



Defining Quality for Research Training in Australia

Consultation Paper

The Australian Academy of Science welcomes the opportunity to comment on the Department of Innovation, Industry, Science and Research consultation paper, *Defining quality for research training in Australia*. We offer the following answers to the questions asked in the consultation paper:

Question 1:

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

Postgraduate research has undergone significant changes in the past ten years in response to the changing roles of Universities, the interactions between Universities, industry and Institutes (including CSIRO), and changes in disciplines, with far greater attention to interdisciplinary research. New types of doctorates have been established, and debate has escalated on issues such as the number of PhD students trained in Australia, and the nature, purpose and future of doctoral education, both for the traditional PhD and the so-called 'professional doctorate'. Doctoral education in Australia is currently under pressure to become more industry-focussed, which gives cause for concern because PhD training is carried out over a relatively short training period, particularly for laboratory-based research.

To ensure that there is high quality research training in Australia, it is crucial that there are minimum quality requirements for higher degrees by research. The aim of such quality management measures is to ensure that an integrated approach is in place which will achieve and sustain high quality output. In general terms, the Australian Academy of Science welcomes any attempt (such as the ERA) to offer a well-rounded, objective assessment of Australian research quality, and to embed standards for post-graduate research into agreements between Government and the University/Institute sector. In view of the large public investment in research, such assessments are both a Government and a community expectation, and are also essential to guarantee the success of our attempts to recruit the best international post-graduate students. However, it is also essential that the requirements are flexible as well as aspirational, because the traditional PhD will meet only the needs of some researchers in future, while other researchers may opt for equally challenging but different PhD structures.

Question 2:

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

Institutions should be required to provide a minimum standard of physical resources in order to receive funding for research, which includes standards relevant to conducting PhD studies. The standards should reflect the necessary laboratory equipment required for the discipline, space dedicated to the needs of research students, computers and access to computing facilities, and reasonable afterhours access to facilities, subject to security, health and safety considerations.

Students who work in CSIRO, Medical Research Institutes and other “off-campus” sites should receive similar physical and academic resources as their University-based counterparts. The University should ascertain that this is indeed the case.

Question 3:

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

The Academy has always accepted that investment in research collaborations and exposure to outside ideas and knowledge is not only crucially important for the development of future researchers, but it is also a key driver of innovation. The training of researchers, especially in emerging areas of science and technology through the two-way flow of researchers and students, is of tremendous benefit. Access to opportunities such as conference attendance and international study or experience is, therefore, very important - Universities and Institutes must be strongly encouraged to provide such opportunities.

Student scholarships could also include an allowance to help cover such costs, and we recommend that every student should attend at least one international and one national conference during their period of PhD study, to present a paper or poster and fully funded by their institution. This also provides an excellent opportunity for students to develop national and international connections that endure throughout their career; it is often during a conference that a student will arrange their postdoctoral fellowship with a new research group, further strengthening their existing professional network.

Question 4:

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

PhD supervisors need to maintain a high level of accessibility and support for their research students. Supervision has both a teaching role – often implicit – and a monitoring role. Certainly the teaching component needs to be taken seriously, and in some cases structured coursework should be considered, particularly in research areas that are not taught explicitly at undergraduate level. However, many PhDs still receive in-depth training in research, and the Academy also notes that (in contrast to undergraduate teaching) it is difficult to prescribe a uniform pattern that meets the needs of all research higher degree situations. There is a need to maintain flexibility.

The Academy's 2008 Workshop *“Enhancing the quality of the experience of postdocs and early career researchers”* identified the skills and mentoring required by

postgraduates to enter careers in Universities, Research Institutes, industry and government agencies (e.g., training in finance, media, public presentation, time management, HR). Every PhD student should have the opportunity to acquire many of these skills during their PhD training.

Funding bodies such as NHMRC and ARC should take greater interest and responsibility for ensuring that students are exposed to many opportunities for skills acquisition and mentoring. Mentoring is especially important and should be taken into account when choosing supervisors for PhD students.

Question 5:

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

The Academy does not wish to offer comments on Question 5, apart from noting that it would be useful if outcomes, in terms of time taken to obtain a PhD, success in obtaining a qualification, and eventual career choice were to be noted for every institution or department offering PhD-level research training.

Question 6:

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

The Academy does not wish to offer comments on Question 6, apart from supporting any arrangements between institutions that expose students to high quality research environments. We note that this should not only include other Universities, but arrangements with industry, CSIRO, DSTO, or (for instance) the synchrotron.

Question 7:

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

The Academy sees several barriers. On the practical side, every research site needs to have adequate access to resources and expertise, which may not be available in a single locale. This is of particular concern at smaller Universities generally, but especially those located regionally, and also for highly specialised Research Institutes. Financially, we note that multidisciplinary projects are often funded in larger national and/or international projects that require more funding, which may not be available for all sites.

