of completions, but a greater emphasis on ensuring Australian Universities deliver high quality research training is now required.[94]

3.112 Professor Nigel Laing stated that RTS funding comes too late, and that more is needed during candidature:

> The current PhD payment system results in supervisors receiving funding mostly from 3 to 5 years after the PhD student has completed. During the PhD, the supervisor receives very little funding, perhaps between $2,000 and $4,000 per year, or in many cases nothing at all. However, a PhD student in an expensive research field, costs $20,000 a year in consumables. This means that during the time of the PhD, the supervisor has a $16,000 to $18,000 or $20,000 hole in their budget. This is a disincentive to supervisors taking on PhD students.[95]

3.113 Professor Laing also suggested that funding for PhD students never actually goes to the PhD supervisor:

> You end up taking on the work of supervising a PhD student, with very little reward or incentive for doing it, and you end up asking yourself the question, 'Can I afford to take on a PhD student with the budget that I have available?'[96]

3.114 Professor Laing explained further:

> I do not know the exact sum that comes to a university for a PhD student, but it filters down into the university, down to the faculty, down to the school, down to the department, down to the

93 UNSW, *submission 31*, p. 6.

94 UNSW, *submission 31*, p. 6.

95 Professor Nigel Laing, *submission 40*, p. 1.

96 Professor Nigel Laing, *transcript of evidence 12 August 2008*, p. 17.

> supervisor, and it gets reduced, each taking a cut … Frequently the money does not actually come right back to that supervisor who has the hassle of trying to support the PhD student.[97]

3.115 Several submissions supported a change in the way RTS funding is paid to universities. University of New South Wales stated:

> We would favour a model in which the delivery of the funding to universities is through the course of the research training as opposed to the bulk of the money delivered currently on completion of the degree.[98]

3.116 Professor Laing discussed the need for funding for students during candidature:

> More of the funding has to be there during the time of the PhD student … From my point of view, as someone who has to get on and do the actual research and have the PhD students in my lab, that is what we need.[99]

3.117 Professor Laing suggested that the ideal situation would be:

> … for sufficient funding to be made available during the tenure of the PhD student in the laboratory, up to say $20,000 per year, with a bonus for completion after the PhD is completed.[100]

3.118 University of New South Wales proposed that the funding model be changed whereby 75 per cent of funding is delivered during candidature and 25 per cent of the funding is delivered on successful completion.[101]

3.119 SUPRA discussed at length the pressure imposed on students by universities to finish early, due to the fact that the universities receive their second and final RTS payment on submission of a student's thesis:

> We would suggest that that second half should instead be paid on conferral which would still mean the same total amount of funding going to the university but the second half would just be paid later … What it would avoid though is pressure which can unfortunately be put on students to submit early because the university needs that second tranche of money as soon as it can and therefore it puts pressure on students to submit early … It puts the student in the invidious position of having to do a lot

97 Professor Nigel Laing, *transcript of evidence 12 August 2008*, p. 18.

98 UNSW, *transcript of evidence 5 August 2008*, p. 50.

99 Professor Nigel Laing, *transcript of evidence 12 August 2008*, p. 22.

100 Professor Nigel Laing, *submission 40.1*, p. 1.

101 UNSW, *submission 31*, p. 2.

> more work outside their own funding cycle because of course their APA has ceased at that point as well, but on top of that, it encourages potentially lower quality submissions of theses because they are coming much earlier.[102]

3.120 The Committee understands that the current RTS payments regime is designed to encourage a high completion rate, and is keen to see this remain a key part of the regime. However, the Committee is also cognisant of the fact that students and their supervisors need a larger percentage of funding during the course of study.

3.121 The Committee is of the opinion that universities' drive to have students submit their theses so that those universities can receive their final RTS payments is an unhealthy situation for research training outcomes. The Committee therefore recommends that the final RTS payment for each student be made at the time at which that student is informed that they have been awarded a degree, as opposed to the time at which they submit their thesis.

3.122 The Committee recommends that research training funding be disbursed, partially prospectively, to institutions according to a staggered formula: 50 per cent on enrolment, 20 per cent at a specified benchmark during the course of study, and 30 per cent at the point at which the student is informed that they have been awarded their degree.

3.123 The Committee is concerned that research training funding is not finding its way to the relevant research training supervisors in a timely fashion. The Committee encourages universities to ensure that RTS funding is directed to students and their supervisors appropriately.

Recommendation 6

The Committee recommends that research training funding be disbursed, partially prospectively, to institutions according to a staggered formula: 50 per cent on enrolment, 20 per cent at a specified benchmark during the course of study, and 30 per cent at the point at which the student is informed that they have been awarded their degree.

102 SUPRA, *transcript of evidence 5 August 2008*, p. 28.

Infrastructure

3.124 Universities Australia discussed other forms of infrastructure support for research, namely through the National Collaborative Research Infrastructure Strategy (NCRIS) and the Education Investment Fund (EIF):

> The major 2008-09 Budget initiative was the creation of an $11 billion Education Investment Fund (EIF), which will absorb the $6 billion allocated to the Higher Education Endowment Fund (HEEF) and receive an additional $5 billion from the 2007-08 and 2008-09 budget surpluses. The EIF will be focused on capital expenditure on teaching and research facilities.[103]

3.125 NTEU claimed that funding for research infrastructure has been a significant issue for universities for a number of years:

> While there are a variety of existing Commonwealth Schemes that directly or indirectly support investment in university capital and research infrastructure, these have not been able to entirely address the backlog in university maintenance which includes research infrastructure.[104]

3.126 NTEU submitted that universities need to have greater certainty of funding to develop and maintain world class research infrastructure.[105] NTEU stated that the deficiency in infrastructure funding was addressed to some extent with the 2007 announcement of the Higher Education Endowment Fund, noting that there were some restrictions on the access and amounts available from this Fund.[106]

3.127 NTEU noted the recent announcement of the $500 million one-off block grant to universities, together with the potential benefits of the $11 billion EIF, and suggested that this had been well received by the sector. NTEU also commented that, at the time of submission, the detail of the EIF, such as eligibility requirements and limitations on grant amounts, had yet to be announced.[107]

3.128 ADBED explained that the Productivity Commission estimated the level of deferred maintenance on capital assets in universities at $1.5 billion for

103 Universities Australia, *submission 82*, p. 9.
104 NTEU, *submission 53*, pp. 11-12.
105 NTEU, *submission 53*, p. 4.
106 NTEU, *submission 53*, p. 12.
107 NTEU, *submission 53*, p. 12.

2005,[108] adding that, even allowing for measurement issues, it is clear that infrastructure in Australian universities is of concern.[109]

3.129 ADBED welcomed the announcement of the EIF and the one-off payments for university infrastructure in the 2008-09 Federal Budget, adding:

> Of equal importance is the continuation of the National Collaborative Research Infrastructure Strategy (NCRIS), which ensures that Australia has cutting edge infrastructure in areas of strategic national importance.[110]

3.130 University of South Australia also commented on funding for research infrastructure:

> The recent national investment in research infrastructure through the National Collaborative Research Infrastructure Strategy and the proposal to develop the teaching and research infrastructure through the Education Investment Fund are critical steps in building the next generation of infrastructure required to underpin a superb education system.[111]

3.131 Universities Australia was concerned that the new fund will still be insufficient:

> While the EIF may go some way towards addressing the maintenance backlog in universities, and to meeting new capital needs, there is a danger that, as the EIF will be open to applications for teaching facilities and also to applications from the Vocational Education and Training (VET) sector and other research facilities and institutions, the actual funds available to research infrastructure will be minimal.[112]

3.132 University of Sydney recommended that the EIF be further supplemented from subsequent budgets whenever possible.[113]

3.133 University of Western Australia discussed the inadequacy of infrastructure funding, in particular the Research Infrastructure Block Grant (RIBG):

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108 Productivity Commission (2007) *Public Support for Science and Innovation*, Research Report, Productivity Commission, Canberra, p. 214.

109 ADBED, *submission 39*, p. 5.

110 ADBED, *submission 39*, p. 5.

111 UniSA, *submission 32*, p. 10.

112 Universities Australia, *submission 82*, p. 9.

113 USyd, *submission 17*, p. 4.

> Perhaps the single biggest impediment to research growth at universities, and thus the environment for graduate student training, is the continuing small and stable size of the Research Infrastructure Block Grant. There has been a significant increase in the amount of research funding being won by universities, but the Research Infrastructure Block Grant budget has remained fixed for some time.[114]

3.134 University of Western Australia suggested that there must be an increase in money flowing to universities through the performance based block grants.[115]

3.135 University of South Australia explained that the current level of research infrastructure funding and what that funding is for:

> … funding provided through the [RIBG] is 23c/$ and this funding is intended to:
>
> - enhance the development and maintenance of research infrastructure in Higher Education Providers (HEPs) for the support of high quality research in all disciplines;
> - meet project-related infrastructure costs associated with Australian Competitive Grants;
> - remedy deficiencies in current research infrastructure; and
> - ensure that areas of recognised research potential, in which HEPs have taken steps to initiate high quality research activity, have access to the support necessary for development.[116]

3.136 University of South Australia explained further that the aims of the RIBG scheme are simply not achievable at 23c/$, which lags significantly behind the US (45c/$) and UK (55c/$).[117]

Generic skills development and the Commercialisation Training Scheme

3.137 Submissions to the inquiry suggested that postgraduate research students may require generic skills training so that they are equipped to participate in the workforce after their studies are complete.

3.138 University of Melbourne stated that postgraduate research students require strong generic transferable skills over a broad range of disciplines so they are prepared for a diverse range of occupations.[118]

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114 UWA, *submission 96*, p. 3.
115 UWA, *submission 96*, p. 3.
116 UniSA, *submission 32*, p. 10.
117 UniSA, *submission 32*, p. 10.
118 UniMelb, *submission 56*, p. 5.

3.139 Australian Catholic University claimed that there has been an encouraging shift in universities towards the inclusion of more coursework into research higher degrees, particularly focussing on the generic skills required for research.[119]

3.140 DDoGS also commented on the development of generic skills training:

> With the growing awareness of the diversity of employment outcomes following the PhD and the importance of transferable skills to future employers, Australian universities have enthusiastically responded to the development of generic skills and the broader support needs of research students.[120]

3.141 IRUA also stated that many universities have sought to enhance the quality of research training by introducing a range of associated systems, structures and support mechanisms, including compulsory coursework programs, often including generic skills training.[121]

3.142 Australian National University believes very strongly in adding in generic skills to the PhD program:

> While it is true that just undertaking the research itself gives students a lot of skills, a lot of the students cannot identify them as skills that they have. Part of the process that is needed is that we need to demonstrate to them what skills they are learning through that training. We also need … to teach students how to teach, project management, industry skills, public speaking, report writing—all of those sorts of things that are really valuable skills they could learn in the PhD … [122]

3.143 Several submissions commented on the fact that it is difficult to incorporate generic skills training in a relatively short PhD candidature.

3.144 Australian Catholic University suggested that there is:

> … a tension between the need to provide more generic skills education, the requirement to complete degrees in a timely manner, and the preservation of a certain "standard" at least with respect to the quantity and complexity of research presented in the thesis.[123]

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119 ACU, *submission 97*, p. 2.

120 DDoGS, *submission 72*, p. 3.

121 IRUA, *submission 51*, p. 13.

122 ANU, *transcript of evidence 27 August 2008*, p. 22.

123 ACU, *submission 97*, p. 2.

3.145 An extension of the PhD scholarship period may allow generic skills training to be included in a PhD program (discussion on scholarships can be found further in this chapter).

3.146 University of Queensland stated that a four-year PhD would enable broader training in generic skills.[124]

3.147 University of New South Wales also suggested that extension of scholarships would provide for the generic skill training required to facilitate the transition from PhD or Research Masters into industry, business or government.[125]

3.148 CAPA also discussed the issue of generic skills training acknowledging that that particular students may have different requirements:

> It is important to acknowledge therefore that it is inappropriate to consider the issue of "generic skills" to be a narrowly vocational one. Not all postgraduates come to a research degree effectively as a "clean slate" when it comes to workplace skills and experience, but all seek to build on their existing skills through research in a way which is potentially unique for each candidate.[126]

3.149 CAPA suggested that mandating a narrow set of desired generic skills outcomes through research training:

> … underestimates the capacity for innovation among both candidates and industry. It would be unwise to seek to second-guess either through narrowly focussed and inflexible policy measures.[127]

3.150 CAPA recommended that efforts to promote and support the uptake of "generic skills" should be:

> … characterised by quality, flexibility and choice, as opposed to compulsory requirements and a generic and narrowly vocational view of the "transferable" outcomes of research education.[128]

3.151 Professor Terry Evans, Dr Peter Macauley and Ms Margot Pearson also warned of underestimating the capacity of postgraduate research students:

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124 UQ, *submission 100*, p. 4.

125 UNSW, *submission 31*, p. 3.

126 CAPA, *submission 90*, pp. 13-14.

127 CAPA, *submission 90*, p. 14.

128 CAPA, *submission 90*, p. 14.

> Generic skills training is supplementary to this end and should be provided in ways that recognise the diverse existing expertise of the doctoral population. A narrow focus on skills training as an 'input' ignores the extent to which doctoral students bring skills and knowledge to their doctorate from their employment and other personal and community activities … Many generic skills courses focus on [topics such as critical thinking, ICT skills, time management, problem solving, teamwork, writing and project management] but it seems they may be superfluous for many candidates.[129]

3.152 The Commercialisation Training Scheme (CTS) has been one way to provide skills training to a small set of students enabling them to commercialise their research. Several institutions have also developed graduate certificate courses delivering similar commercialisation and generic skills material.

3.153 DIISR explained how the CTS works:

> The CTS enables universities to provide high quality research commercialisation training for domestic PhD and Masters by research students to equip them with the skills, knowledge and experience necessary to bring research-based ideas, inventions and innovations to market … CTS students … are awarded a Graduate Certificate on successful completion.[130]

3.154 DIISR further explained that 40 out of 42 eligible universities elected to participate in the CTS in 2007 and around 250 CTS students are expected to be supported each year.[131]

3.155 CTS students receive training in three areas:

- commercialisation know-how (a strategic understanding of commercialisation processes);
- technical commercialisation skills (e.g. intellectual property management, financial management, project management and market research); and
- organisational behaviour skills (e.g. leadership, teamwork and presentation skills).[132]

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129 Professor Terry Evans, Dr Peter Macauley and Ms Margot Pearson, *submission 46*, p. 3.

130 DIISR, *submission 50*, pp. 7-8.

131 DIISR, *submission 50*, p. 8.

132 <www.dest.gov.au/sectors/research_sector/policies_issues_reviews/key_issues/commercialisation/commercialisation.htm>, viewed 15 November 2008.

3.156 Some submissions to the inquiry suggested that the CTS is a valuable initiative.

3.157 Australian Technology Network stated that the CTS has been a valuable vehicle for broadening skills development training for higher degree by research students and should be retained for a further three years, with a review of the scheme in 2010.[133]

3.158 Southern Cross University submitted that the CTS has been a valuable scheme. The university developed a Graduate Certificate in Research Management to overcome the perceived barriers to the employment of PhD graduates. The university now has agreements with five other universities to enrol their students in the course under the CTS.[134]

3.159 RMIT University suggested that the CTS will assist research students to broaden their generic skills around research management, including areas such as project management, ethics and social policy development.[135]

3.160 RMIT University added:

> Research graduates with such enhanced understandings will be better equipped to address many relevant and significant research questions/challenges of the future where solutions, needed by our communities will be discovered at boundaries between technology and community and will require input from across many research disciplines.[136]

3.161 RMIT University explored how this initiative would work and what would it cost:

> We recommend that at least 10% of research students should have the opportunity to participate in the CTS and/or an expanded version as described above. This would require increasing the CTS numbers from the current 250 to around 2,500. At $15,000 per student, this could be achieved for approximately $34m. It may be appropriate to stage such growth over say 3 years.[137]

3.162 Dr Adam Cawley suggested that the CTS be doubled:

> … to provide an increasing number of higher degree research students and postdoctoral appointees with an understanding of,

133 ATN, *submission 54*, p. 4.
134 SCU, *submission 12*, p. 4.
135 RMIT, *submission 63*, p. 4.
136 RMIT, *submission 63*, p. 4.
137 RMIT, *submission 63*, p. 4.

> and exposure to, the concepts and processes involved in the management of technology products and services.[138]

3.163 Some evidence to the inquiry suggested that the CTS or graduate certificate programs could be broadened to incorporate other skills development in addition to commercialisation training.

3.164 University of Western Australia elaborated on its views:

> … there are other aspects of the whole research training environment that could be encapsulated in a certificate or diploma if you wanted to have that sort of thing concurrently, rather than just commercialisation. Commercialisation would deal with some areas of project management, but there is a lot more project management outside the commercialised sector. There is a lot of work that needs to be done on ethics and the legislative requirements around being a professional researcher, whether it be in industry, in a university or in a government agency. If you are really thinking about training future research professionals, commercialisation is one aspect of that.[139]

3.165 Australian National University also suggested that the CTS needs to be broadened:

> … the commercialisation training scheme, while it is to be applauded, is too narrow in its focus. It could offer much more if we were to suggest that students could also be trained to teach. Teaching is not just valuable in an academic setting; it is also valuable in many workplaces, where people have to learn how to disseminate their knowledge and the skills they have gained within the PhD.[140]

3.166 Some submissions to the inquiry were unhappy with the CTS, suggesting that the scheme should be evaluated or that the scheme be abolished with those funds directed elsewhere.

3.167 University of Melbourne suggested that there are a number of issues in relation to the CTS. The university stated that there is pressure for timely completions and that supervisors are reluctant to allow research candidates to undertake six months of coursework whilst enrolled in a full-time higher degree by research.

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138 Dr Adam Cawley, *submission 92*, p. 4.

139 UWA, *transcript of evidence 12 August 2008*, p. 50.

140 ANU, *transcript of evidence 27 August 2008*, p. 17.

3.168 University of Melbourne suggested that a solution would be to make funded places in a graduate certificate course available to researchers who have completed a research degree.

3.169 University of Melbourne recommended that the effectiveness of the CTS and the Graduate Certificate in Commercialisation for Research Students[141] should be evaluated.[142]

3.170 Queensland University of Technology stated that the CTS has been a useful contribution to the Australian PhD and should be retained. However, the university suggested that the scheme reaches a small minority of the total research training cohort, and a more comprehensive approach is required.[143]

3.171 University of Western Australia stated that the CTS has worked with limited success, suggesting that demand for the program has been low and it is questionable whether it is being provided at the right time in the research training cycle.[144]

3.172 University of Western Australia added that the idea of a structured program of training with diploma accreditation upon successful completion is good, but that the scheme should be extended to early career researchers.[145]

3.173 University of New South Wales suggested that:

> … the CTS Scheme is poorly targeted for a relatively small pool of funds, distributed to 36 of the 38 Universities with very high administrative, compliance and human resource issues that Universities have had to absorb to deliver the program.[146]

3.174 University of New South Wales stated that most universities have struggled to fill places and suggested that:

> Providing funding to Universities to train < 30-40 students in a stand-alone program is an inefficient use of resources. UNSW considers that the CTS Pilot Program is under-resourced and

141 <www.egradschool.edu.au/whategsaoffe/awardlevelqu/gradcert/>, viewed 15 November 2008.

