

A Personal Submission to the Evaluation of the Knowledge and Innovation Reforms

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I am grateful for the opportunity to comment on the Knowledge and Innovation Reforms. My comments pertain mainly to aspects of the **Research Training Scheme** (RTS).

There are three aspects of Research Training that I wish to comment on, below. I believe what I have to say is very obvious and straightforward, but central to the concept of excellence in research training; however, it appears to be somewhat at variance with current National practice. A point summary is given at the end of this submission.

These remarks represent my own opinions, and are not necessarily those of my Institution.

1. Separation of Teaching and Research

The reforms introduced after 1999 have explicitly drawn a distinction between undergraduate teaching and research activities. The philosophy appears to be that the two activities are largely unrelated; presumably it is believed that undergraduate learning is largely a routine process, but that true creativity occurs during research.

There are many instances where this distinction is plainly invalid. Rather than attempt to give examples, let it simply be stated again here that genuinely inspiring teaching draws regularly from the insights and freshness that recent research affords. Similarly, good research is often enhanced by a clear expository style derived from good teaching. Separating teaching from research is creating a false and damaging dichotomy.

Of more long-term concern is the fact that the separation of teaching from research jeopardizes research excellence. It also wrongly relegates teaching to a second-class activity, and this harmful view is clearly reflected in current funding relativities. These two points are developed below.

2. Funding Models for Undergraduate versus Postgraduate Training

In spite of recent talk about the value of undergraduate teaching, and the creation of numerous positions that oversee its quality and innovative delivery, the fact remains that undergraduate teaching is undervalued in the new funding scheme. A simple approximate calculation makes the obvious point.

Undergraduate and postgraduate programmes in a particular discipline are largely coordinated from within a specialist University Department. That Department attempts to behave so as to maximize its share of undergraduate and research income. An undergraduate student taking a major in the discipline offered by that Department typically undertakes 25%, 25% and 50% of his or her subjects from that Department, over three successive years. The Department therefore earns the equivalent of one full-time student weighting over three years. This translates into something like \$5,000 - \$7,000 for that Department in three years. By contrast, that same Department can make about \$50,000 from a completing Ph.D. student over about the same three-year period.

The message being sent to University Departments is brutally clear. Such a funding regime entrenches undergraduate teaching as a second-class activity, and rewards it accordingly. Departments are clearly encouraged to abandon undergraduate programmes in their speciality, and if possible to focus exclusively on the income they can derive from research. Indeed, most Universities have now set up exclusive research-only centres, to cash in on the quick rewards this offers.

This behaviour pattern directly threatens the quality of the research it supposedly nourishes. A distorted and minimalist undergraduate programme plainly cannot prepare students to participate in research, at the high level that international competition now demands. Research training is therefore under substantial strain as a result of inappropriate funding relativities.

3. A National Approach to Mandating Core Skills

Without doubt the greatest single factor threatening the integrity of Australian University research is the fact that University undergraduate degree programmes are not uniformly required to contain mandatory core material. This statement highlights the fundamental fallacy of treating research and undergraduate teaching as separate unrelated entities.

Australian Universities have been pushed to adopt a retail model that focusses heavily on unfettered undergraduate student choice. This has led to a proliferation of courses and units. Core material, essential to research in the national interest, is abandoned by University Departments fearful of frightening off weaker or disinterested students and so losing their share of undergraduate student income.

As a result, there has been a steady decline of student numbers in key disciplines that are vital to research in the national interest. Insufficiently many undergraduate students translates into a decline in funding to University Departments that specialize in these core disciplines, with a resulting loss of staff and expertise in these areas. In other words, the National capacity to undertake research, and to train research students, is directly linked to the subject choices made by current high-school students, which in turn are governed by an uncertain mix of personal whim, a view of what is fashionable, and a perception of

subject difficulty. This bizarre situation is plainly unsupportable, and needs urgent remedy.

Recent reviews have highlighted the damaging loss of expertise in some disciplines (*e.g.* Thomas [1]), and have even suggested partial remedies (Batterham [2]). It is distressing that so little account has been taken of these warnings.

As a matter of urgency, there needs to be a Nationally agreed response to the inclusion of mandatory core material in undergraduate degree programmes. It may be appropriate to establish a National Taskforce to advise on such material. The mandatory inclusion of core subjects within undergraduate degree programmes will have the double benefit of providing appropriate student training in key material, needed later for research, and to ensuring that research expertise in key areas is maintained nationally.

Additionally, there is an urgent need to establish a scheme of undergraduate scholarships in key disciplines [2]. This will encourage talented students into undergraduate subject choices of strategic value, from which they will then be positioned to contribute meaningfully to research in the national interest.

Summary

- The current separation of research and teaching needs to be de-emphasized, and replaced by a focus on creating an integrated training programme through the undergraduate degree and into full research training mode.
- Research training must be enhanced by de-emphasizing the current focus on unfettered student choice in undergraduate degrees. In its place, partial regulation must be introduced at an agreed National level.
- Undergraduate scholarships should be introduced in key strategic areas relevant to later research in the National interest.
- Appropriate recognition of undergraduate teaching is required in a new funding model.

[1] J. Thomas, *Mathematical Sciences in Australia; Looking for a Future*. FASTS occasional paper series, number 3, October 2000.

[2] R. Batterham, *The Chance to Change*, Discussion Paper by the Chief Scientist, August 2000.