We recommend that there should be a further element of flexibility introduced into PhD scholarships in interdisciplinary fields, where funding for travel, gaps in grant funding, and multi-site supervision be considered. Perhaps most important, PhD projects in interdisciplinary fields of research may leave a student feeling inadequate because they only master a small component of a large, “stage-managed” research

programme over which they have no scientific control. This is not a game-breaker, but has to be managed by the supervisors and the University.

Question 8:

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

A key concern regarding the PhD candidature in recent years is that it is still a single purpose qualification that provides training in research, oriented primarily to a University/Institute-based, single-investigator, “blue skies” research model. This does not meet the current expectations of many students, nor employers and end-users of the graduates after they obtain their PhD. We estimate that the majority of Australian students obtaining a PhD will NOT move into the sort of University/Institute-based jobs that the training is geared toward, but will instead find positions in management, government, industry and every type of senior post in any sphere. The bottom line is that research training at Universities needs to prepare postgraduates for the “real world” and facilitate their development of transferable, professional skills. This is especially important given the increasing imbalance between the growth in PhD opportunities, and the rapidly diminishing opportunities for a lifelong career in research. There are between 2,000-2,500 PhD graduates every year with only approximately 200 University/Institute-based positions available in Australia.

The mind-set encouraged during PhD training is that academic research is the ultimate goal and you have “failed” if you do not achieve this standard. This attitude needs to change. The “good news” is that the PhD degree provides skills and training that could be applied to multiple career paths, even though the current single and primary focus on academic research is not realistic training in terms of national priorities and job opportunities over the coming century. It is important that every PhD candidate obtains transferable skills, is exposed to the various career paths open to them, and has the opportunity to get some experience in these various career paths and the skills that underlie them.

While compulsory coursework and workplace experience could be a component of the provision of broader skills training, it is necessary for Universities to be far more imaginative, since the needs of individual students will vary greatly. Provided a student applies for a PhD course with a concise, detailed and well written research proposal, forcing them to go through a semi-structured program may not be appropriate. This concern can only be countered by emphasizing that any semi-structured program should be flexible. We need to encourage PhD students to think laterally and examine ways they can use industry, academic and government-based resources to bring innovation to their research.

Universities should seek to assist PhD mechanisms that can optimise engagement with industry and professional bodies, with program coordinators who can develop links with industry partners. There would be a number of benefits including the production of more rounded graduates possessing an umbrella of skills; crucial at a time when worldwide supply of PhD graduates is exceeding demand.

There are some experiments with different styles of PhD training, such as that from the National ICT Australia (NICTA) consortium, which has promoted development of a US-style PhD course, longer in length to the Australian PhD model and incorporates research as well as coursework.

In general, the Academy does not favour extending the PhD course to four years in order to incorporate mandatory coursework, although this is not a universal view. Extending the course would have significant cost implications for both funders and self-funded students. However, if our PhD courses are to remain at three years, they must be well organised, and students must be well funded so they do not have to spend time working at non-academic jobs just to support themselves.

Question 9:

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

The rules should be made more flexible; the individual situations and needs of PhD students have become much more varied than they were thirty years ago, in terms of time of entry, part-time study, family and professional responsibilities and financial situation. A broader, better-rounded assessment of individual applicants needs to be considered including grades, experience, publications, referee recommendations and an individual's personal circumstance – e.g. rural applicants versus city-based applicants will have different access to support networks. It is particularly important to have increased flexibility to allow part-time access and study, and in relation to “other income” if received in the context of a research program.

Currently many PhD students need to work part-time to increase their income for basic living needs, as they are paid well below the Federal minimum wage. PhD students must be paid enough from their APA scholarship such that they can devote full time to their research.

Question 10:

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

The Academy does not wish to offer comments on Question 10, apart from noting that the value of a research-based MSc must be seen in the context of it being regarded in many situations as a “failed” PhD, and that many PhD-qualified individuals “on the market” now compete for posts for which traditionally a research-based MSc was felt to be appropriate.

Question 11:

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

In general, the Academy would argue that there is room for a great deal of diversity in relation to entry into a research higher degree, in particular PhD research. However, there should be little room for diversity in the “exit standards”, the standard that must be achieved by the student in order to meet the requirements of PhD training. Excessive flexibility in exit standards would operate to reduce standards. Whatever the perceived limitations of the PhD, it remains the entry qualification for a career in academic research; it cannot be replaced by a professional doctorate or a research degree of lower standard, but must be strengthened and remain the bench-mark for sustained, robust and original research.

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