142 UniMelb, *submission 56*, p. 4.

143 QUT, *submission 36*, p. 4.

144 UWA, *submission 96*, p. 8.

145 UWA, *submission 96*, p. 8.

146 UNSW, *submission 31*, p. 8.

poorly targeted to deliver its goals by expecting 36 universities to deliver CTS training.[147]

3.175 University of New South Wales recommended that the CTS be abolished and the limited funds should be allocated to universities that have demonstrated industry and commercial linkages to incorporate commercialisation training into the training of research students working with industry.[148]

3.176 The Committee is of the opinion that the Commercialisation Training Scheme has merit in providing particular generic skills training that will enable students to develop the most from their research training.

3.177 The Committee understands that the Commercialisation Training Scheme is in place until 2011,[149] and recommends that the Australian Government retain the scheme for at least that period, and conduct a review of the effectiveness of the scheme during the latter part of that period with a view to extending the scheme.

Recommendation 7

The Committee recommends that the Australian Government retain the Commercialisation Training Scheme, currently in place until 2011, and evaluate the effectiveness of the scheme during the latter part of that period, with a view to extending the scheme.

3.178 Griffith University also discussed the CTS, suggesting that it should continue. However, the university raised two additional means of achieving commercialisation and industry outcomes for PhD students:

- The 'public space' concept suggests that the university sector can best assist business, industry, government and community by provision of conferences and other forms of interaction which allow universities to engage in applied problem solving. Outcomes could include the provision of advisory services, access to specialist equipment or facilities, short courses, consultancy, contract research, or graduate programs. Doctoral students should be an integral part of this activity.

147 UNSW, *submission 31*, p. 8.

148 UNSW, *submission 31*, p. 8.

149 <www.innovation.gov.au/Section/AboutDIISR/FactSheets/Pages/CommercialisationTrainingScheme(CTS)FactSheet.aspx>, viewed 19 November 2008.

- Knowledge Transfer Partnerships (KTP) are a UK concept in which one or more KTP 'associates' (high-calibre PhD graduates) are recruited to work in a particular business on a project that is central to its strategic development. A project may last from 12 to 36 months. The university partner provides its expertise and jointly supervises the project together with a representative from the company. The costs are part funded by Government with the balance being borne by the participating business. The PhD graduate then receives the benefit of the industry position whilst still retaining links with the university and research mentoring from the academic supervisor.[150]

3.179 The Committee is of the opinion that the two models outlined above should be given consideration by universities as a means of further developing links with industry.

3.180 The Committee recommends that the Australian Government develop and implement an additional industry partnership program, modelled on Knowledge Transfer Partnerships, that will further facilitate connection between business and research institutions.

Recommendation 8

The Committee recommends that the Australian Government develop and implement additional industry partnership programs, possibly modelled on Knowledge Transfer Partnerships, that will further facilitate connection between business and research institutions.

Increasing student diversity

3.181 Several submissions to the inquiry discussed addressing social equity issues, particularly through making postgraduate research study accessible to all graduates.

3.182 Victoria University's submission discussed the issue at length, initially outlining its diverse student background:

> Victoria University's student body consists of many students who are the first in their family to attend University. Many of these students are from non-English speaking backgrounds, their share of the student body rising from 25.9 per cent in 2001 to 34.1 per

150 Griffith, *submission 80*, p. 5.

> cent in 2004. The University also has the highest proportion of students from a low socio-economic background in terms of access and participation in Victoria with, in 2005 23.8 per cent of commencing VU students from a low socioeconomic background, and 25 per cent of commencing students who are under 25 years of age.[151]

3.183 Victoria University explained the difficulties some students face:

> Many students from disadvantaged backgrounds face financial and other hardships which make them view postgraduate as an unattainable 'pipedream'.[152]

3.184 Victoria University explained that it currently has a number of initiatives aimed at improving the student mix and addressing social equity, but added that:

> … as a single institution, the scope for activity is limited. As such, government should act to improve equitable outcomes for research participation. The programs should be directly aimed at postgraduate research students from disadvantaged backgrounds.[153]

3.185 Victoria University suggested that Government initiatives could be developed to encourage greater participation from groups that are currently under-represented, adding that such programs could be similar to those that have existed to attract women.[154]

3.186 Victoria University also explained that:

> Improving the student mix would also have benefits of a less altruistic nature. The diversity would bring new perspectives and thought processes that would facilitate innovation and improve research outcomes.[155]

3.187 James Cook University also believes that further incentives are required to attract outstanding research students, in particular:

> … from minority groups who are underrepresented in research training (e.g. Indigenous Australians who can attract high salaries external to the academy and typically have family commitments at a younger age than the wider community).

151 VU, *submission 15*, p. 2.
152 VU, *submission 15*, p. 2.
153 VU, *submission 15*, pp. 2-3.
154 VU, *submission 15*, p. 2.
155 VU, *submission 15*, p. 2.

3.188 Murdoch University also recommended the introduction of programs to encourage Indigenous Australians and disadvantaged Australians to undertake research higher degrees.[156]

3.189 IRUA also discussed the need for supporting research training across all segments of the Australian community. Further, IRUA suggested that the distribution of research higher degree attainment is unevenly distributed across the Australian population.[157]

3.190 IRUA discussed the importance of the participation of Indigenous Australians in research training:

> The government's critically important policy goal, of 'closing the gap' for Indigenous Australians, will rely significantly on access to Indigenous research graduates with a strong understanding of Indigenous culture and issues and the skills required to conduct complex research, analysis and evidence-based policy development.[158]

3.191 IRUA also stated that education and training is at the heart of the government's social inclusion agenda, requiring participation from all Australian communities:

> Australia not only needs to increase participation in higher education by disadvantaged communities and citizens, but it also needs to ensure that more Australians from disadvantaged backgrounds have an opportunity to undertake research training.[159]

3.192 Australian Academy of the Humanities discussed the negative impact of the current arrangements with the Research Training Scheme:

> We would add that the RTS's effects on women, older candidates and people from disadvantaged backgrounds – also not consonant with the objectives of the Scheme – constitute a similar significant failure of the mechanism to produce the stated policy outcomes.[160]

3.193 The Committee agrees that all Australians should have the opportunity to participate in research training, regardless of cultural or socio-economic background.

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156 Murdoch, *submission 38*, p. 2.
157 IRUA, *submission 51*, p. 9.
158 IRUA, *submission 51*, p. 9.
159 IRUA, *submission 51*, p. 9.
160 AAH, *submission 61*, pp. 7-8.

3.194 The Committee is of the opinion that appropriate measures should be put in place to encourage Indigenous Australians, minority groups, and under-represented or disadvantaged Australians to undertake and successfully complete higher degrees by research.

3.195 The Committee therefore recommends that the Australian Government encourage the participation of minority groups and under-represented Australians by applying a weighting to research training funds for universities that increase PhD completions by minority or under-represented students.

Recommendation 9

The Committee recommends that the Australian Government attach additional funds to research training scheme places that are secured by minority and under-represented students. This funding is for universities to provide the additional necessary assistance for minority and under-represented students throughout their candidature.

Areas of skill shortage

3.196 James Cook University commented on the current Australian employment market and the availability of high salaries for commencing graduates, suggesting that the situation is exacerbating the challenges in attracting high-quality candidates to postgraduate research training.[161]

3.197 James Cook University, quoting data from Queensland's Chief Scientist, stated:

> In Australia, employment in scientific and engineering professions is growing more than twice as fast as the workforce as a whole. In Queensland, employment in these professions is at 1.3 times the national rate and the percentage of domestic science and engineering graduates is falling.[162]

3.198 James Cook University added that undergraduate enrolments in enabling disciplines (especially science) have been steadily declining for a number of years, creating a supply problem for research candidature.[163]

161 JCU, *submission 22*, p. 5.
162 JCU, *submission 22*, p. 5.
163 JCU, *submission 22*, p. 6.

3.199 CSIRO stated that it is finding it difficult to recruit skilled researchers in a number of science disciplines as well as interdisciplinary skills areas critical to effective multidisciplinary science. Analysis of CSIRO's requirements indicates current, anticipated and continuing shortages in the following areas:

- Mathematical and statistical sciences
- Computational, simulation and modelling sciences
- Quantitative systems science
- Metallurgy, surface science and advanced materials
- Petroleum, geosciences and geo-engineering
- Chemistry and chemical engineering
- Mechanical, electrical and electronic engineering
- Bioinformatics
- Molecular biologists
- Quantitative geneticists
- Molecular geneticists and advanced genomics
- Climate sciences including: atmospheric, marine, meteorological, hydrology and hydro-climatology sciences.[164]

3.200 CSIRO further explained that it recognises there are fewer postgraduate students, and is concerned about the impact of this on research outcomes:

> In addition to the problems of recruiting experienced research staff, a number of CSIRO Business Units face difficulty securing high quality PhD students and acknowledge that this is a broad issue as university departments cite the same issue. The declining supply and quality of PhD graduates means that the pool of future scientists able to conduct world class research is small. If not addressed, this will affect the long term viability of Australian research … [165]

3.201 University of Western Australia discussed the issue of shortages of domestic students conducting postgraduate study in particular fields:

> … last year we had no domestic applicants for PhDs in the earth sciences in Western Australia, at our university—none. Not one student decided to stay on and do a PhD in the earth sciences, which is driving the national economy. On the other hand, the demand from international students to come and study earth sciences for PhDs is very high. It is the same for engineering. Domestic interest in research training in engineering is low, low,

164 CSIRO, *submission 83*, pp. 6-7.

165 CSIRO, *submission 83*, p. 7.

> low; they have all got jobs. Year 2, year 3, they have all got guaranteed jobs before they finish their undergraduate work.[166]

3.202 Professors Hyam Rubinstein, Peter Hall, William Dunsmuir and Philip Broadbridge, representing key Australian mathematical societies and institutes, expressed their concerns regarding a critical skills shortage in several important areas of mathematical sciences:

> Industry is hampered by a lack of graduates and for example, BHP Billiton now exports problems in the mathematical sciences to India and Russia for solution and offers scholarships to students in such countries to attract them for employment.[167]

3.203 Professors Rubinstein, Hall, Dunsmuir and Broadbridge discussed the need to attract more PhD students to particular fields:

> The stipend for PhD students where there is high demand for mathematical or statistical expertise is unattractive compared with what they can earn by going into the workforce. This is a problem shared by some other skills shortage areas. Yet these are the areas that need to attract PhD students or there will be no-one to train the next generation of highly skilled people in these areas. Greatly improving the stipend for students who can attract large salary packages on completion of an honours degree should be a priority.[168]

3.204 James Cook University believes that further incentives are required to attract outstanding research students:

> … in particular in areas of national significance in which there is an emerging skills gap (e.g. engineering, earth sciences, the enabling sciences, quantitative marine science, and Indigenous health) … [169]

3.205 James Cook University's experience suggests that potential students in these categories will require a stipend which is significantly above the APA rate, and recommended:

> … that a National Priority Postgraduate Research Scholarship Scheme be introduced to provide attractive and competitive

166 UWA, *transcript of evidence 12 August 2008*, p. 34.

167 Professors Hyam Rubinstein, Peter Hall, William Dunsmuir and Philip Broadbridge, *submission 52*, p. 4.

168 Professors Rubinstein, Hall, Dunsmuir and Broadbridge, *submission 52*, p. 4.

169 JCU, *submission 22*, p. 6.

> stipends to attract outstanding students in areas of national significance … [170]

3.206 James Cook University also suggested that the operational arrangements for such a scheme be developed after wide consultation to ensure that it is attractive to the target groups.[171]

3.207 The Committee is deeply concerned that there are serious shortages of postgraduate research students in fields that are considered of national significance or fields where there is an identified skills gap.

3.208 The Committee shares the concerns of particular submitters regarding the lack of interest in certain fields, which will lead to a serious shortage of people to teach and sustain those fields in the future.

3.209 To address the shortage of postgraduate research students entering particular fields, the Committee is of the opinion that a National Priority Postgraduate Research Scholarship Scheme should be established to provide scholarship awards, with stipends that are competitive with workforce conditions, to outstanding students who undertake studies in fields of national significance and skills shortage.

Recommendation 10

The Committee recommends that the Australian Government introduce a National Priority Postgraduate Research Scholarship Scheme that provides competitive stipends to outstanding students in areas of national significance and skills shortage.

National competitive grant funding for research

3.210 Many submissions to the inquiry called for competitive funding for research to be increased so that it covers the full cost of the research undertaken.

3.211 Many submissions also suggested that the success rate of applications for competitive funding is too low, excluding young PhD graduates from a research career.

170 JCU, *submission 22*, p. 6.

171 JCU, *submission 22*, p. 6.

3.212 This section of the chapter briefly examines the two key competitive funding bodies and discusses the issues of success rates and the full cost of funding.

Australian Research Council

3.213 The ARC, a statutory authority within the Innovation, Industry, Science and Research portfolio, provides advice to the Australian Government on research matters and manages the National Competitive Grants Program (NCGP).[172]

3.214 ARC explained that, through the NCGP, it supports the highest quality fundamental and applied research and research training across all disciplines (with the exception of clinical medicine and dentistry), primarily through two streams of research funding:

- Discovery, under which funding is made available for investigator-initiated research and research fellowships; and
- Linkage, under which research projects, infrastructure, fellowships, centres and networks are funded jointly with partner organisations in the private sector, government or the community.[173]

3.215 ARC explained that funding is allocated on the basis of a competitive peer review process using national and international research experts.[174]

National Health and Medical Research Council

3.216 The National Health and Medical Research Council (NHMRC) is Australia's principal agency for:

- funding fundamental and applied health and medical research;
- developing health advice for the Australian community, health professionals and governments; and
- providing advice on ethical behaviour in healthcare and in the conduct of health and medical research.[175]

3.217 NHMRC stated that it is committed to building Australia's competitiveness in health and medical research, through funding grants for research activities and building research capacity.[176]

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172 ARC, *submission 24*, p. 2.

173 ARC, *submission 24*, p. 2.

174 ARC, *submission 24*, p. 2.

175 NHMRC, *submission 101*, p. 2-3.

176 NHMRC, *submission 101*, p. 3.

3.218 NHMRC explained that it supports early, mid and senior researchers through prestigious and highly competitive fellowship and scholarship programs.[177]

3.219 NHMRC acknowledged that there are complex inter-relationships between universities, healthcare settings, medical research institutes and industry in training healthcare professionals:

> Whilst universities are the breeding ground for the development of researchers, universities are also competing with medical research institutes (MRI), industry and hospitals in attracting and retaining staff. There is competition between these organisations in a limited labour market, and perceived disparity between the costs of funding research and the salaries provided.[178]

3.220 NHMRC explained that researcher salaries are regulated in the university and public hospital settings, however they are not regulated in industry or medical research institutes. NHMRC suggested that this disparity may affect onward employment and career progression and retention of researchers.[179]

3.221 NHMRC briefly discussed the cost of research, stating that is:

> … aware of concerns that research funding does not currently cover the full costs of researcher salaries, as seen in the gap between NHMRC funding and existing salary structures within the sector. This is particularly relevant when researchers are able to attract significantly higher remuneration packages overseas.[180]

Success rates

3.222 University of New South Wales also commented on low success rates and the impact on young researchers:

> … the success rates for ARC and NHMRC have now dropped to a low that is very demoralising particularly to a new academic coming in. If you do not get up and going it is very tough; you go into a hole and you do not get out.[181]

177 NHMRC, *submission 101*, p. 3.
178 NHMRC, *submission 101*, pp. 3-4.
179 NHMRC, *submission 101*, p. 4.
180 NHMRC, *submission 101*, p. 4.
181 UNSW, *transcript of evidence 5 August 2008*, p. 69.

3.223 James Cook University explained that postdoctoral fellowships are the most common form of apprenticeship into a university research career, but they are 'in short supply and funded for only three years'.[182]

3.224 James Cook University discussed the impact of a low number of fellowships:

> The success rate for ARC Discovery Postdoctoral Fellowships starting in 2008 was only 17.8%. The lack of availability and guaranteed tenure is a major deterrent for applicants and also result in some post-doctoral fellows spending much of the last year unproductively looking for a new job rather than writing up their research.[183]

3.225 James Cook University further explained the impact of the low success rate of ARC grants:

> … even very good researchers sometimes miss out on expected funding forcing the university to meet the shortfall in the project costs of their research students (who cannot put their career on hold waiting for the next funding round).[184]

3.226 WEHIMR suggested that access to some funding schemes has become increasingly difficult to achieve:

> … for example, NHMRC Fellowships now have an average age of entry in the mid 40's and applicants need to be ranked as *outstanding* to be funded - being merely excellent does not guarantee funding.[185]

3.227 NTEU-UQ submitted that many research staff feel there is a lot of effort wasted in preparing unsuccessful research grants, and commented on the need for an established research record to obtain funding:

> The competition for grants means usually it is necessary to have an internationally recognised track record to support the research application. This can only be obtained by initially undertaking a considerable amount of unfunded research, before a successful grant application can be prepared.[186]

3.228 Professor Ellen McIntyre discussed her concerns over the low success rate of NHMRC grants:

182 JCU, *submission 22*, p. 10.
183 JCU, *submission 22*, p. 10.
184 JCU, *submission 22*, p. 4.
185 WEHIMR, *submission 34*, p. 4.
186 NTEU-UQ, *submission 59*, p. 3.

> You put an awful lot of effort into writing up your proposal and so on, and then if you do not get it, what then? There is a lot of energy going into developing proposals that often are quite doable and should be funded, but there is just not enough funding. That is one issue. It seems that we are wasting a lot of energy.[187]

3.229 The Committee is disappointed that there are so few competitive grants for research, and considers the success rate of around 20 per cent to be too low.

3.230 The Committee is also of the opinion that the low success rate for grant applications can be a deterrent for young researchers considering a career in research.

3.231 The Committee recommends that the Australian Government increase the funding pool for Australian Research Council and National Health and Medical Research Council grants to enable a minimum success rate of 40 per cent.

Recommendation 11

The Committee recommends that the Australian Government increase the funding pool for Australian Research Council and National Health and Medical Research Council grants to enable a minimum success rate for applicants of 40 per cent.

