
Smarter

A boost to research training at universities has been recommended to ensure Australia makes the grade in a competitive world.

oy degrees

STORY: GEOFFREY MASLEN

DRIVING INNOVATION: *A new parliamentary report has recognised the vital role of research for Australia's future development. Photos: photolibrary*

Professor Ian Chubb doesn't mince his words when discussing the decline in the number of people commencing PhDs at Australian universities. It is "our national calamity" says the Australian National University's Vice-Chancellor.

Other presentations and submissions to a parliamentary inquiry into research training are just as forthright. One by one, they spell out the gloomy situation: universities are in crisis and Australia has far too few research-trained people to meet its immediate much less its future needs.

That's not all: the current scholarship length for PhD students of 3.5 years is said to be ridiculous; too many talented researchers who could form the base for the next generation are being lost to the system; in only seven of the nation's higher education institutions do more than 70 per cent of academics have PhDs, while in 14 of them little more than half hold that crucial qualification…

The pessimistic observations are not a litany of despairing cries, because the individuals who made the comments are rational and thoughtful people. There is considerable unanimity in their call to arms by government and the universities themselves.

Says Professor Ian Chubb: "We are in an un-virtuous cycle with too few research-trained people, an ageing academic workforce charged with training them, and too few of the trainers with research training in the first place. The cycle needs to be broken in Australia's interests."

In its submission, the Australian Academy of Science says a large number of tertiary students who progress to postgraduate study experience inadequate research training. Issues include the structure of that training, too many students per academic, and the lack of support and training available to prepare postgraduates for careers in the world outside universities.

The Council of Australian Postgraduate Associations represents the nation's 270,500 postgraduates, including 50,000 who are completing research degrees. CAPA highlights the contributions the latter make to Australia's research efforts while noting that 70 per cent of university research relies on the work of postgraduates.

Yet so difficult has life become for PhD and masters by research students that commencing numbers are falling and completion rates are among the lowest in the developed world.

One reason is the low value of postgraduate awards and scholarships as

most barely exceed $20,000 a year. Students undertaking their second and third degrees work for the equivalent of $5 an hour, says CAPA in its submission. The council estimates that postgraduate awards will fall below the poverty line by the end of this year although others say this has already occurred.

Hence the national calamity Professor Chubb warns about and which CAPA says is resulting in the loss of too many talented students who could form the base for the next generation of researchers. As the council notes, to complete a PhD a student needs to work four years full-time compared with the less than two years to finish a masters degree by coursework.

Yet, when they do finish their degrees, the PhD and masters by research graduates earn on average less than $61,000 a year compared with the $65,000 salaries paid to coursework masters graduates.

If research graduates decide to stay on in universities, 90 per cent of them will be employed on limited-term contracts that offer no security and prevent them from even obtaining bank loans to buy homes. That is why, CAPA says, more than two in every three PhD graduates are employed outside the universities.

In its submission, the National Tertiary Education Union offers a similar monitory view. The union notes that two-thirds of academic staff are aged over 40 and that a quarter of the university workforce will retire within the next seven years. So who is going to replace them when the union quotes figures that say Australia already needs to increase the graduate output by 800 PhDs a year just to meet current needs?

Then again, it is not just the universities that should have more highly-trained workers. In the past two decades, Australians have become markedly better educated yet the number with doctorates remains comparatively low: 7.8 in every thousand Australians hold PhDs compared with 32 in Switzerland, 20 in Germany and 11 in the United States.

It was within this context that the Minister for Innovation, Industry, Science and Research, Senator Kim Carr, last April asked the House of Representatives Industry, Science and Innovation Committee to conduct an inquiry into the contribution universities make to research training, and the challenges they face in recruiting, training and retaining quality research staff.

Subsequently, the committee received 105 full submissions and five supplementary texts. Public hearings were held in each of the capital cities, some more than once, as well as in Batchelor in the Northern Territory and Townsville in Queensland.

The submissions and public presentations appear to have had a powerful effect on the committee because in late October it released an interim report with 24 recommendations addressing many of the concerns that had been raised. This was so its recommendations could be taken into account in the 2009–10 budget planning process. It says the final, more comprehensive report will feature "full discussion of the issues and arguments raised in the submissions" and the evidence gathered during the public hearings.

Releasing the interim report, committee chair Maria Vamvakinou (Member for Calwell, Vic) said: "Throughout the inquiry, several key issues were repeatedly raised by those presenting to the committee. The recommendations contained in this interim report directly respond to many of these key issues."