Full cost of research

3.232 ADBED explained the impact of serious deficiencies in funding for research:

> While research in universities for industry and other segments of the public sector are done on a full cost basis, the gap between the funding supplied under ARC and NHMRC programs and the real cost of undertaking this research must be met by the universities. This impacts significantly on universities undertaking curiosity-driven research, and the development of the next generation of research leaders.[188]

187 Professor Ellen McIntyre, *transcript of evidence 6 August 2008*, p. 3.

188 ADBED, *submission 39*, p. 7.

3.233 University of Western Australia stated that research project grant applications that are successful are under-funded and have to be subsidised through other parts of university activity:

> … and, typically, that is going to come from whatever other resources you have, so out of teaching or out of whatever else you can spend on doing research. So there is almost a negative feedback loop, in the sense that the more successful you get to be with research, the more it is going to cost you to do it.[189]

3.234 Australian National University discussed the shortfall in competitive funding and the consequences for universities:

> If the ARC, on average, funds 65 per cent of the research costs and the university has either got to bear the rest or do 65 per cent either of the quantity or of the quality—assuming that you can draw that longbow—as a consequence of that funding, is that good? I do not think it is. And that is done in order to keep the success rate at one in five. Is that good? I do not think it is strategic, because the money that then comes in comes in in packets determined by somebody else's evaluation of the quality of the program.[190]

3.235 Professor Nigel Laing stated that the gaps between NHMRC salary packages and host institution salary scales need to be abolished, with NHMRC fully funding research staff positions on NHMRC grants.[191]

3.236 Professor Laing suggested that NHMRC is the only funding agency in the world that partially funds agreed necessary positions on grants, through its Personnel Support Packages (PSPs).[192]

3.237 Professor Laing explained that:

> The problem with the personnel support packages is that they do not fully fund that position. You get enough money for maybe four days a week of that person at that level. You do not get enough to pay the person the full five days.[193]

3.238 Professor Laing added that on-costs of employing a researcher, such as superannuation, are not included in the PSPs.[194]

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189 UWA, *transcript of evidence 12 August 2008*, p. 30.

190 ANU, *transcript of evidence 27 August 2008*, p. 23.

191 Professor Nigel Laing, *submission 40*, p. 1.

192 Professor Nigel Laing, *submission 40.1*, p. 1.

193 Professor Nigel Laing, *transcript of evidence 12 August 2008*, p. 19.

194 Professor Nigel Laing, *transcript of evidence 12 August 2008*, p. 18.

3.239 Professor Laing stated further:

> When you have a gap, you spend a lot of your time trying to find ways to overcome the gap instead of getting on with the research … Even the premier funding body for medical research in this country says, 'We're only going to pay you for four days a week.' It is telling you that it is looked on as a part-time job, and it is not. It is a six and a half days a week job.

3.240 The Institute Postdoctoral Researchers' Association at the Telethon Institute for Child Health Research (IPRA-TICHR) compared its NHMRC Personnel Support Packages to the university sector, stating that remuneration for PSPs ranges from 16 per cent to 26 per cent lower than equivalent positions at University of Western Australia, depending on the superannuation scheme available.[195]

3.241 IPRA-TICHR also stated that employment on-costs impacted significantly on researchers' salaries, in particular those not in the university system:

> … with my fellowship, for example, 30 per cent is considered on-costs and is taken out of my salary, out of my fellowship, whereas a university would pay that 30 per cent, as well as the superannuation … Universities, I guess, have ways of absorbing that. They are big institutions and they can do that, whereas at our institute there are maybe 300, 400 researchers.[196]

3.242 IPRA-TICHR suggested that the argument for not funding employment on-costs is that grant salaries are only supposed to pay researchers at 0.8 of a full-time position:

> That is employing you maybe four out of five days a week. Firstly, the institution is supposed to absorb those 30 per cent costs, and our institute cannot. They do not have the money to do that. Secondly, now we are supposed to be working only 0.8, so they have tried to justify that poorer level of funding that they provide by saying, 'It's only a 0.8 level.' The other day a week we are supposed to get a real job and make up the difference, which is just not realistic.

3.243 When asked how the funding gap has impacted on the ability to retain good researchers, IPRA-TICHR stated:

> … when it comes time to advertise even for a position of a research assistant, they cannot match the market rate, so what they are

195 IPRA-TICHR, *submission 81*, p. 1.

196 IPRA-TICHR, *transcript of evidence 12 August 2008*, p. 63.

> seeing is a poor number of applicants for a given job and perhaps a poorer quality. Higher up, in terms of recruiting decent postdocs, it is the same sort of effect.[197]

3.244 Professor Laing stated that this funding gap is growing:

> What has gradually been happening is that the PSPs have been going up by about two per cent a year since they were introduced, whereas institution salary scales have gone up at a much faster rate. So the gap between what you should be paying your staff and what you are getting from the NHMRC is gradually widening.[198]

3.245 The Committee is very concerned that researchers are expected to conduct their research with only a proportion of the funding required to do the job effectively.

3.246 The Committee is again of the opinion that the full cost of research should be met by any competitive grants awarded to researchers.

Recommendation 12

The Committee recommends that the Australian Government specify that competitive grants, in particular all National Health and Medical Research Council grants, fund the full cost of research in each program to which a grant has been awarded.

197 IPRA-TICHR, *transcript of evidence 12 August 2008*, p. 55.

198 Professor Nigel Laing, *transcript of evidence 12 August 2008*, p. 20.

4

Funding and support for research students

4.1 This chapter examines critical funding and support issues for postgraduate research students, including the length and value of scholarships.

Period of PhD candidature

4.2 Several submissions to the inquiry discussed the length of PhD candidature, which is currently a maximum of four years full-time equivalent study.[1]

4.3 Members of the Centre for the Study of Research Training & Impact (SORTI) at the University of Newcastle explained that the Australian PhD candidature is relatively short by international standards, however, international comparisons may be invalid given the different nature of PhD programs.[2]

4.4 SORTI has studied PhD completion times extensively and explained that:

> … it is possible to determine an accurate measure of time to completion for an individual candidate, taking into account full-time and part-time semesters of enrolment and periods of leave or other non-enrolment. This is the only reasonable measure to use when calculating average times to completion by discipline, by university or over time.[3]

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1 DIISR, *submission 50*, p. 4.
2 SORTI, *submission 9*, p. 3.
3 SORTI, *submission 9*, p. 3.

4.5 SORTI provided details on a recent project it undertook examining PhD completion times:

> Our recent project covering 804 PhD candidates at 8 Australian universities across all discipline areas indicated that the mean candidacy time was a fraction less than 4 years (7.9 semesters) with a range from 3.5 years for Education candidates to a little over 4 years for Engineering candidates.[4]

4.6 SORTI added that the reasons for these discipline differences related to age and enrolment patterns of candidates.[5]

4.7 SORTI, in its research, also explained:

> Longer candidacy times were related to discipline, younger age, being a native English speaker, entering PhD candidature through an honours degree, being enrolled full-time, having held a scholarship, taking leave, having more than one supervisor, having more experienced supervision, having no change in supervision arrangements and having had a problem during candidature. However, many of these relationships were complex rather than simple … Length of candidature in full-time equivalent terms was not related to the research intensiveness of the university attended and candidate gender.[6]

4.8 Curtin University of Technology, quoting a report from Graduate Careers Australia, stated that the national average time for completion of a PhD is 5.4 years.[7]

4.9 IRUA, quoting the Group of Eight, stated that the current average completion time for a PhD in Australia is between 4.5 and 5.5 years depending on the discipline.[8]

4.10 University of Queensland argued that worldwide reforms of the PhD should be acknowledged and reflected in Australian Government policy. The University explained that PhD programs in many countries have been

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4 SORTI, *submission 9*, p. 3.

5 SORTI, *submission 9*, p. 3.

6 Bourke, S., Holbrook, A. and Lovat, T. (2006) *Relationships of PhD candidate, candidature and examination characteristics with thesis outcomes*. Paper presented at the AARE Annual Conference, Adelaide, 27-30 November.

7 CUT, *submission 18*, p. 2; Graduate Careers Australia, *Postgraduate Destinations 2006 – The Report of the Graduate Destinations Survey*.

8 IRUA, *submission 51*, p. 7; Group of Eight, *Adding to Australia's Capacity: The Role of Research Universities in Innovation*, a submission from the Group of Eight to the Review of the National Innovation System, April 2008.

transformed in ways that would make them unrecognisable by those who gained their own PhDs as recently as 10 years ago. The changes include:

- high quality generic skills training (team-based and applied research, project management, interdisciplinary research, grant writing and management, people management, leadership and financial management etc);
- extended academic coursework to develop disciplinary and interdisciplinary context; and
- period of research/study at another institution or in another country during the PhD.[9]

4.11 University of Queensland added that, in Australia, the limits on funding to students and institutions have constrained these developments. For students and supervisors, there are tensions between:

- the acquisition of generic skills and the dedication to a cutting-edge research project; and
- industry or international experience and the production of an outstanding thesis.[10]

4.12 University of Queensland discussed the duration of a PhD:

> In the UK and Australia in the mid-1990s, it was fashionable to assume that the appropriate PhD duration was 3 years. While some successful PhD outcomes [can] be achieved in 3 years, it is not a standard that can be applied to all. When that fashionable assumption became embedded in policy and funding decisions, it had negative effects on the opportunities for:
>
> - pursuing anything other than the thesis itself (preferably on a 'safe' topic);
> - appropriate coursework to broaden the disciplinary knowledge of graduates;
> - the deep acquisition of generic skills;
> - disseminating the results of their work through publications and conferences; and
> - gaining industry and/or international experience.[11]

4.13 The University of Queensland explained that a higher degree by research:

> … is always subject to the kinds of events that are unforeseeable precisely because the cutting edge of knowledge is where the unpredictable and the unknowable are encountered. It is therefore

9 UQ, *submission 100*, p. 2.

10 UQ, *submission 100*, p. 2.

11 UQ, *submission 100*, p. 4.

> impossible to prescribe the length of time that this will take, although it is possible to describe an expected duration.[12]

4.14 The University of Queensland suggested that a four-year PhD would enable:

- Broader training in generic skills;
- Deep and broad knowledge of the context of the discipline;
- Excellence of research outcomes; and
- Appropriate dissemination of research outputs.[13]

4.15 The Committee understands that doctoral students in Australia have historically aimed to complete their PhDs in three to three-and-a-half years, as this has been the period typically funded by a scholarship.

4.16 The Committee also understands that longer PhD completion times for some candidates may be due to their poor financial circumstances. Typically, this would occur at the end of the scholarship period, necessitating the need to seek part-time employment.

4.17 The Committee suggests that, with increased financial support for doctoral students through an increase in the length of the scholarship period, the need to seek part-time employment will be reduced, and the time taken to complete a PhD should be reduced.

4.18 However, the Committee is of the opinion that there should be some flexibility in the Research Training Scheme which may allow students to continue their PhD study past the current four year limit.

4.19 Therefore the Committee recommends that the Australian PhD candidature period through the Research Training Scheme include the option of a six-month extension.

Recommendation 13

The Committee recommends that the Australian Research Training Scheme PhD candidature period include the option of a six-month extension.

12 UQ, *submission 100*, p. 4.

13 UQ, *submission 100*, p. 4.

Scholarships and awards

4.20 Many submissions to the inquiry commented on postgraduate research scholarships and awards. The majority of those submissions suggested that scholarship support had declined in the recent past and that drastic measures were needed to support students in the future.

4.21 Several issues were raised relating to the Australian Postgraduate Award (APA) including their number, duration, value and indexation.

The Australian Postgraduate Award

4.22 CAPA explained that:

> The aims of research stipends in general, and the Australian Postgraduate Award (APA) in particular, are to assist in making research degrees an attractive proposition for talented prospective researchers, and to offer them an adequate means of financial support allowing them to focus on research.[14]

4.23 DIISR explained that the objectives of the APA program are to:

- support postgraduate research training in the higher education sector; and
- provide financial support to domestic postgraduate students of exceptional research promise who undertake their higher degree by research at an eligible Australian university.[15]

4.24 DIISR further explained that APAs help support the living costs of Australia's best and brightest domestic PhD and Masters by research students during their studies.[16]

4.25 CAPA explained that scholarships, particularly APAs, are now inadequate:

> The fact is that the APA is no longer fit to meet its aims. It no longer represents a competitive incentive for aspiring researchers, and it is certainly failing us as an adequate means of support, especially for those living and studying in major capital cities. The APA has not kept pace with living costs, and is a poor fit for the reality of what it takes to complete a PhD.[17]

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14 CAPA, submission 90, p. 30.
15 DIISR, *submission 50*, p. 5.
16 DIISR, *submission 50*, p. 5.
17 CAPA, *submission 90*, p. 31.

Number

4.26 DIISR stated that the APA program provides income support for around 20 per cent of domestic postgraduate research students supported by the government under the RTS (or around 12 per cent of total domestic higher degree by research students).[18]

4.27 According to DIISR, there were 4 985 APA holders in 2006. DIISR added:

> There were 1,584 new APAs allocated to universities in 2008. As part of the Education Revolution, the Australian Government has committed to double the number of APAs by 2012. The first allocation of new APAs under this initiative will commence in 2009.[19]

4.28 Many submissions welcomed the Australian Government's announcement in the 2008-09 Federal Budget concerning the doubling of the number of APAs.[20]

4.29 However, CAPA suggested that although the increase in the number of APAs is welcome:

> … this increase does not adequately take into account our current needs in sustaining research capacity and research workforce planning for the medium and longer term.[21]

4.30 SUPRA added:

> While we welcome the recently announced doubling of APA places it is important to note that only around 25% of research students Australia wide will undertake Research Higher Degrees with such a stipend.[22]

Duration

4.31 DIISR provided details on the duration of the APA:

> APAs are available for a period of two years for a Masters by research student or three years, with a possible extension of six months, for a PhD student.[23]

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18 DISSR, *submission 50*, p. 19.

19 DIISR, *submission 50*, p. 6.

20 FASTS, *submission 37*, p. 8; ADBED, *submission 39*, p. 2; AAS, *submission 45*, p. 2; Universities Australia, *submission 82*, p. 12; CAPA, *submission 90*, p. 33.

21 CAPA, *submission 90*, p. 33.

22 SUPRA, submission 66, p. 5.

23 DIISR, *submission 50*, p. 5.

4.32 CAPA discussed the duration of the APA and its impact on PhD students:

> Under the RTS the candidature time for a research doctorate is four years' full-time equivalent study, and two years' full-time equivalent study for a masters. Currently the APA is funded for Masters degrees to the maximum duration of candidature, however this is not the case for Doctoral studies. This means many PhD students find themselves with no access to any financial support at all during the final and most crucial stages of their degree. Many students overcome this financial hardship by taking on extra paid work, often in the form of casual employment with their institution. It is difficult under these conditions for students to dedicate suitable time to completing their studies.[24]

4.33 The Research School of Physical Sciences and Engineering at Australian National University summarised the need to increase the scholarship duration:

> The maximum duration of APA funding is currently 3.5 years. However, as was recognized some years ago with 4 year Commonwealth funding of APAs, a good student working consistently requires on average 4 years to complete a PhD to international standard. If students are unfunded beyond 3.5 years they have [to] take up employment and this leads to extension of the course well beyond 4 years. Consequently, restricting funding to 3.5 years does not reduce the duration of a PhD, but rather has the reverse effect. In addition, it increases the risk of non-completion, which is undesirable for the student, the university and the country. It is recommended that the duration of an Australian Postgraduate award be restored to 4 years.[25]

4.34 Queensland University of Technology stated that, without a sufficient scholarship, the need to find 'extensive part-time work to keep body and soul together is not conducive to quality outcomes and timely completion'.[26]

4.35 University of Sydney commented on the fact that PhDs are completed in around four years, often requiring host institutions to support students once their scholarships have run out:

> It is widely accepted that 4 years is sufficient to provide internationally acceptable PhD research training so many students

24 CAPA, *submission 90*, p. 31.

25 RSPSE-ANU, *submission 49*, pp. 1-2.

26 QUT, *submission 36*, p. 2.

> stay for 4 years, thus, institutions endeavour to support the final semester, from internal resources or grant funding, but do so at a cost to other programs.[27]

4.36 IRUA explained how difficult it can be for a student once their scholarship has ended:

> A student's scholarship funding is often discontinued at the most demanding time of the PhD candidature, when they are focusing on writing up their thesis, placing unhelpful financial stresses on them.[28]

4.37 University of Queensland discussed the SORTI study on PhD completions and commented on the particular financial situations for some candidates:

> Robust data from a large study conducted by Professor Sid Bourke at the University of Newcastle show that candidates who switch from full-time to part-time take statistically longer to complete than those who are either full-time throughout or part-time throughout. A decision to change from full-time to part-time is almost always a financial one: either a scholarship has run out, or the candidate's financial responsibilities (to a family, for example) can't be met by the scholarship.[29]

4.38 University of Queensland commented on the benefits of lengthening the scholarship period:

> If research higher degree candidates are funded at an appropriate level for the appropriate duration of their degree, they will be much more likely to:
>
> - complete their degree ON scholarship IN time;
> - have a realistic opportunity to acquire appropriate generic skills in a research context; and
> - have time to disseminate the outcomes of their research.[30]

4.39 Eighteen submissions to the inquiry suggested extending the duration of APAs to three-and-a-half years plus a possible six-month extension.[31]

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27 USyd, *submission 17*, p. 2.

28 IRUA, *submission 51*, p. 8.

29 UQ, *submission 100*, p. 5.

30 UQ, *submission 100*, p. 5.

31 UWS, *submission 10*, p. 3; SCU, *submission 12*, p. 3; CUT, *submission 18*, p. 4; JCU, *submission 22*, p. 6; UNSW, *submission 31*, p. 8; QUT, *submission 36*, p. 2; Murdoch, *submission 38*, p. 2; ADBED, *submission 39*, p. 3; CHASS, *submission 47*, p. 3; IRUA, *submission 51*, p. 8; ATN, *submission 54*, p. 2; Group of Eight, *submission 55*, p. 2; DDoGS, *submission 72*, p. 5; Deakin, *submission 73*, p. 2; USC, *submission 74*, p. 1; Griffith, *submission 80*, p. 3; AINSE, *submission 94*, p. 5; UWA, *submission 96*, p. 6.

4.40 Twelve submissions to the inquiry suggested extending the duration of APAs to four years thereby matching the duration of the Research Training Scheme place.[32]

4.41 Three submissions to the inquiry suggested extending the duration of APAs to four years with the possibility of a six-month extension.[33]

4.42 An additional four submissions suggested that current scholarship support levels are inadequate; however they did not suggest any particular increases in scholarship duration.[34]

4.43 The Committee agrees that extending the APA scholarship to four years would align the period of the scholarship with the Research Training Scheme period.

4.44 The Committee is of the opinion that three-and-a-half years should be the absolute minimum duration for a scholarship. The Committee is also supportive of extensions to scholarships, and suggests that two six-month extensions should be sufficient to get the majority of students through to the end of their studies.

4.45 Therefore, the Committee recommends that the duration of all Commonwealth-funded scholarships for PhD candidates be extended to a minimum of three-and-a half years, full-time equivalent, and include the option of two six-month extensions.

Recommendation 14

The Committee recommends that the duration of all federal postgraduate awards with stipends for PhD students be increased to three and a half years (full-time equivalent) with the option of two six-month extensions.

32 ATSE, *submission 6*, p. 6; SORTI, *submission 9*, p. 2; USyd, *submission 17*, p. 2; UniSA, *submission 32*, p. 5; WEHIMR, *submission 34*, p. 3; FASTS, *submission 37*, p. 8; La Trobe, *submission 48*, p. 3; RSPSE-ANU, *submission 49*, p. 1; NTEU, *submission 53*, p. 20; NTEU-UQ, *submission 59*, p. 5; SUPRA, *submission 66*, p. 7; UQ, *submission 100*, p. 5.

33 UOW, *submission 25*, p. 2; AARE, *submission 64*, p. 6; CAPA, *submission 90*, p. 32.

34 ANU, *submission 23*, p. 3; ASM, *submission 29*, p. 3; UniMelb, *submission 56*, p. 1; ARCCE, *submission 87*, p. 10;

Value

4.46 DIISR provided details on the value of the APA:

> In 2008, a full-time APA is worth $20,007 (tax-free). A part-time APA is $10,710 and, although tax liable, is adjusted to take taxation into account.[35]

4.47 Many submissions to the inquiry stated that this stipend is too low.

4.48 Queensland University of Technology stated:

> The value of the APA and like scholarships is uncompetitive in the marketplace for talent, and it is inadequate to support the kind of fulltime commitment to research required of trainees.[36]

4.49 CAPA discussed the decline in value of the APA over time:

> The APA has been below the poverty line for individuals with dependents for many years. Based on the average annual increase in seasonally adjusted household income, projections indicate the standard rate for the APA will fall below the poverty line for single individuals for the first time by the end of 2008.[37]

4.50 CAPA added:

> If the award is to be able to meet its aims, an upward adjustment in the APA stipend rate is urgently needed. The same holds for all other Commonwealth funded awards, including part time APAs, APAIs and the IPRS.[38]

4.51 There was considerable variation in the increases in the value of the stipend recommended in submissions to the inquiry.

4.52 Five submissions to the inquiry argued for a 25 per cent increase in the APA stipend.[39]

4.53 Significantly, 21 submissions to the inquiry argued for a 30 per cent increase in the APA stipend.[40] Importantly, some of those submissions

35 DIISR, *submission 50*, p. 5.

36 QUT, *submission 36*, p. 2.

37 CAPA, *submission 90*, pp. 32-33.

38 CAPA, *submission 90*, p. 33.

39 ECU, *submission 20*, p. 4; RSPSE-ANU, *submission 49*, p. 2; ATN, *submission 54*, p. 5; RMIT University, *submission 63*, p. 3; Research Australia, *submission 70*, p. 11.

40 SCU, *submission 12*, p. 3; JCU, *submission 22*, p. 5; UOW, *submission 25*, p. 1; UNSW, *submission 31*, p. 10; QUT, *submission 36*, p. 3; FASTS, *submission 37*, p. 8; ADBED, *submission 39*, p. 4; CHASS, *submission 47*, p. 2; La Trobe, *submission 48*, p. 3; Professors Rubinstein, Hall, Dunsmuir and Broadbridge, *submission 52*, p. 5; NTEU, *submission 53*, p. 18; NTEU-UQ,

were from key representative bodies such as Universities Australia, the Council of Deans and Directors of Graduate Studies, and the Council of Australian Postgraduate Associations.

4.54 Two submissions argued for a 35 per cent increase in the APA stipend[41], while seven submissions argued for a 50 per cent increase[42], one submission argued for a 75 per cent increase[43], and one submission argued for a 100 per cent increase.[44]

4.55 The Australian Council of Deans of Agriculture (ACDA) recommended that the stipend level be raised to at least graduate employment salary levels, equivalent to an increase of 70-120 per cent, and the tax-free status abandoned.[45]

4.56 RMIT University, in addition to suggesting an increase in the stipend of 25 per cent, also suggested that:

> … targeted APAs attract an increase in the stipend of at least $10,000 per year over current levels, and more likely $20,000 per year, to provide the incentives for students not only to choose research training instead of immediate employment but also to engage in research that aligns specifically with national needs.[46]

4.57 Eighteen submissions expressed concerns regarding the inadequacy of the current APA scholarship stipend, with many submissions suggesting an urgent need for the stipend to be increased. However, these submissions were silent on how much the increase should be.[47]

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submission 59, p. 5; AARE, *submission 64*, p. 6; DDoGS, *submission 72*, p. 5; Deakin, *submission 73*, p. 2; USC, *submission 74*, p. 1; Griffith, *submission 80*, p. 3; Universities Australia, *submission 82*, p. 12; CAPA, *submission 90*, p. 33; UWA, *submission 96*, p. 6; UQ, *submission 100*, p. 5.

41 SORTI, *submission 9*, p. 3; UniSA, *submission 32*, p. 7.

42 USQ, *submission 11*, p. 1; USyd, *submission 17*, p. 1; WEHIMR, *submission 34*, p. 3; Murdoch, *submission 38*, p. 3; IRUA, *submission 51*, p. 7; SUPRA, *submission 66*, p. 7; Flinders, *submission 78*, p. 2.

43 Dr Steve Madden, *submission 60*, p. 5;

44 Mr David Packham OAM, *submission 5*, p. 2.

45 ACDA, *submission 57*, p. 1.

46 RMIT University, *submission 63*, p. 3.

47 ACED, *submission 7*, p. 2; UWS, *submission 10*, p. 3; ACDS, *submission 13*, p. 2; VU, *submission 15*, p. 1; Professor Judy Searle et al., *submission 16*, p. 3; CUT, *submission 18*, p. 2; ANU, *submission 23*, p. 3; ASM, *submission 29*, p. 3; Group of Eight, *submission 55*, p. 2; UniMelb, *submission 56*, p. 4; AAH, *submission 61*, p. 16; IPRA-TICHR, *submission 81*, p. 2; Queensland Government, *submission 85*, p. 4; ARCCE, *submission 87*, pp. 12-13; MDANZ, *submission 89*, p. 2; SUT, *submission 91*, p. 3; ACU, *submission 97*, p. 2; Minister for Defence Science and Personnel, *submission 105*, p. 4.

4.58 Monash University suggested the introduction of a special scholarship that would allow part-time postgraduate research students in their late 30s and early 40s with families and mortgages to switch from part-time without scholarship to full-time for up to two years with scholarship support of $35,000 per annum. Monash University further explained that these special scholarships could be reserved for particular areas of shortage where it is important that suitably qualified people are fast-tracked into the workforce.[48]

4.59 The Committee agrees that an increase in scholarship stipend value is urgently needed, and recommends that the Australian Postgraduate Award stipend be increased by 50 per cent.

Recommendation 15

The Committee recommends that the Australian Postgraduate Award stipend value be increased by 50 per cent.

Indexation

4.60 DIISR stated that APA funding had increased marginally per annum due to indexation, and also a small annual increase to the base funding from 2006 as an outcome of the previous Government's *Backing Australia's Future* package.[49]

4.61 DIISR explained that the full-time APA stipend rate is fixed by the Australian Government through guidelines and indexed by the Higher Education Indexation Factor, which is about two per cent per annum.[50]

4.62 However, CAPA stated that the APA stipend rates have failed to keep pace with average weekly earnings.[51]

4.63 ACDA summarised data from the Australian Taxation Office and the Australian Bureau of Statistics, describing the relative increase in value of the APA stipend in relation to the equivalent taxable income, average weekly earnings for males and the consumer price index (CPI):

48 Monash, *submission 76*, p. 4.

49 DIISR, *submission 50*, p. 6.

50 DIISR, *submission 50*, pp. 19-20.

51 CAPA, *submission 90*, p. 32.

> Until about 2001, there was a 1:1 relationship between stipend and equivalent taxable income but recent changes to the tax scales have reduced the value of the tax-free status. The data show that stipends have not maintained parity with the CPI, were that to be used as the measure of relativity. Most starkly however is the discrepancy between stipend and average weekly earnings which has substantially diverged from scholarship relativity. Australian average weekly earnings since 1994 have increased by about 75% compared to only 37% for stipends in Australian postgraduate awards.[52]

4.64 Nine submissions to the inquiry, including those from key representative bodies such as the Council of Australian Postgraduate Associations and the Council of Deans and Directors of Graduate Studies, suggested that scholarship stipends should be subject to an appropriate indexation mechanism, to ensure that the value of those stipends keeps pace with inflation and the cost of living.[53]

4.65 The Committee agrees that the value of scholarship stipends should keep pace with inflation.

Recommendation 16

The Committee recommends that the APA stipend be fully indexed with CPI.

Post-submission candidature

4.66 Several submissions to the inquiry discussed the need for consideration for PhD students' needs at the end of their studies, in particular, the period between the submission of a thesis and the awarding of a PhD degree.

4.67 SUPRA explained that:

52 ACDA, *submission 57*, p. 2.

53 IRUA, *submission 51*, p. 8; NTEU, *submission 53*, p. 5; JCU, *submission 22*, p. 5; Murdoch, *submission 38*, p. 2; DDoGS, *submission 72*, p. 5; Deakin, *submission 73*, p. 3; CAPA, *submission 90*, p. 33; UQ, *submission 100*, p. 6; USC, *submission 74*, p. 1.

> Currently, one is considered to have completed a degree when the thesis is submitted yet candidature in practice does not end until the degree is conferred.[54]

4.68 University of Wollongong discussed this issue at length:

> Much of the Australian research output in terms of publications, discoveries, patents and technology transfer arises from the research work of HDR students. Yet, our ability to ensure that this output is made generally available is inhibited by the counterproductive practise of de-enrolling an HDR student as soon as they submit their thesis. This results in students entering a "no-man's-land" while waiting for examiners' deliberations on their work; they typically must find paid work to survive and thus cannot devote time to the preparation of publications or presentations of their findings. Their effective removal from the academic community occurs at a time when they need that engagement most. This is particularly problematic for international students whose visas terminate with their enrolment.[55]

4.69 James Cook University also commented on the situation PhD students face upon thesis submission:

> I find it very anomalous that a student who finishes their PhD within the tenure of their scholarship has to immediately surrender their scholarship and cannot use it to support themselves during the interregnum of the examination period, which typically takes several months.[56]

4.70 James Cook University suggested that an extension of candidature and scholarship would be of great benefit to the PhD student and their research output:

> I think that it would be reasonable, if the time of scholarships were extended—or even if it were not, but preferably if it were—that a student be allowed to retain their scholarship during the examination period in the expectation that they would use that to complete the publication of their papers from their thesis. There are huge advantages in this: they are used to being poor and you are prolonging it just a bit, they will have a head of steam because they have just completed the writing process, they are really on top of it, the literature is current et cetera. And the minute they go to

54 SUPRA, *transcript of evidence 5 August 2008*, p. 24.

55 UOW, *submission 25*, p. 2.

56 JCU, *transcript of evidence 19 August 2008*, p. 17.

> another job, their employer's priorities will inevitably be different and they will be consumed.[57]

4.71 University of Wollongong suggested that doctoral students:

> … remain nominally enrolled for a period of 6 months after submission of their thesis and that APA and APA-I awards automatically extend past submission of the thesis to completion of the thesis when the period is within the 4.5 year limit.[58]

4.72 SUPRA recommended that the definition of completion of postgraduate degrees be extended to the time at which a student is informed that they will be awarded their degree. SUPRA also recommended that the length of the APA should be changed to match this extension of candidature:

> We would like to see that the awards be extended to match that definition of candidature, that it reaches until conferral of degree rather than submission, given that there is a substantial amount of work demanded from postgraduate students between first submission of a thesis and actual conferral of a degree.[59]

4.73 SUPRA sought to clarify exactly what the extension period should be:

> On the issue of conferral versus submission, probably we need clarification. When we say conferral what we mean is when someone says 'Here's your letter, you've passed your PhD,' not necessarily when someone makes you lift your hat [at a graduation ceremony] and gives you your PhD. Even we say you can call yourself doctor once you have got your letter even though you have not got your degree. That is the point that we would like it rather than the point where you go to the office and get the stamp saying, 'Yes, we have four copies of your thesis'.[60]

4.74 The Committee is fully supportive of the need to extend doctoral student enrolment past thesis submission to the point when students are informed that they will be awarded a degree.

4.75 The Committee sees this time as an ideal opportunity for doctoral students to publish papers from their research, apply for post-doctoral grants and complete generic skills training that will assist in preparing them for the research workforce.

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57 JCU, *transcript of evidence 19 August 2008*, p. 22.

58 UOW, *submission 25*, p. 2.

59 SUPRA, *transcript of evidence 5 August 2008*, p. 24.

60 SUPRA, *transcript of evidence 5 August 2008*, p. 35.

4.76 The Committee is also of the opinion that doctoral students should continue to receive income support during this extended period, through any unexpended portion of their original award, including any unused extensions.

4.77 The Committee is confident that the majority of doctoral students receiving stipends will be able to complete their studies with adequate income support, given that the Committee has recommended that doctoral students should be eligible for stipends of three-and-a-half years plus two six-month extensions.

Recommendation 17

The Committee recommends that the Australian PhD candidature period be nominally extended beyond thesis submission until the time at which the student is informed that they will be awarded their degree.

Additional income support

4.78 CAPA explained that access to income support is the most critical factor in supporting participation in higher education, explaining that it is:

- a deciding factor for those considering pursuing a higher degree;
- an enabling factor in supporting adequate student engagement, allowing students to get the most out of their experience in higher education;
- a critical factor in supporting the quality of the contribution higher degree candidates are able to make through research; and
- a major factor in mitigating student attrition.[61]

4.79 SUPRA submitted that student poverty is one of the most pressing issues facing postgraduate research students, suggesting that:

> … the mounting pressure of ongoing poverty for students who have committed 7 or 8 or more years of their lives to becoming qualified researchers can be too much for many students to bear.[62]

61 CAPA, *submission 90.1*, p. 7.

4.80 SUPRA recommended that Austudy and Youth Allowance provisions should be extended to include all postgraduate research students, and that the rates of assistance need to increase steeply. SUPRA discussed an example:

> For the many students who live in and around the main Camperdown campus of the University of Sydney, the problem of the paucity of their income support combined with an extremely tight rental market and inflationary pressures on transport and household goods has made it exceedingly difficult to make ends meet.[63]

4.81 SUPRA stated that it is often confronted with postgraduate research students struggling to manage significant rental expenditure. SUPRA explained that it has previously discussed many ways to deal with these issues, including having a loading added to the scholarships of postgraduate research students studying in high cost areas, but acknowledged difficulties with determining eligibility criteria.[64]

4.82 SUPRA explained that a solution that would effectively support students with higher living costs would be to extend Centrelink's Rent Assistance scheme to postgraduate research students in receipt of an APA or similar scholarship (as well those students receiving Austudy or Youth Allowance, if that was to be implemented). Health Care Card eligibility was also proposed.[65]

4.83 Victoria University stated that the Australian Government should consider measures that recognise individual hardship and make additional support available to postgraduate research students who face severe difficulties, and suggested that rent support could be one such measure.[66]

4.84 CAPA explained that only an extraordinarily low number of postgraduate research students are currently eligible for Austudy or Youth Allowance. CAPA provided an example:

> Students in receipt of Youth Allowance who are under 21 may apply to receive income support while undertaking a research higher degree. This provision would have affected only 28 PhD

62 SUPRA, *submission 66*, p. 5.

63 SUPRA, *submission 66*, p. 5.

64 SUPRA, *submission 66*, p. 5.

65 SUPRA, *submission 66*, p. 5; SUPRA, *transcript of evidence 5 August 2008*, p. 24.

66 VU, *submission 15*, p. 2.

> students and 19 research masters students under the age of 21 enrolled in 2006.[67]

4.85 CAPA explained that several recent legislative reforms have extended eligibility for Youth Allowance and Austudy to certain students, however, those provisions are very limited, failing to address the genuine need clearly identified for postgraduate research students:

> … only students in approved courses are eligible to apply for income support … 920 masters students in approved courses would be eligible for income support in 2008, increasing to approximately 1,470 in 2010. There were 74,248 domestic masters by coursework students enrolled in 2006.[68]

4.86 CAPA summarised various data sources, suggesting that there are approximately 20 000 postgraduates (or 59 per cent) attempting a research higher degree without access to any form of student income at all.[69]

4.87 CAPA recommended that access to Youth Allowance, Abstudy or Austudy be extended to all students enrolled in a tertiary degree, regardless of the nature of the course in which they are enrolled.[70]

4.88 The Committee is very concerned that the majority of Australian postgraduate students are beginning their courses of study at a serious disadvantage through the lack of income support.

4.89 The Committee is of the opinion that access to the Youth Allowance, Austudy or Abstudy schemes should be extended to all students enrolled in a tertiary degree. The Committee notes that candidates in receipt of a scholarship or other source of income above a determined assessment threshold would be ineligible, and access to those schemes should be regarded as secondary to access to a scholarship or award with an adequate living stipend.

67 CAPA, *submission 90.1*, p. 5.
68 CAPA, *submission 90.1*, pp. 5-6.
69 CAPA, *submission 90.1*, p. 7.
70 CAPA, *submission 90.1*, p. 7.

Recommendation 18

The Committee recommends that access to Youth Allowance, Austudy or Abstudy be extended to all students enrolled in a higher degree by research, noting that:

- **access to those schemes does not determine eligibility;**
- **candidates in receipt of a scholarship or other source of income above a determined assessment threshold would be ineligible; and**
- **access to those schemes should be regarded as secondary to access to a scholarship or award with an adequate living stipend.**

4.90 CAPA, in its supplementary submission to the inquiry, highlighted the uneven nature by which state governments support postgraduate research students through access to transport concessions.[71]

4.91 CAPA provided a table summarising state provision of transport concession to various student groups:

- South Australia, Northern Territory and Western Australia provide concessions to all tertiary students, including international students;
- New South Wales provides concessions to undergraduate students and postgraduate students with scholarships;
- Queensland and Victoria provide concessions to undergraduate students only; and
- Tasmania and the Australian Capital Territory provide no concessions to tertiary students.[72]

4.92 Murdoch University also called for the introduction of transport concessions, particularly for international PhD students.[73]

4.93 The Committee considers it absurd that there is such considerable variation in access to transport concession between the states.

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71 CAPA, *submission 90.1*, p. 11.

72 CAPA, *submission 90.1*, p. 11.

73 Murdoch, *submission 38*, p. 4.

4.94 The Committee recommends that the Australian Government work with State Governments to support postgraduate research students through the reduction of certain living expenses, in particular, public transport travel.

Recommendation 19

The Committee recommends that the Australian Government work with State Governments to support postgraduate students through the reduction of certain living expenses, in particular, through the provision of concessions for public transport travel. Access to transport concessions should be made available to all full-time tertiary students, regardless of type of enrolment or the level of course in which they are enrolled.

5

Attracting students to research training

Financial considerations

5.1 The Committee recognises that financial considerations play a decisive role in contemplating enrolment in postgraduate research. Many people still have a large Higher Education Contribution Scheme-Higher Education Loan Programme (HECS-HELP) debt to repay from their first degree. Some are ready to purchase a home or start a family.

5.2 Furthermore, taking on a research degree entails forgoing up to four income-generating years, and associated accruing benefits, such as leave entitlements, superannuation, and promotion and networking opportunities. The value of the lost income can, in some cases, be very high; starting salaries in the booming mining sector in South Australia are around $100 000 per annum.[1]

5.3 It is evident that the postgraduate research sector is in direct competition with the workforce, particularly at the graduate and entry levels, in the current climate of low professional unemployment. In comparison, the Committee heard evidence that many European countries, such as Germany, pay their PhD students a salary equivalent to a junior academic level, in recognition of the skills required to be accepted for doctoral studies.[2]

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1 Adelaide, *submission 79*, p. 1.

2 UQ, *transcript of evidence 18 August 2008*, p. 60.

5.4 IRUA highlighted that recent graduates are faced with a choice between attractive salaries or 'very modest support through a postgraduate award'.[3] This 'modest support' is currently at a level below[4] the average starting salary in most industries. Australian National University described this situation as counter-productive:

> … the very lowest graduate starting salary in Australia is offered to some of our very best graduates who choose to do a PhD.[5]

5.5 Moreover, many potential higher degree by research candidates have already established their profession, and face postponing their career trajectory for a fraction of their previous salary.

5.6 The Committee heard that many postgraduate research students choose research over employment due to a personal and intellectual desire or passion rather than financial reasons.[6] However, the ACDA argued that:

> The notion that there is eventual personal gain and hence stipends can be less than market value would seem outdated when the nation needs to invest in the best for the nation's benefit.[7]

5.7 In any case, research degrees do not necessarily lead to better gains. The Group of Eight provided figures showing that the median full-time salary in 2006 for higher degree by research graduates was lower than the median salary received by coursework Masters graduates.[8]

5.8 The need to increase the value of the Australian Postgraduate Award is argued at length in Chapter Four and will not be discussed here. However, the Committee recognises that any further financial disincentives to undertaking postgraduate research studies should be removed.

5.9 The Committee was advised by several submitters that although full-time Australian Postgraduate Awards are exempt from income tax, part-time awards are not, and nine submissions recommended that

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3 IRUA, *submission 51*, p. 7.

4 ANU, *submission 23*, p. 3; UQ, *submission 100*, p. 5.

5 ANU, *submission 23*, p. 3.

6 AAH, *submission 61*, p. 15, CAPA, *submission 90.1*, p. 22; Group of Eight, *transcript of evidence 25 June 2008*, p. 10; ATSE, *submission 6*, p. 8.

7 ACDA, *submission 57*, p. 3.

8 Group of Eight, *submission 55*, *attachment*, p. 3.

this inequity be removed.[9] The Committee agrees that taxation of part-time awards 'is a major impediment to improving equity participation rates'.[10]

5.10 The Committee recommends eliminating this financial disincentive by exempting all postgraduate research scholarships from assessable income tax.

Recommendation 20

The Committee recommends that postgraduate research scholarships be exempt from assessable income for taxation, including part-time awards.

5.11 Four submissions recommended a financial incentive to increase domestic postgraduate research enrolments and completions in the form of a HECS-HELP loan remission, awarded upon successful completion of a postgraduate research degree.[11] IRUA suggested that:

> Specifically, a completed PhD might result in full remission of the debt, or a research masters, 50 per cent of the debt … Such a provision would represent a significant offset to income foregone for students undertaking research training programs, and create an incentive to drive higher completion rates. For reasons of fairness, some consideration would need to be given to compensating research graduates who paid their HECS debts fully or partially upfront.[12]

5.12 The Committee supports this scheme, and recommends that a tax deduction be guaranteed to successful research graduates who have already paid their HECS-HELP fees.

5.13 As discussed in the previous chapter, a National Priority Postgraduate Research Scholarship Scheme that offers attractive stipends to research candidates in areas of national research skill shortage is also recommended. Such a scheme would offset the

9 CAPA, *submission 90*, pp. 34-35; VU, *submission 15*, p. 2; UNSW, *submission 31*, p. 10; NTEU, *submission 53*, p. 18; NTEU-UQ, *submission 59*, p. 2; ATN, *submission 54*, p. 5; UniMelb, *submission 56*, p. 3; SUPRA, *submission 66*, p. 4; UQ, *submission 100*, p. 6.

10 UQ, *submission 100*, p. 6.

11 Murdoch, *submission 38*, p. 3; La Trobe, *submission 48*, p. 3; Deakin, *submission 73*, p. 2; Griffith, *submission 80*, p. 4.

12 IRUA, *submission 51*, p. 9.

disparity between the cost of research training and the available starting salaries in growth industries.

Recommendation 21

The Committee recommends a full remission of the HECS-HELP debt for successful research PhD graduates and a partial (50 per cent) remission for successful research Masters graduates, awarded upon conferral, and a tax deduction for successful research graduates who have already paid their HECS-HELP fees.

Flexibility of study arrangements

5.14 The Committee believes that research training opportunities in Australia should be flexible in order to accommodate the greatest number of high-quality postgraduate research candidates, regardless of circumstances.

5.15 The Committee notes that some postgraduate research students will benefit from simultaneous enrolment at two institutions, due to the nature and available resources of the research field. At present, the RTS does not recognise joint enrolment:

> Joint PhD programs are gaining profile and relevance internationally but nationally the RTS does not credit completion to more than one university. This is a strong disincentive to cross-institutional co-supervision and collaboration, a hindrance to the mobility of Australian research and the national research workforce, and a barrier to the broadening of the PhD experience.[13]

5.16 The Committee believes that higher degree by research students should be able to enrol jointly at two universities to take advantage of the best access to infrastructural and supervisory resources.

13 DDoGS, *submission 72*, p. 4.

Recommendation 22

The Committee recommends that the Research Training Scheme guidelines be amended to enable higher degree by research students to enrol jointly at two institutions, with student load and completion credited to both institutions.

5.17 The Committee is apprised of the diversity of postgraduate research students and recognises that a one-size-fits-all model is not suitable for developing Australia's research capacity and strength. Many students, for many reasons, elect to undertake higher degrees by research on a part-time basis, or need to convert from full-time to part-time status. Postgraduate research scholarships should reflect these needs.

5.18 Professor Terry Evans, Dr Peter Macauley and Ms Margot Pearson argued in their submission that Australia currently has:

> … a monocular policy focus on younger, full-time, scholarship holders "preparing for work" which is blind to the needs and potential of the many candidates who are older and often mid-career, part-time, salaried and in a good job … We believe that diversity is a strength of Australian doctoral education and we call for policy that eschews homogeneity and which values diversity and flexibility.[14]

5.19 CAPA added that:

> The majority of postgraduate research students are over 30, and are subject to the commitments that typically accompany the middle decades of many peoples' lives … Postgraduate research students have partners, children, mortgages, debt repayments, employment commitments, and aging parents.[15]

5.20 However, the Commonwealth Scholarship Guidelines allow for part-time allocation of Australian Postgraduate Scholarships only in the instances of:

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14 Professor Terry Evans, Dr Peter Macauley and Ms Margot Pearson, *submission 46*, pp. 1-2.

15 CAPA, *Implementing the Research Training Scheme: The consequences for postgraduate research students*. CAPA Research paper, November 2002, p. 25.

> … exceptional circumstances [that] relate to significant caring commitments or a medical condition which limits the student's capacity to undertake full-time study.[16]

5.21 NTEU submitted that the option of part-time study would have better results for on-time completions.[17]

5.22 Research Australia discussed some of the benefits of offering more flexible study options in the medical field:

> More part-time and flexible learning (e.g. distance) options for study would not only make study alongside continuing clinical practice more attractive financially, it would enable health professionals to remain embedded in the health system, progressing within their organisation and maintaining currency of skills and knowledge.[18]

5.23 Moreover, postgraduate research scholarships should be more flexible in allowing changes between part- and full-time status during the term of the award. University of Melbourne argued that scholarships should also 'allow short periods of full-time activity by part-time students'.[19]

5.24 The Committee is of the opinion that flexible arrangements, which take into account work, family and financial obligations, should be implemented to encourage higher enrolment in postgraduate research programs. Specifically, the Committee recommends amending the Commonwealth Scholarships Guidelines' restrictions on part-time approval.

Recommendation 23

The Committee recommends that the Commonwealth Scholarship Guidelines be amended to give award recipients greater flexibility in undertaking all or part of a higher degree by research on a part-time basis.

16 *Higher Education Support* (*Commonwealth Scholarships Guidelines) Act 2003*, p. 10.

17 NTEU, *submission 53*, p. 19.

18 Research Australia, *submission 70*, p. 9.

19 UniMelb, *submission 56*, p. 3.

Equity

Eligibility

5.25 The Committee believes that the ranking criteria, based largely on a standard of first-class Honours, for postgraduate research places and scholarships are too narrow, resulting in the danger that suitably-qualified candidates may be overlooked to Australia's detriment.

5.26 The Cooperative Research Centres (CRC)Association indicated that CRCs have broader eligibility criteria, and thus play an important role in facilitating research training for high-quality students who would not be accepted by universities.[20]

5.27 The Committee heard directly from a recent PhD graduate whose second-class Honours was insufficient to secure an APA, essentially preventing him from pursuing research training. However, he was subsequently accepted by a CRC. He completed his PhD on schedule at a standard equivalent to the highest 10 per cent at a major university, published several papers, and made a contribution to Australia's scientific knowledge that has resulted in a patent.[21]

5.28 Furthermore, the standard of first-class Honours varies considerably across disciplines:

> Across the country we talk about honours H1 [first-class] as if we know what we are talking about but, in fact, in any single university between disciplines there could be differences in the way that they measure honours H1, and to get honours H1 in history can be quite different from getting it, say, in engineering; even in terms of the required grade point average. [And] there are also nationally agreed upon behaviours about how many honours H1s you hand out; in particular, law. All agree to hand out not more than five per cent honours H1s to their law graduates, almost regardless of what marks they get. So you can find that you have very few law graduates that quality for honours H1, whereas you will have lots of mathematicians or physicists.[22]

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20 CRCA, *transcript of evidence 3 September 2008*, pp. 13-25.

21 CRCA, *exhibit 11*, p. 1.

22 UWA, *transcript of evidence 12 August 2008*, p. 45.

5.29 Certain professional sectors, such as teaching and nursing, argued that their research postgraduate student profile tends to comprise mid-career professionals with a practical or clinical background.[23] Thus education and health applicants generally eschew the Honours year for work experience and, later in the career, a Masters degree. However, they are disadvantaged by the primary importance of Honours in the ranking criteria.

5.30 The Committee is concerned that the pool of postgraduate research applicants is limited by out-of-date and inconsistent standards. This is of particular concern in light of the need to increase Australia's research force. Thus the Committee recommends that the ranking criteria for higher degree by research places and scholarships be reviewed for greater equity between disciplines and a less rigid interpretation of potential eligibility.

Recommendation 24

The Committee recommends a review of the ranking criteria for Research Training Scheme places and Australian Postgraduate Awards for greater consistency and to account for diverse backgrounds and entry points.

Regional universities

5.31 The Committee heard that many of the challenges facing Australian universities in terms of attracting and retaining research students are having a greater impact on regional universities.

5.32 This may be due to a perception of status. Southern Cross University noted that Australian universities can be compared unfavourably to overseas institutions and, within Australia, regional universities unfavourably to metropolitan universities.[24] NTEU-CQU observed that 'regional universities are often regarded as second-rate institutions', possibly due to disparities in resources.[25]

23 AARE, *submission 64*, p. 7; CDNM(ANZ), *submission 69*, p. 1.

24 SCU, *submission 12*, pp. 5-6.

25 NTEU-CQU, *transcript of evidence 19 August 2008*, p. 3.

5.33 The Committee recognises the importance of research into regional issues for regional development and future national skill requirements, and believes that incentives should be introduced to promote research enrolment at regional universities.

Recommendation 25

The Committee recommends that the Australian Government introduce a scheme to fund relocation costs for students who choose to undertake research training in regional universities.

Under-represented groups

5.34 The Committee recommended, in Chapter Three, a priority scholarship scheme that targets those who are under-represented in Australian research training, such as Indigenous Australians and students from rural and regional Australia.

5.35 Innovative Research Universities Australia submitted data on the different levels of postgraduate participation across Australia:

> The 2006 ABS Census indicates that 6.7 per cent of non-Indigenous Australians … held a postgraduate degree, compared with only 1.4 per cent of Indigenous Australians.[26]

5.36 James Cook University claimed that more attractive stipends would encourage higher enrolments from Indigenous Australians, who generally find high-paying opportunities immediately after obtaining an undergraduate degree.[27]

5.37 The Batchelor Institute of Indigenous Tertiary Education argued that research training needs to be flexible and supportive since 'there is a larger economic and social cost for Indigenous Australian students who engage in research training'.[28]

26 IRUA, *submission 51*, p. 3.

27 JCU, *submission 22*, p. 6.

28 Batchelor, *submission 42*, p. 2.

5.38 Universities Australia submitted that the number of Australians from regional areas undertaking a higher degree by research had not increased very much in the period 2001 to 2006.[29]

5.39 The 2006 Census also reported that six per cent of Australians aged 25-54 possess a higher degree by research:

> The equivalent figure for Sydney is 8.7 per cent and Brisbane 6.7 per cent. In contrast, the Hunter Statistical Division in NSW records a figure of only 3.4 per cent and the Northern Statistical Division in Queensland records a figure of only 3.7 per cent … and the figures are much lower for Divisions further removed from regional cities and large centres.[30]

5.40 Murdoch University recommended the introduction of programs to encourage students from rural and regional Australia to undertake research higher degrees and to support them for successful completion.[31]

5.41 SUPRA agreed that 'it is essential that there is an increased focus on recruitment and retention of students from equity backgrounds'.[32]

5.42 The Committee believes that all Australians, regardless of geographical or ethnic background, should have equal opportunity to pursue research training.

Recommendation 26

The Committee recommends that the Australian Government develop and implement appropriate measures to encourage the recruitment of Indigenous, regional and rural Australians to higher degrees by research.

29 Universities Australia, *submission 82*, p. 3.

30 IRUA, *submission 51*, p. 3.

31 Murdoch, *submission 38*, p. 2.

32 SUPRA, *submission 66*, p. 6.

International postgraduate research students

5.43 The Committee is of the strong opinion that first and foremost Australia should encourage and enable Australian students to access and benefit from research training. Australia needs to strengthen and expand its national research and innovation capacity without undue reliance on importing knowledge.

5.44 The Committee is cognisant of Australia's research labour shortage and emphasises that the factors leading to the current decline in domestic research training and teaching must be addressed to guarantee Australia's future innovation capacity. Edith Cowan University argued that:

> While it is clearly in the nation's interest to focus research training on Australian citizens, [the] recent move to increase the number of highly skilled migrants reflects the shortfall of highly qualified personnel in the broad workforce.[33]

5.45 However, the Committee also appreciates that, for the foreseeable future, Australia requires the benefits that international researchers-in-training, researchers and academics bring to Australia's standing in the global knowledge economy. Furthermore, Australia should capitalise on the current strong interest from international students.

5.46 While domestic enrolments in higher degrees by research are plateauing, international demand is high.[34] University of Western Australia indicated that their international postgraduate student body is growing faster than other cohorts.[35] The university further noted that whereas not a single Australian student applied in 2007 for a PhD in earth sciences - an area of great significance to the national economy - there was strong interest from international applicants.[36]

5.47 Australia is in fact trailing behind countries such as the United Kingdom and the United States in terms of the proportion of international students in research training. International students in Australia comprise only 18-22 per cent[37] of the higher degree by

33 ECU, *submission 20*, p. 5.

34 Universities Australia, *submission 82*, p. 3.

35 UWA, *submission 96*, p. 7.

36 UWA, *transcript of evidence 12 August 2008,* p. 34.

37 DIISR, *submission 50*, p. 18; FASTS, *submission 37*, p. 6.

research cohort, compared to the UK and the US, with 40.2 per cent and 33.3 per cent, respectively.[38]

5.48 The Committee acknowledges the dual responsibility of the Australian Government to equip domestic students with internationally-competitive research skills, and to attract high-quality students from overseas to support Australia's research effort.

5.49 There are several advantages to Australia's investing in international students. One is an ambassadorial force of students who return to their homelands, spreading Australia's higher education reputation and strengthening global academic ties. Second, graduates who choose to remain and work in Australia help fill the pipeline that feeds a growing research environment.

Scholarships

Number

5.50 The Committee is of the opinion that international students should not be recruited at the expense of Australian students. As such, the Committee supports the current separate research scholarship program specifically targeted at international students and does not believe that the Australian Postgraduate Awards should be opened to international students, as some submissions have recommended.[39] The Committee notes that eligibility for Australian Postgraduate Award (Industry) has been extended to international students.[40]

5.51 The Australian Government, through the Department of Education, Employment and Workplace Relations, implements the Endeavour International Postgraduate Research Scholarships (IPRS) program. IPRS awards are allocated for Masters and Doctorate by research degrees for two years and three years, respectively.[41]

5.52 There are currently 330 annual scholarships available, last increased in 2002 by 30 places.[42] The Group of Eight submitted that in contrast

38 FASTS, *submission 37*, p. 6.

39 UOW, *submission 25*, p. 3; RSPSE-ANU, *submission 49*, p. 2; ACDS, *submission 13*, p. 4; FASTS, *submission 37*, p. 1; Flinders, *submission 78*, p. 2; CUT, *submission 18*, p. 2; ATN, *submission 54*, p. 6.

40 ARC, *transcript of evidence 25 June 2008*, p. 14; RSPSE-ANU, *submission 49*, p. 2.

41 <www.endeavour.deewr.gov.au/australian_institutions/international_postgraduate_research_scholarships.htm>, viewed 7 November 2008.

42 DIISR, *submission 50*, p. 7; DDoGS, *submission 72*, p. 6.

to the relatively static number of scholarships, international enrolment in higher degrees by research has increased four-fold since 1997.[43]

5.53 Numerous submissions recommended increasing the number of IPRS places to accommodate the growing number of international students undertaking higher degrees by research. Dr Adam Cawley noted the importance of increasing the number of IPRS for building human capital in Australia.[44]

5.54 IRUA argued that the IPRS program should be increased five-fold.[45] University of Southern Queensland indicated that the current number of IPRS places is 'totally inadequate' and recommended a three-fold increase, while University of South Australia suggested 'at least a doubling'.[46]

5.55 Edith Cowan University suggested that:

> It would be prudent for the universities and Government to facilitate the movement of suitably qualified overseas applicants into the research training system in order to maintain the research capacity during the period of low domestic demand for places. Making more IPRS available would help to attract qualified researchers from overseas and provide a pipeline effect of skilled researchers for the broader workforce.[47]

5.56 Regional and smaller universities face even greater challenges in attracting international higher degree by research students because the IPRS funding formula favours larger and more established institutions.[48] Southern Cross University is allocated only two IPRS places each year, despite receiving a high number of international applications.[49]

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43 Group of Eight, *submission 55*, p. 5.

44 Dr Adam Cawley, s*ubmission 92*, p. 7.

45 IRUA, *submission 51*, p. 11.

46 USQ, *submission 11*, p. 1; UniSA, *submission 32*, p. 7. .

47 ECU, *submission 20*, p. 5.

48 The formula for IPRS allocations is based on a 50 per cent weighting for higher degree by research completions, a 40 per cent weighting for research income and a 10 per cent weighting for research publications, each taken over the two most recent years for which data are available, according to DIIRS, *submission 50*, p. 34.

49 SCU, *submission 12*, p. 3.

5.57 The Committee recommends a doubling in the annual number of IPRS awards to attract a greater number of international students to Australia.

Recommendation 27

The Committee recommends a doubling in the annual number of IPRS awards to accommodate a greater number of international students.

Value

5.58 The Committee notes that although the IPRS program purports to cover tuition fees, several submissions refuted this. University of Queensland noted that the average tuition fee shortfall from IPRS funding is $11 000 per annum.[50]

5.59 University of New South Wales argued that the funding model for IPRS grants 'greatly penalised Universities that are dominated by high-cost disciplines'.[51] This resulted in the university only being able to:

> … offer IPRS Scholarships to about 5% of applicants with the IPRS grant covering only 65% of tuition fee costs, while other Universities are unable to fill their places and report surplus funds.[52]

5.60 The Group of Eight said that IPRS funding covers 69 per cent of the established tuition costs, and University of Queensland estimated the funding allocation at 60 per cent of the average cost of tuition.[53]

5.61 The Committee notes that Australian universities often provide their own top-up or living-allowance stipend as incentives to potential international candidates.[54]

50 UQ, *submission 100*, p. 9.
51 UNSW, *submission 31*, p. 9.
52 UNSW, *submission 31*, p. 9.
53 Group of Eight, *submission 72*, p. 6; UQ, *submission 100*, p. 8.
54 See, for example, UQ, *submission 100*, pp. 8-9 and USQ, *submission 11*, p. 1.

5.62 DDoGS argued that Australia is:

> … competing against well-funded scholarships at international universities and hampered by inadequate and under-funded international scholarship schemes. As well as the Canadian Georges Vanier Scholarships which have been described as a "marquee graduate scholarship program aimed at attracting young academic superstars to Canadian campuses", the move by the New Zealand government to attract international students by reducing fee rates to domestic levels also places Australian universities at a significant disadvantage.[55]

5.63 The Australian Council of Deans of Science explained that Germany does not impose any tuition fees on higher degree by research students, and the United States provides financial incentives for international students to enrol in postgraduate courses.[56] In contrast, international postgraduate research students in Australia must meet high fees (with the exception of scholarship recipients) and growing living expenses, with very little income-generating opportunity.[57]

5.64 The Committee recommends that the value of the IPRS be increased to fund the full cost of the postgraduate research program it supports.

Recommendation 28

The Committee further recommends that the value of the IPRS be increased to fully fund the tuition fees for each course of study.

Variety

5.65 In addition to the IPRS, numerous other scholarships are available under the Endeavour umbrella.[58] Eleven key submissions, including that from DDoGS, argued that:

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55 DDoGS, *submission 72*, p. 6.

56 ACDS, *submission 13*, p. 4.

57 See MUPRA, *submission 68*, pp. 3-6 for first-hand accounts of international students at Macquarie University struggling to make ends meet, particularly with rising accommodation costs.

58 <www.endeavour.deewr.gov.au/international_applicants/>, viewed 7 November 2008.

> … the suite of international postgraduate scholarships offered under the Endeavour program is complex, confusing and poorly targeted.[59]

5.66 The Committee recommends rationalising and simplifying all Australian postgraduate research scholarships available to international students.

Recommendation 29

The Committee recommends that Endeavour international postgraduate scholarships be rationalised and simplified for greater accessibility and competitiveness.

Visa arrangements

5.67 The restrictive and inflexible nature of visa policies relating to international students was cited by many submissions as an obstacle to promoting Australia as an educational and research destination.

5.68 The Committee heard evidence from international students at a public hearing of the costly and bureaucratic experience of extending, renewing, or changing a student visa.[60]

5.69 University of Western Australia noted that the visa arrangements permit less flexibility than that enjoyed by domestic students, such as the ability to suspend their study for a period of up to 12 months or to undertake their higher degree by research on a part-time basis. Thus, international students are unable to supplement their income with part-time employment, suspend their studies for family reasons, or make flexible arrangements for child-caring.[61]

59 USQ, *submission 11*, p. 1; JCU, *submission 22*, p. 7; UNSW, *submission 31*, p. 9; Murdoch, *submission 38*, p. 1; LaTrobe, *submission 48*, p. 5; IRUA, *submission 51*, p. 11; UniMelb, *submission 56*, p. 4; DDoGS, *submission 72*, p. 6; Deakin, *submission 73*, p. 2; UWA, *submission 96*, p. 7; UQ, *submission 100*, p. 9.

60 Mr James Manicom, Mr Jun Kimura, Mr Cyle Duane, *transcript of evidence 6 August 2008*, pp. 58-59.

61 UWA, *submission 96*, p. 7; UWA, *transcript of evidence, 12 August 2008*, p. 45.

5.70 According to Victoria University's submission to the inquiry, international students must return home if taking personal leave of more than four weeks, or when ill.[62]

5.71 University of Wollongong explained that the rigid visa regime also affects Australia's ability to enhance international research collaboration, given the difficulty in organising visas for brief visits or academic exchanges.[63]

5.72 The Committee recognises that the imposition of current visa policies for international postgraduate research students detracts from Australia's ability to compete effectively in attracting high-quality international research students, and recommends that the policies be amended.

Recommendation 30

The Committee recommends that international student visa policies relating to higher degree by research programs be amended to allow greater flexibility for further research and employment.

5.73 Other, non-visa, measures can be put in place to attract international postgraduate students to Australia. The Committee commends the Victorian Government's policy of waiving primary and secondary public school fees for dependents of international students enrolled in higher degree by research programs in Australian universities.[64]

5.74 University of New South Wales and the Group of Eight noted that school fees are a financial disincentive to international students with children. James Cook University recommended that the waiving of such fees be implemented as a national policy.[65]

5.75 The Committee supports a national policy of fee-exemption at public schools for dependents of international postgraduate research students.

62 VU, *submission 15*, p. 6.

63 UOW, *submission 25*, p. 3.

64 IRUA, *submission 51*, p. 12.

65 JCU, *submission 22*, p. 7; JCU, *transcript of evidence 19 August 2008*, p. 17; UNSW, t*ranscript of evidence 5 August 2008,* p. 51; Group of Eight, *transcript of evidence 25 June 2008*, p. 6.

Recommendation 31

The Committee recommends that the Australian Government work with the States to ensure that the dependents of all international higher degree by research students enrolled at Australian universities are subject to the same fee levels as local students at government primary and secondary schools.

6

Research Careers

6.1 This chapter examines the factors that influence the decision to embark on research training and, subsequently, a research career. These factors include the perceived value of research careers, research career pathways in universities and industry, barriers for women, and Australia's international research competitiveness. Finally, the chapter will discuss the issue of Australia's ageing academic workforce.

6.2 NTEU-UQ described the various entry points into a research career:

> Most researchers begin a research career path from the end of their undergraduate degree, by choosing to do postgraduate study. Some first obtain research experience in Government or private research agencies before taking on a higher degree. Others are motivated to focus on research in mid-career, in an effort to advance an area with which they have become involved in their working life.[1]

The value of research careers in Australia

6.3 The Committee is concerned that Australian society does not place appropriate value on the role of research or researchers, and that this discourages students from considering a research career. Griffith University agreed that 'there is a concern that Australia as a whole does not necessarily value people with a doctorate'.[2]

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1 NTEU-UQ, *submission 59*, p. 10.

2 Griffith, *transcript of evidence 18 August 2008*, p. 43.

6.4 University of Western Australia concurred:

> There is a significant cultural difference in the approach that we take to the value of education and the value of an intellectual life and the approach taken in many other countries. … We had a Nobel prizewinner a couple of years ago. He travels with the vice-chancellor to China on a number of occasions [where] he is a pop star. There are thousands of screaming schoolchildren and university students who want his autograph and want to talk to him. It is completely different in Australia. In Australia, the word 'academic' means 'useless'. Academics and scientists are portrayed in the press as boffins.[3]

6.5 Queensland University of Technology stated that:

> … the traditional isolation of the whole academic endeavour … from the broad stream of society has contributed to that deeply held perception in the industry and in the community that the PhD is a bit of a pointy-headed person who cannot really connect.[4]

6.6 The negative image of researchers and academics is not going to encourage future generations, given that 'peer and public esteem are major drivers for research career choices'.[5] SORTI argued that:

> … university students look at university academics and they see that their rewards are not particularly great, and their working hours are particularly high, and you have to be particularly committed to research from the first instance to actually be interested to stay on under those conditions.[6]

6.7 The Committee supports the promotion of a better understanding of the value of research and acknowledges that researchers gain significant value from research training and contribute greatly to Australian research, science and innovation. A 2006 study of almost 2 000 research graduates conducted by University of Queensland Social Science Research Centre reported that 79 per cent found their training 'very useful or useful' for their current job.[7]

3 UWA, *transcript of evidence 12 August 2008*, p. 46.
4 QUT, *transcript of evidence 18 August 2008*, p. 19.
5 CSU, *submission 65*, p. 11.
6 SORTI, *transcript of evidence 5 August 2008*, p. 4.
7 UQ, *submission 100*, p. 3.

6.8 DIISR submitted that:

> Economic spillover benefits from university research are particularly high, as academics are strongly encouraged to publicly disseminate the results of their research, and research has a broad range of applications.
>
> …
>
> … using conservative estimates [it has been] calculated that each student would contribute up to $700,000 (1997 value) to GDP growth over a lifetime through their contribution to research.[8]

6.9 Australian Academy of Humanities argued that:

> Humanities-educated professionals with HDR qualifications are increasingly valued in industry, government, the professions and management for the particular skills that are acquired through advanced project-based learning in history, criticism, philosophy and other humanities disciplines. The importance of these attributes is being recognised in private and public arena that require expertise in complex problem-solving, behaviour modification and cultural analysis.[9]

6.10 DIISR stated that:

> Qualitative analysis identifies some of the major benefits of public research as: new products and services, faster adoption of new technologies, beneficial social and environmental outcomes (such as improved public health outcomes) and other intangibles such as national prestige and contributions to the global pool of knowledge. What is more is that research contributes to productivity through innovation, particularly through universities engaging with industry.[10]

6.11 Australian National University submitted that there is a 'need for many other sectors apart from the higher education sector to recognise the value of a PhD' and cited the example of Germany where 'half of the senior management in the top 200 companies have PhDs'.[11]

6.12 Australian National University further proposed that should PhD qualifications be included in relevant non-academic job advertisements as

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8 DIISR, *submission 50*, p. 17.

9 AAH, *submission 61*, p. 14.

10 DIISR, *submission 50*, pp. 17-18.

11 ANU, *transcript of evidence 27 August 2008*, p. 14.

a preferred criterion, Australians 'would start to see that it was not simply about training the next generation of academics'.[12]

6.13 Employers are currently discouraged to support their employees' research training by a Fringe Benefits Tax (FBT).[13] Monash University suggested that the FBT be waived for businesses and institutions whose employees undertake higher degrees by research.[14]

Recommendation 32

The Committee recommends that the Australian Government waive Fringe Benefits Tax incurred by businesses or institutions that employ staff undertaking higher degrees by research.

6.14 The Committee supports the suggestion of a 'campaign to raise the awareness and standing of research as a career in the community'.[15]

6.15 University of South Australia recommended:

> A representative body of research professionals with specialist chapters for specific disciplinary areas such as science, health or social science [that] could monitor workforce capacity in areas of strategic importance for Australia's innovation agenda, have oversight of career progression milestones, and ensure research training systems deliver the appropriate skills required. Importantly the establishment of such a professional body would provide recognition of the status and importance of research as a career path for bright and ambitious young Australians.[16]

6.16 Griffith University suggested that Australia follow the United States' lead in marketing higher degrees by research to communities and to industry:

> [The US has] been doing a lot of advocacy work in terms of: what is the benefit of the RHD to a country? What is the public good from an RHD? I think we need more of those generic campaigns, if

12 ANU, *transcript of evidence 27 August 2008*, p. 15.
13 ACDE, *submission 88*, p. 2.
14 Monash, *submission 76*, p. 4.
15 CSU, *submission 65*, p. 11.
16 UniSA, *submission 32*, p. 8.

> you like, to promote why you would do an RHD. We need to bring industry on board on what is a benefit to them.[17]

Recommendation 33

The Committee recommends that the Australian Government, in conjunction with universities and research institutes, follow the example of successful advocacy programs overseas and implement a national research career campaign to market the value of research training to schools, communities and industry, and raise the profile of research careers in Australia.

6.17 Another disincentive to pursuing a research career is the unclear nature of its path. Charles Sturt University submitted that:

> The lack of supported career progression opportunities after completion of a research doctorate creates unnecessary uncertainty for potential applicants about the value of commencing postgraduate research study. Charles Sturt University is of the view that a better career path for research workers across the nation should be developed to reduce the loss of good researchers because they can't see the path ahead.[18]

Career pathways in academia

6.18 The three major impediments to attracting researchers to academic careers are the scarcity of opportunities, lack of job security, and uncompetitive salaries.

Limited entry-level research positions

6.19 Potential academic career researchers are discouraged by the dearth of postdoctoral and entry-level positions in some disciplines and the extremely competitive nature of research grants programs.

17 Griffith, *transcript of evidence 18 August 2008*, p. 43.

18 CSU, *submission 65*, p. 11.

6.20 Universities Australia noted that:

> Over the period 1996 to 2006, the number of [entry-level academic] positions increased from 18,988 to 21,356, a very small increase compared to the increase in undergraduate, research training, research and administrative workloads of universities. This in turn means that the opportunities for research in many junior academic positions are reduced, and the appeal of these positions to prospective high-calibre researchers is commensurately reduced.[19]

6.21 Victoria University noted that the limited number of postdoctoral opportunities has a negative affect on early career researchers' ability to enter academia.[20]

6.22 CAPA agreed, claiming that:

> PhD completion is one point where many talented individuals who may consider an academic career are lost to industry (or even to low paid menial jobs) through lack of opportunity at the early career level.[21]

6.23 In addition to tough competition for postdoctoral fellowships:

> There are at least 7 different Fellowship Schemes within the ARC and 26 Fellowship Schemes within the NHMRC. These need to be reviewed and simplified to ensure that there are good career paths for researchers at ALL stages of their careers [Levels A to E+].[22]

6.24 Several submissions welcomed the Australian Government's recent introduction of four-year Future Fellowships for mid-career researchers but expressed concern with their number (1 000 over a five-year period) or duration (four years, non-renewable).[23]

6.25 IRUA highlighted a Canadian scheme that offers superior stability:

> In 2000, the Government of Canada created a new permanent program to establish 2000 … Canada Research Chairs in universities across the country by 2008. Tier 1 Chairs, tenable for seven years and renewable, are for outstanding researchers acknowledged by their peers as world leaders in their fields … Tier 2 Chairs, tenable for five years and renewable once, are for

19 Universities Australia, *submission 82*, p. 4.

20 VU, *submission 15*, p. 3.

21 CAPA, *submission 90.1*, p. 8.

22 UNSW, *submission 31*, p. 10.

23 AAS, *submission 45*, p. 2; IRUA, *submission 51*, p. 18; AAH, *submission 61*, p. 17; RMIT, *submission 63*, p. 4.

> exceptional emerging researchers, acknowledged by their peers as having the potential to lead in their field.[24]

6.26 It was also noted that schemes similar to Future Fellowships are imperative for early-career researchers as well:

> It would be useful to have a similar measure to encourage early career research academics, as existing post-doctoral places are quite limited in terms of availability and discipline area.[25]

Recommendation 34

The Committee recommends that the Australian Government implement a postdoctoral fellowship scheme targeted at early-career researchers who are up to five years out from PhD completion.

6.27 IPRA-TICHR explained that early-career researchers did not face as much competition when NHMRC used to administer grants directly to institutions:

> An organisation was given a pot of money and it was up to them how they actually allocated it. In that case, rather than the early career researcher having to compete nationwide against the number of people who could do the work or come up with a project … all they have to do then is compete at that local level for a position in the institute.[26]

6.28 In addition, successful applicants were employed for a longer period:

> … they are given five years to actually develop … a research project. It is a little bit different going the other way around, where you have to demonstrate that you have got a viable project up and running at the beginning and you only get three years in the current project funding.[27]

6.29 In the current national competitive grant system, however, early-career researchers must compete nationally against all discipline areas as well as against more established researchers:

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24 IRUA, *submission 51*, p. 18.

25 NTEU, *submission 53*, p. 25.

26 IPRA-TICHR, *transcript of evidence 12 August 2008*, pp. 61-62.

27 IPRA-TICHR, *transcript of evidence 12 August 2008*, p. 61.

> I have just spoken to someone [about the career development award] … and there are again 300 to 350 applicants and there are only 70 awards. Of those, there are maybe seven again in my area of population health. That is across Australia … For someone at my level, only three years postdoc, I am only considered an early career researcher and so me competing [for an NHMRC grant] with very well established people is more difficult … People say it takes two to three goes before you can even get a project grant, so these early career fellowships are the only way to really get us that leg-up to get our track record established so that we can then apply for the grants … I think there is going to be this missing generation of postdocs because it is so competitive and there are so few opportunities out there.[28]

Recommendation 35

The Committee recommends that the Australian Government implement a quota of 10 per cent of ARC and NHMRC successful grants to be allocated to early-career researchers who are first-time awardees.

Declining job security and stability

6.30 As discussed in Chapter Three, universities have experienced chronic under-funding. This has led to universities offering more and more casual and fixed-term contracts which entail less overhead costs than permanent positions. Universities can potentially save money on superannuation costs and salary-step promotions by limiting the number of permanent employees.[29]

6.31 Dr Steve Madden described the piece-meal career path that entry-level academic researchers have to look forward to:

> An uncertain life of fixed term contract based employment then lies ahead where the next contract relies on the success of another person's ARC Discovery grant application … At some undefined period likely 10-15 years ahead, a tenured position may arise when someone dies, leaves, or retires then offering some career stability. … The pre-tenure low level academic employment environment is

28 IPRA-TICHR, *transcript of evidence 12 August 2008*, p. 57.

29 IPRA-TICHR, *transcript of evidence 12 August 2008*, p. 61.

> just not a sensible way to treat some of the most educated and skilled people in our society and desperately needs fixing if we are to retain and grow the best people here in Australia and have some prospect of extracting an economic benefit.[30]

6.32 James Cook University submitted that the current situation in which 'early career research positions are typically funded by project funds ("soft money")' is a disincentive to choosing a research career. [31]

6.33 NTEU noted that:

> … the increase in casual and fixed term employment has corresponded with a decrease in permanent employment. As such, many HDR graduates are dissuaded from entering academia.[32]

6.34 IRUA cited data indicating that 57 per cent of full-time equivalent university staff across the country are tenured and 43 per cent are employed on casual or fixed-term contracts.[33]

6.35 A recent study of 697 research-only staff at Queensland University of Technology found that:

> … 54.6% were general scale casual contracts, 30.3% were fixed-term full-time contracts, and 12.9% were fixed-term part-time contracts. Only 2.2% of the contracts, accounting for 17 staff at the university, were ongoing full-time contracts.[34]

6.36 AUQA noted that 'the increasing "casualisation" of the academic workforce will affect overall research capacity within institutions'.[35] The submission from NTEU-UQ included a comment from an employee that:

> It is common for casual staff to be course coordinators. Far from being supported in developing or improving courses, they even have their email and internet access cut off at the end of each semester.[36]

30 Dr Steve Madden, *submission 60*, p. 3.
31 JCU, *submission 22*, p. 10.
32 NTEU, *submission 53*, p. 24.
33 IRUA, *submission 51*, p. 18.
34 Dr Ruth Bridgstock, *submission 2*, p. 2.
35 AUQA, *submission 14*, p. 6.
36 NTEU-UQ, *submission 59*, p. 7.

6.37 University of South Australia submitted that the lack of a formal postdoctoral career path means that:

> … graduates with some 10 years of training are routinely employed on successive short term contracts resulting in high wastage to a range of other career roles in times of high employment.[37]

6.38 NTEU blamed the insecure employment patterns on:

> … the grant structure, which generally incorporates grants for short-term research projects, typically three years in the case of ARC grants, three to four years for NHMRC grants, and even shorter grants for industry funded and contract research.[38]

6.39 Australia could also lose much-needed researchers to overseas universities where working conditions are more amenable. Despite a shortage of qualified veterinary science academics in Australia, veterinarian scientist Dr Lee Skerratt indicated that he may leave Australia for a more secure position:

> I was able to return [from the US] in 2003 to Australia to take up an academic position which involved a large amount of teaching. Despite this my research career continued to prosper and I needed to resign in 2007 and take up a fixed term research position to meet my research commitments. Despite my research success, my future is uncertain as the funding cycle is generally three years. It is possible that I will return overseas to pursue my research career once my children are older given the current lack of permanent positions in Australia.[39]

6.40 Southern Cross University advocated 'proper funding of universities to enable an increase in tenured academic staff'.[40]

Academic salary structures

6.41 The academic salary structure has also been affected by insufficient funding of universities. Queensland University of Technology quoted a Department of Education, Science and Training report which found that:

37 UniSA, *submission 32*, p. 8.

38 NTEU, *submission 53*, pp. 24-25.

39 Dr Lee Skerratt, *submission 4*, pp. 3-4.

40 SCU, *submission 12*, p. 6.

> … academic salaries relative to average weekly earnings over the period from 1977 to 2002 … had declined across all levels, but with the greatest decline for the most senior academics.[41]

6.42 The same report was quoted by the Australian Academy of Science:

> The salary of a professor and a senior lecturer declined around 25 per cent between 1977 and 2002 relative to average weekly earnings, and the salary of a lecturer and an associate lecturer declined around 15 per cent in the same time.[42]

6.43 Current salaries are also uncompetitive with entry-level positions in industry:

> In 2007, academic salaries for Academic Level A (Associate Lecturer) appointments ranged from $46,000 at the entry step to $62,900 at the top step. For Academic Level B (Lecturer) the range was from $66,200 to $78,500. Equivalent skills command much higher rates of remuneration in Government departments, publicly-funded agencies and professional service firms.[43]

6.44 The disparity between salaries is more pronounced in some sectors than others: 'the greatest contrast in salaries is seen with medical specialists where an academic salary can often be half that of a staff specialist'.[44]

6.45 University of Western Australia argued for:

> Better indexation of Commonwealth block grants [that] would allow universities to keep salaries closer to those available in the private sector, and thus retain quality staff.[45]

6.46 The Committee hopes that increased funding for universities, as recommended in Chapter Three, will mitigate the relatively low academic salary scale and the over-reliance on casual or fixed-term contracts.

41 QUT, *submission 36*, p. 7.
42 AAS, *submission 45*, pp. 6-7.
43 NTEU, *submission 53*, p. 24.
44 Professor Judy Searle et al., *submission 16*, p. 3.
45 UWA, *submission 96*, p. 4.

Research career pathways in industry

6.47 The Committee notes that the disparity in salary scales contributes to the lack of compatibility between academic and industry research career structures. The Australian Academy of Science suggested that 'there is much greater freedom in movement between industry and universities' in the US than in Australia.[46]

6.48 Australian Association of Research in Education recommended 'encouraging movement of professionals among universities, and between industry and the university'.[47]

6.49 The Committee acknowledges the importance of formal links between research training and industry in promoting research career pathways in non-academic sectors. The Committee further recognises that such links enhance much-needed skills and broaden Australia's research capacity.

6.50 Queensland University of Technology asserted that 'the postdoctoral experience needs to provide bridges into longterm career development'.[48] CSIRO provided an example of such a bridging program:

> Post-doctoral fellowships, in particular, could be offered as joint appointments in business and CSIRO, in the same way that CSIRO and universities can, and do, share appointments. Such appointments may be particularly valuable to [small to medium enterprises] and start-ups who cannot otherwise afford to invest in R&D.[49]

6.51 The Group of Eight indicated its support for a similar, wider-reaching scheme:

> … the UK introduced recently which is to provide industry with some funding for the first year of a postdoctoral fellowship, or at least the first year of work in industry, where the government would pay 50 per cent of their salary. It would encourage industry to take on PhD graduates and at the same time after a year they would see the benefits, hopefully, of having such a person in their midst.[50]

46 AAS, *transcript of evidence 18 June 2008*, p. 7.

47 AARE, *submission 64*, p. 5.

48 QUT, *submission 36*, p. 4.

49 CSIRO, *submission 83*, pp. 8-9.

50 Group of Eight, *transcript of evidence 25 June 2008*, p. 8.

6.52 CSIRO also recommended:

> … an expanded post doctoral program that would encourage early career scientists to spend some time in publicly funded research organisation (PFRAs), providing incentives where critical skill shortages exist, and a greater integration with industry.[51]

6.53 These suggestions are in line with findings from the Australian Academy of Science's workshop on the opportunities that postdoctoral and early-career researchers need, including 'greater awareness, exposure and access to other fields of research, for example in industry'.[52]

Recommendation 36

The Committee recommends that the Australian Government implement a scheme that funds 25 per cent of the first two years of salary of postdoctoral researchers in industry areas of national skills priorities in order to promote the value of research graduates to industry.

6.54 The Committee is of the opinion that industry has a significant role to play in building Australia's research capacity. As such, the Committee encourages industry to recognise the contribution that researchers make to industry, and encourages industry to make greater investment in research.

Centres of Excellence and research networks

6.55 The Committee acknowledges the role of research Centres of Excellence and research networks in supporting research and industry links across Australia.

6.56 Australian National University stated that:

> Centres of Excellence allow for more risk-taking because they have a continuity of funding for five to seven years … In areas of strategic importance you can build critical mass in a very, very high-quality research environment.[53]

51 CSIRO, *submission 83*, p. 4.

52 AAS, *submission 45*, p. 6.

53 ANU, *transcript of evidence 27 August 2008*, p. 24.

6.57 Australian Research Council described the way the Research Network works with Centres of Excellence:

> The scheme has a flexible architecture which is highly productive in bridging both physical distance and disciplinary contradictions between researchers to produce new collaborative work. Networks complement Centres by connecting people who cannot be in the same place at the same time, and incubate prospective Centres, by mapping and sustaining emerging areas of research.[54]

6.58 Australian Research Council suggested that 'consideration should be given to expanding the support available for the [Centres of Excellence] scheme'.[55]

Recommendation 37

The Committee recommends that research Centres of Excellence schemes, such as the ARC Centres of Excellence, and other research networks be expanded to continue stimulating research and industry links in areas of national importance across Australia.

Women and research careers

6.59 The Committee is concerned that despite high female participation rates in higher degrees by research, the proportion of those women progressing to, and remaining in, a research career is low, especially in academia and science, technology, engineering and mathematics (STEM) areas.[56]

6.60 CHASS described the disparity between women's participation in research training and in academic research careers:

> What we see is that over 50 per cent of our undergraduates are women. More than half our honours students are women. Now about 47 or 48 per cent of our PhD completions are women, but after the PhD we see a very distinct dropping off of those women. They do not actually continue and enter into the academic

54 ARC, *submission 24*, p. 8.
55 ARC, *submission 24*, p. 8.
56 WEHIMR, *submission 34*, p. 5.

> workforce in particular and we do not know a lot about those decision-making processes nor indeed the incentives or disincentives for those women to remain in the productive academic workforce, although we can all speculate about issues such as child care, work-friendly workplaces et cetera.[57]

6.61 Once women do enter academia, the attrition rate of female academics in their late 20s and 30s rivals that of academics at retirement age.[58]

6.62 The disparity is also evident outside academia:

> … approximately 50 per cent of our PhD students are women and yet 20 per cent to 25 per cent of career scientists are women. It is a complex issue, but in a sense it is a waste of intellectual power that they are not continuing on in this enterprise.[59]

6.63 Australian Academy of Science attributed this trend to women's additional family responsibilities:

> Young women in research face particular problems, with a huge drop-out rate during child-bearing years testament to the insufficient support available to women. Female scientists are receiving inadequate quality of childcare and insufficiently flexible employment after return from maternity leave. Additionally, women often face greater challenges in gaining independence in research.[60]

6.64 Family responsibilities may also prevent women from participating in international endeavours:

> It is generally acknowledged that postdoctoral experience overseas is an advantage for later professional advancement. It signals a broader outlook on scholarship and wider personal linkages internationally. Young women may be less likely or less able to undertake their first postdoctoral role overseas. This would in turn limit their career opportunities.[61]

6.65 The Committee recognises that Australia's knowledge economy suffers from qualified women leaving their research careers. WEHIMR argued that:

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57 CHASS, *transcript of evidence 18 June 2008*, p. 14.
58 CHASS, *transcript of evidence 18 June 2008*, p. 20.
59 AAS, *transcript of evidence 18 June 2008*, p. 5.
60 AAS, *submission 45*, p. 8.
61 AAS, *submission 45*, p. 8.

> Retaining women in the scientific workforce is essential if Australia wishes to hang on to, let alone increase, its innovation performance in the face of increasing competition from large science and technology-focussed countries such as India and China – we simply cannot afford to lose 50% of our talent.[62]

6.66 Australia faces the same challenges in recruiting and retaining women in STEM careers as other OECD countries:

> These issues have moved from being ones of individual equity to ones of relevance to the national skills shortages in key industry areas. It is time for a national co-ordinated effort to increase the participation, retention and advancement of women in careers in all STEM related fields.[63]

6.67 The Committee recognises that existing equal opportunity policies at universities and research institutes have been insufficient to retain women in research careers:

> The single most important factor that would improve retention of women in a research career is to increase the availability of high quality, readily accessible and affordable childcare facilities.[64]

Attracting international and expatriate researchers to Australia

6.68 The Committee is concerned that Australia is not sufficiently competitive in the international market for high-quality researchers. The Committee believes that unless Australia improves its competitiveness in the areas of academic salaries, research funding and working conditions, international and Australian researchers will not be attracted to research careers in Australia.

6.69 University of New South Wales indicated that research by Professor Graeme Hugo has found:

> … employment-related reasons dominate the reasons provided by Australian expatriates living in foreign countries, including academics, for moving elsewhere. Non-competitive salaries, teaching conditions, paucity of research funding, job security and

62 WEHIMR, *submission 34*, p. 5.

63 UniSA, *submission 32*, p. 8.

64 WEHIMR, *submission 34*, p. 5.

> opportunities for career advancement are all cited as contributory factors.[65]

6.70 The Australian Academy of Science also submitted that:

> … the absence of secure positions with remuneration, research funding and the expectation of employment of a par with that overseas, is attracting and keeping Australia's best talent overseas.[66]

6.71 The Committee recognises that international research graduates can continue to enhance Australia's research and innovation output by remaining in Australia upon completion of their studies. Anecdotal evidence suggested that many do in fact stay in Australia and acquire permanent residency and citizenship.[67]

6.72 University of New South Wales suggested that Australia should more seriously consider retaining international research graduates:

> While we invest very heavily in the three or four years of training that we actually put into these students, it is a pity that we do not capitalise on the investment by actually having more of them encouraged to stay in Australia beyond their term.[68]

6.73 Flinders University recommended that:

> A specific scheme to retain the best international higher degree graduates in Australia as postdoctoral fellows would also help to build Australia's research capacity and performance.[69]

6.74 The Committee recognises the importance of overseas research training and postdoctoral experience for Australians; however, many researchers subsequently choose to remain overseas where salaries and funding are more competitive.[70]

6.75 The Australian Academy of Science recommended:

> … a 'boomerang scheme' to tempt Australians back to the country before they become too settled overseas. The scheme would

65 UNSW, *submission 31*, p. 11.
66 AAS, *submission 45*, p. 7.
67 RSPSE-ANU, *submission 49*, p. 2; Dr Adam Cawley, *submission 92*, p. 7.
68 UNSW, *transcript of evidence 5 August 2008*, p. 51.
69 Flinders, *submission 78*, p. 2.
70 UNSW, *submission 31*, p. 11.

> involve substantial start-up funds, a salary equivalent to Australian peers and job security.[71]

6.76 The Committee commends the Australian Government's Federation Fellowships scheme which aims to encourage early- to mid-career researchers currently working overseas who have an interest in contributing to Australia's research capacity.[72] The Fellowships are tenured for five years, well-salaried, and include a possible $500 000 in start-up funds.[73]

6.77 However, over the scheme's seven-year lifetime, the proportion of expatriate Australian and international Federation Fellows has decreased significantly in favour of resident Australians.[74]

Recommendation 38

The Committee recommends an expansion of fellowship schemes targeted specifically at expatriate and international researchers that offer competitive salaries and sufficient start-up support to establish research projects prior to competing for national competitive grants.

Ageing academic workforce

6.78 A considerable number of submissions discussed the impact of an ageing academic workforce on Australia's research capacity, with essentially all submissions admitting that a significant problem is looming.

6.79 Universities Australia stated:

> Australia's research performance is … increasingly living off the past … with a 'baby boomer'-led research workforce now approaching retirement in unprecedented numbers.[75]

71 AAS, *submission 45*, p. 7.

72 <www.arc.gov.au/ncgp/fedfellows/ff_default.htm>, viewed 19 November 2008.

73 ARC, *submission 24*, pp. 15-16.

74 ARC, *submission 24*, Table 9, p. 16.

75 Universities Australia, *submission 82*, p. 4.

6.80 IRUA, quoting research from Professor Graeme Hugo from University of Adelaide, stated:

> The Australian academic workforce is ageing, with projections suggesting that the supply of new graduates will not go close to matching attrition from the system through retirement.[76]

6.81 Professor Nigel Laing discussed the attrition of academic positions:

> … one thing that seems to be frequently happening now with the constraints on university budgets is that when someone finally leaves, that position is not filled, and so there is little opportunity for young people to come into the system.[77]

6.82 Professor Graeme Hugo from University of Adelaide presented a paper entitled *The Demographic Outlook for Australian Universities' Academic Staff* to the Council of the Humanities and Social Sciences (CHASS) *Workshop on the Future of the PhD in the Humanities, Arts and Social Sciences*, at the University of NSW in March 2008. CHASS included this paper as an attachment to its submission to this inquiry.[78]

6.83 Professor Hugo's paper outlines the age structure of Australia's university academic employees, which is significantly older than that of the total population. Professor Hugo explained:

> The rapid influx of young academics into the Australian university system in the 1960s and 1970s followed by a period of slow growth in the number of academic jobs due to demographic and management shifts has produced a high degree of 'age heaping' [producing problems of workforce succession and continuity] in the Australian university teacher workforce … The Australian university teaching workforce is concentrated in the older age groups more than not only the total workforce but also the total professional workforce.[79]

6.84 Professor Hugo suggested that universities are likely to lose between a fifth and a third of their staff in the next decade or so.[80]

6.85 Further exacerbating the impending wholesale retirement of academics, Professor Hugo's age pyramid data indicated that there has been a 'lost generation' of potential university academics, being:

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76 IRUA, *submission 51*, p. 2.

77 Professor Nigel Laing, *transcript of evidence 12 August 2008*, p. 17.

78 CHASS, *submission 47*.

79 CHASS (Professor Graeme Hugo), *submission 47, attachment A*, p. 8.

80 CHASS (Professor Graeme Hugo), *submission 47, attachment A*, p. 12.

> … those currently aged in their 20s and 30s. A comparison of the age pyramids shows that Australian academics aged in their 40s and 50s outnumber those in their 20s and 30s by 31.1 percent.[81]

6.86 Professor Hugo further explained:

> There is no extant research as to why this younger generation of academics have been lost and the extent to which it has been due to factors such as a decline of attractiveness of academic positions, salary, conditions, etc. and the extent to which alternative sectors have been more attractive.[82]

6.87 Professor Hugo discussed university human resources policies and the need for change:

> In the last decade redundancy programs have been a major element in the human resource policies of several Australian universities. However, it could be argued that the policies of the next two decades will need to concentrate on three other 'Rs' - Retention, Recruitment and Return.[83]

6.88 Professor Hugo explained that, over the next decade, Australian universities will be faced by their largest recruitment task for three decades, adding:

> This task will have to be addressed in a context of the most competitive international labour market for the skilled academics, scientists, technologists and researchers that has ever existed. If Australian universities are to maintain their current levels of excellence, let alone enhance them, a range of innovative human resource strategies will need to be initiated.[84]

6.89 Despite the majority of submissions to the inquiry acknowledging the serious problem, very few submissions proposed any innovative solutions to address the issue.

6.90 Some submissions did indicate that they had begun to address the problem in their own way. Flinders University discussed its approach to the problem of the ageing academic population:

> The way we address it internally is that we tend to take more risks with younger academics, and often that is to retain them, so we will give them promotion earlier or we will perhaps invest in them

81 CHASS (Professor Graeme Hugo), *submission 47, attachment A*, p. 12.
82 CHASS (Professor Graeme Hugo), *submission 47, attachment A*, p. 12.
83 CHASS (Professor Graeme Hugo), *submission 47, attachment A*, p. 13.
84 CHASS (Professor Graeme Hugo), *submission 47, attachment A*, p. 16.

> more than we might otherwise, given their age and the stage of their career. When we hire someone, we more frequently now take a risk, in a sense, on someone who seems to be on an upward trajectory but has not quite got the track record yet, and we try to encourage people internally and develop them. Right across the university I can name lots of areas where we are very dependent on relatively young academics who have a good 20, 25 years ahead of them in their career and who are already in leadership positions. We try to do more of that. It is conscious. The 'succession planning' phrase gets discussed a lot within senior management here and among the executive deans. It is something we are aware of and that we try to build on where we can.[85]

6.91 ADBED suggested that the question of workforce ageing is one of succession planning and resources that allow for a timely process of training and mentoring junior researchers in preparation for more senior roles.[86]

6.92 Associate Professor Ellen McIntyre suggested that a form of succession planning takes place through mentoring:

> Flinders University has a good mentoring program, particularly for women, and, from people that have been involved, I have heard that it has been really successful. It is actually really nice when someone is interested in what you are doing. You tend to then listen to them—and do what they say! But it is also really important to grow the research area, to grow the profession, by having mentoring, so that people can build others up to become leaders and continue on from there … My concern is that we do not give much credit to mentoring in terms of what we do to go for promotion, to go for further grants, funding and so on. We need to somehow build mentoring in as part of your track record, part of what is important in doing research.[87]

6.93 RMIT suggested that workforce planning in Australian universities may be facilitated through an initiative such as tenure-track Post-Doctoral Fellowships:

> … through which new research graduates can be introduced into a university academic career path as part of the host-university's workforce planning. The university will thus get a head start on

85 Flinders, *transcript of evidence 6 August 2008*, p. 27.

86 ADBED, *submission 39*, p. 10.

87 Associate Professor Ellen McIntyre, *transcript of evidence 6 August 2008*, p. 5.

> succession planning in anticipation of the departure of older staff. Promising young researchers are eased into the full spectrum of academic staff requirements in ways that ensure they are well prepared for the demands of such positions.[88]

6.94 Professor Hugo recommended a mix of strategies and programs that may assist in relation to innovative human resources objectives:

- introduction and support of 'New blood' programmes;
- early recognition of new talent;
- family friendly policies;
- 'bringing them back' programmes to repatriate former staff and students of the university;
- developing joint international exchanges in teaching and research;
- incentives to keep 'high flyers' in the university;
- gradual retirement programs for selected staff; and
- accelerated promotion for key staff.

6.95 The Committee encourages universities, if they have not already done so, to develop and implement key succession planning and mentoring schemes that will enable the development of early and middle career researchers.

6.96 The Committee is of the opinion that the seriousness of the ageing academic workforce issue will be lessened considerably if research training and research careers once again become attractive prospects for students.

6.97 The Committee envisages research training becoming more attractive to students through increases in fully-funded university places, adequate scholarships and fully-funded postdoctoral competitive grants.

6.98 The Committee is confident that more people will consider research training if there are established career pathways and the increased prospect of job security.

6.99 The Committee is confident that the implementation of this report's recommendations will encourage an increase in the number of people pursuing a research career in Australia, thus increasing the national research and innovation capacity.

88 RMIT, *submission 63*, p. 4.

Maria Vamvakinou MP

Committee Chair

December 2008

A

Appendix A – List of submissions

1	Professor John Clark
2	Dr Ruth Bridgstock
3	Dr Margaret Zeegers & Dr Deirdre Barron
4	Dr Lee Skerratt
5	Mr David Packham OAM
6	Australian Academy of Technological Sciences and Engineering (ATSE)
7	Australian Council of Engineering Deans
8	Professor Arthur Sale et al.
9	Members of the Centre for Study of Research and Training Impact, University of Newcastle
10	University of Western Sydney
11	University of Southern Queensland
12	Southern Cross University
13	Australian Council of Deans of Science
14	Australian Universities Quality Agency
15	Victoria University
16	Professor Judy Searle, Professor Claire Rickard, Mr Ged Williams and Dr Haida Luke

17	University of Sydney
18	Curtin University of Technology
19	Professor Su Lloyd
20	Edith Cowan University
21	Association of Australian Medical Research Institutes
22	James Cook University
23	The Australian National University
23-1	The Australian National University (Supplementary to Submission No. 23)
24	Australian Research Council
24-1	Australian Research Council (Supplementary to Submission No. 24)
25	University of Wollongong
26	University of Ballarat
27	Professor Ellen McIntyre
28	Coalition of National Nursing Organisations
29	The Australian Society for Microbiology
30	Australian Housing and Urban Research Institute
31	The University of New South Wales
32	University of South Australia
33	Vision CRC Limited
34	The Walter and Eliza Hall Institute of Medical Research
35	Australian Nuclear Science and Technology Organisation
36	Queensland University of Technology
37	Federation of Australian Scientific and Technological Societies
38	Murdoch University
39	Australian Deans of Built Environment and Design
40	Professor Nigel Laing

40-1	Professor Nigel Laing (Supplementary to Submission No. 40)
41	Cooperative Research Centres Association Inc
42	Batchelor Institute of Indigenous Tertiary Education
43	Course Management Committee of the Australian Course in Advanced Neuroscience
44	Genetics Society of AustralAsia Inc
45	Australian Academy of Science
46	Professor Terry Evans, Dr Peter Macauley and Ms Margot Pearson
47	Council for Humanities, Arts and Social Sciences
48	La Trobe University
49	Research School of Physical Sciences and Engineering, Australian National University
50	Department of Innovation, Industry, Science and Research
51	Innovative Research Universities Australia
52	Professor Hyam Rubinstein, Professor Peter Hall, Professor William Dunsmuir and Professor Philip Broadbridge
53	National Tertiary Education Union
54	The Australian Technology Network of Universities
55	Group of Eight Limited
56	The University of Melbourne
57	Australian Council of Deans of Agriculture
58	Professor Peter Drummond
59	National Tertiary Education Union (University of Queensland Branch)
60	Dr Steve Madden
61	Australian Academy of the Humanities
62	National Tertiary Education Union (Central Queensland University Branch)
63	RMIT University

64 Australian Association for Research in Education

65 Charles Sturt University

66 Sydney University Postgraduate Representative Association

67 The Heart Foundation

68 Macquarie University Postgraduate Representative Association

69 Council of Deans of Nursing and Midwifery

70 Research Australia

71 Minister for the Environment, Heritage and the Arts

72 Australian Council of Deans and Directors of Graduate Studies

73 Deakin University

74 University of the Sunshine Coast

75 Department of Climate Change

76 Monash University

77 Department of Agriculture, Fisheries and Forestry

78 Flinders University

79 The University of Adelaide

80 Griffith University

81 Institute Postdoctoral Researchers Association at the Telethon Institute for Child Health Research

82 Universities Australia

83 CSIRO

84 The University of Notre Dame Australia

85 Queensland Government

86 Charles Darwin University

87 Australian Research Council College of Experts

88 Australian Council of Deans of Education Inc

89 Medical Deans Australia and New Zealand

90	Council of Australian Postgraduate Associations
90-1	Council of Australian Postgraduate Associations (Supplementary to Submission No. 100)
91	Swinburne University of Technology
92	Dr Adam Cawley
92-1	Dr Adam Cawley (Supplementary to Submission No. 100)
93	Associate Professor David Clark-Murphy
94	The Australian Institute of Nuclear Science and Engineering
95	Professor Brian Fitzgerald
96	The University of Western Australia
97	Australian Catholic University
98	Government of South Australia
99	Australian Education Union
100	The University of Queensland
100-1	The University of Queensland (Supplementary to Submission No. 100)
101	National Health and Medical Research Council
102	Dr Kevin Ryland
103	Professor Allan Borowski
104	Melbourne College of Divinity
105	Minister for Defence Science & Personnel
106	NSW Department of Premier and Cabinet

B

Appendix B – List of exhibits

1 Professor Su Lloyd

'*Co-mediation for Intellectual Property Rights Disputes*'
- Professor Su Lloyd and Dr Joseph Patroni

(Related to Submission No. 19)

2 Cooperative Research Centres Association Inc (CRC)

'*The Impact of Cooperative Research Centres on the Australian Education System*'

(Related to Submission No. 41)

3 Cooperative Research Centres Association Inc (CRC)

Media Article -Australian Financial Review, 25Feb08

(Related to Submission No. 41)

4 Cooperative Research Centres Association Inc (CRC)

'*CRC for Sustainable Resource Planning*'

(Related to Submission No. 41)

5 Cooperative Research Centres Association Inc (CRC)

Products of smart applications of intelligence and industry

(Related to Submission No. 41)

6 Cooperative Research Centres Association Inc (CRC)

Graduate Certificate in Research Commercialisation

(Related to Submission No. 41)

7 Council for Humanities, Arts and Social Sciences (CHASS)

Rigour and relevance: Extending the role of the social sciences and humanities in public policy research, Dr John H Howard, Apr08

(Related to Submission No. 47)

8 The University of Queensland

PhD Graduates 5 to 7 Years Out: employment outcomes, job attributes and the quality of research training

(Related to Submission No. 100)

9 Professor Nigel George Laing

NH&MRC PSP Current Gap Calculations

(Related to Submission No. 40)

10 The University of Queensland

Co-mediation for Intellectual Property Rights Disputes

(Related to Submission No. 100)

11 Cooperative Research Centres Association Inc (CRC)

A CRC PhD student: Benefited by the CRC and benefiting Australia

(Related to Submission No. 41)

12 Joint Mathematical Sciences Groups

Critical skills for Australia's future

(Related to Submission No. 52)

13 Australian Council of Deans of Science

RHD Applicant Assessment

(Related to Submission No. 13)

C

Appendix C – List of public hearings

Wednesday, 18 June 2005 - Canberra

Australian Academy of Science

Professor Philip Kuchel FAA, Secretary, Science Policy

Professor Kurt Lambeck, President

Dr Sue Meek, Chief Executive

Council for Humanities, Arts and Social Sciences (CHASS)

Professor Sharon Bell, Board Member

Mr Toss Gascoigne, Director

Professor Graeme Hugo, University Professorial Research Fellow, The University of Adelaide

Wednesday, 25 June 2008 - Canberra

Australian Research Council

Mr Lennard Marsden, Chief Operational Officer

Professor Margaret Sheil, Chief Executive Officer

The Group of Eight Limited

Mr Tim Payne, Deputy Executive Director

Professor Mandy Thomas, Pro Vice-Chancellor (Research), Australian National University

Tuesday, 5 August 2008 - Sydney

Members of the Centre for Study of Research Training and Impact (SORTI), University of Newcastle

Professor Allyson Holbrook, Director

Research Australia

Ms Rebecca James, Chief Executive Officer

Mr David Pullar, Manager, Partnerships and Policy

Sydney University Postgraduate Representative Association

Ms Katherine Barnsley, Counsellor

Mr Samuel Greenland, Co- President

Macquarie University Postgraduate Representative Association

Mr Phil Betts, President

Individual

Dr Adam Cawley

Australian Catholic University

Professor Peter Wilson, Pro Vice-Chancellor, Research and International

The University of New South Wales

Professor Leslie Field, Deputy Vice-Chancellor, Research

Professor Margaret Harding, Pro Vice-Chancellor

University of Sydney

Professor Merlin Crossley, Acting Deputy Vice-Chancellor (Research)

University of Western Sydney

Professor Andrew Cheetham, Pro Vice-Chancellor (Research)

University of Wollongong

Mrs Kim Callaway, Director, Research Student Centre

Dr Lori Lockyer, Associate Dean, Faculty of Education

Australian Nuclear Science and Technology Organisation (ANSTO)

Dr Miriam Goodwin, Senior Advisor Research Policy and Planning

The Australian Institute of Nuclear Science and Engineering (AINSE)

Professor Bruce King, Vice-President

Wednesday, 6 August 2008 - Adelaide

Individual

Professor Ellen McIntyre

Flinders University

Professor Christopher Marlin, Deputy Vice-Chancellor

University of South Australia

Professor Nanthi Bolan, Dean of Graduate Studies

The University of Adelaide

Professor Richard Russell AM, Pro Vice-Chancellor, Research Operations

Flinders University

Mr Jun Kimura, Postgraduate Student

Mr James Manicom, PhD Candidate

Mrs Sandra Elizabeth Muecke, PhD Candidate

Mr Cyle Duan Sprick, Postgraduate Student

Monday, 11 August 2008 - Batchelor

Batchelor Institute of Indigenous Tertiary Education

Dr Sharon Chirgwin, Post Graduate Coordinator

Professor Joe Fraser, Pro Vice-Chancellor

Professor Jeanie Herbert, Vice-Chancellor

Professor Peter Stephenson, Pro Vice-Chancellor, Research

Tuesday, 12 August 2008 - Perth

Individuals

Professor Su Lloyd

Professor Nigel Laing

Curtin University of Technology

Professor Linda Kristjanson, Deputy Vice-Chancellor (Research and Development)

Edith Cowan University

Professor John Finlay-Jones, Deputy Vice-Chancellor (Research)

Murdoch University

Associate Professor Graham William O'Hara, Dean of Graduate Studies

The Universitiy of Notre Dame Australia

Dr Marc Fellman, Manager, Research Office

The University of Western Australia

Professor Robyn Owens, Pro Vice-Chancellor (Research and Research Training)

Institute Postdoctoral Researchers Assocation at theTelethon Institute for Child Health Research

Dr Natasha Nassar, Research Fellow

Dr Matthew Wikstrom, Research Fellow

Monday, 18 August 2008 - Brisbane

University of Southern Queensland

Professor Graham Baker, Deputy Vice-Chancellor (Scholarship)

Southern Cross University

Professor Neal Ryan, Pro Vice-Chancellor

Queensland University of Technology

Mr Graham MacAulay, Director, HR

Dr Lawrence Stedman, Principal Policy Advisor

Professor Rodney Wissler, Dean of Graduate Studies

University of the Sunshine Coast

Mr Donald Maconachie, Director, Teaching and Research Services

Ms Barbara Palmer, Manager, Research, Teaching and Research Services

Griffith University

Professor Jacqueline Cumming, Dean

The University of Queensland

Professor Christa Critchley, Dean, Graduate School

Professor Alan Lawson, Pro-Vice-Chancellor, Research and Research Training

National Tertiary Education Union (University of Queensland Branch)

Dr John Cokley

Dr Jane O'Sullivan

Professor William Whiten, Member

Tuesday, 19 August 2008 - Townsville

National Tertiary Education Union (Central Queensland University Branch)

Associate Professor Dr Errol Vieth

Individual

Professor Richard Speare (for Dr Lee Skerrat)

James Cook University

Professor Helene Marsh, Dean, Graduate Research

Professor Chris Cocklin, Acting Deputy Vice-Chancellor, Research and Innovation

Wednesday, 27 August 2008 - Canberra

Australian National University

Professor Mandy Thomas, Pro Vice-Chancellor (Research)

Professor Ian Chubb, Vice-Chancellor

Universities Australia

Dr Alexander Maroya, Assistant Director

Dr Arun Sharma, Chair, Deputy Vice-Chancellor (Research)

Wednesday, 3 September 2008 - Canberra

CSIRO

Dr Jim Peacock, Fellow

Dr Alastair Robertson, Deputy Chief Executive, Science Strategy and Investment

Cooperative Research Centres Association Inc (CRC)

Dr Ian Dagley, Member

Mr Michael Hartmann, Chief Executive Officer

Mr Andreas Glanznig, Chief Operating Officer, Invasive Animals Cooperative Research Centre

Dr Brendan Cowled, Former PhD Student

Monday, 8 September 2008 - Melbourne

Australian Universities Quality Agency

Dr Jeanette Baird, Audit Director

Australian Council of Deans and Directors of Graduate Studies

Mrs Fiona Zammit, Executive Officer/Member

Professor Richard Strugnell

Individual

Dr Deirdre Barron

Swinburne University of Technology

Associate Professor Pam Green, Director, Graduate Studies

University of Ballarat

Dr Singarayer Florentine, Senior Lecturer

Victoria University

Professor Helen Borland, Director, Postgraduate Research

Professor Linda Rosenman, Deputy Vice-Chancellor, Research and Region

RMIT University

Professor Neill Furlong, Pro Vice-Chancellor, Research and Innovation

Melbourne College of Divinity

Dr Paul Beirne, Dean and CEO

Deakin University

Dr Maree Gladwin, Director, Staff Research and Development

La Trobe University

Professor Andrew Brennan

Monash University

Professor Rodney Devenish, Deputy Director, Research Graduate School

The University of Melbourne

Professor Richard Strugnell

National Tertiary Education Union

Dr Carolyn Allport, President

Mr Paul Kniest

Tuesday, 9 September 2008 - Melbourne

Australian Council of Deans of Education

Professor Peter Renshaw, Secretary/Treasurer

Ms Lucy Rogers, Executive Officer

Professor Sue Willis, President

Australian Education Union

Mr Angelo Gavrielatos, Federal President

Australian Mathematical Sciences Institute and National Committee for the Mathematical Sciences

Professor Philip Broadbridge, Director

Professor Peter Hall, Chair, AMSI Scientific Advisory Committee

Professor Joachim Rubinstein, Chair

Individual

Mr David Packham OAM

Wednesday, 17 September 2008 - Canberra

Individual

Professor John Clark, Director, Australian Centre for Asian Art and Archaeology University of Sydney

National Health and Medical Research Council

Professor Warwick Anderson, Chief Executive Officer

Ms Miranda Bruyn, Assistant Director, Research Investment Branch

Dr Clive Morris, Chief Knowledge and Development Officer

Wednesday, 24 September 2008 - Canberra

The Council of Australian Postgraduate Assocations (CAPA)

Ms Tammi Jonas, Regional Secretary

Mr Nigel Palmer, National President