"The committee has made some innovative recommendations for improvements in research education."

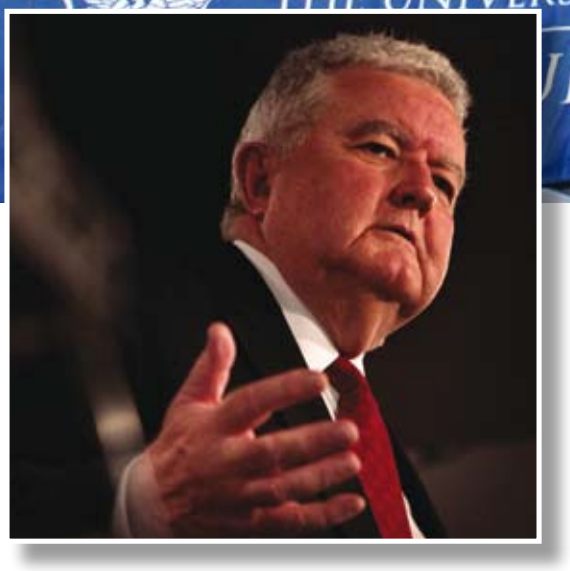
She added: "This interim report and its recommendations are a strong endorsement of support for Australian universities and research graduates who play a vital role in driving innovation in Australia."

Although opposition members of the committee supported the idea of an interim report and backed 11 of the recommendations, they said another 13 should not have been included as they deserved "a more thorough analysis".

"It is for these reasons that opposition members reserve their right to further review these recommendations and do not believe that with such limited discussion and lack of scrutiny by the committee that they should be included in this interim report," said the committee's deputy chair, Fran Bailey (Member for McEwen, Vic).

All members of the committee, however, did accept many of the arguments and they all agreed with the first three recommendations: that the government should increase funding for research and development by raising gross expenditure on research and development as a percentage of GDP over a 10-year period until it equals the average of the OECD.

GETTING THE EVIDENCE:
The House Innovation Committee heard from universities and vice-chancellors, including Professor Ian Chubb (inset). Photos: Andrew Dawson and aapimage



Australia needs to increase the graduate output by 800 PhDs a year just to meet current needs.

As well, the committee calls on the government to fund the full cost of each higher degree by research. It says this should take account of the provision and maintenance of a minimum standard of supervision, infrastructure and resources, as well as expenses associated with supporting national and international mobility of PhD students.

Crucially for financially troubled postgraduates, the report says the stipend research students receive should be boosted by 50 per cent and be fully indexed with the CPI. As well, all scholarships and awards should be exempt from tax.

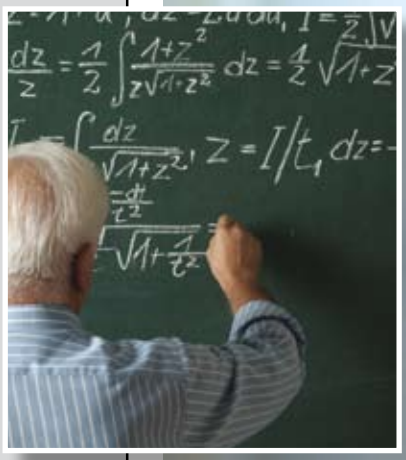
The report addresses recommendations in some of the submissions regarding the limited time postgraduates have to complete research degrees. "The duration of all federal postgraduate awards with stipends for PhD students [should] be increased to three and a half years (full time equivalent) with the option of two six-month extensions," it states.

Among other proposals, the report calls on the government to introduce a national priority postgraduate research scholarship scheme. This would provide "competitive stipends" to outstanding students in areas of national significance and skills shortage.

It also urges a doubling in the funding pool for the Australian Research Council and National Health and Medical Research Council to enable a 40 per cent success rate for applicants. Grants allocated by the latter council should fund the full cost of research in the program to which it has been allocated.

There remain a number of issues the committee still has to report on. Australia is experiencing a decline in domestic PhD commencements at a time of fierce international competition for the best talent available. As the ANU says, other countries are not just investing in their own "they are seeking the best of ours".

For humanities' sake



Although there was widespread agreement in the submissions to the House inquiry into research training that Australia must spend more on supporting research in the science and technology disciplines, academics in the arts and humanities believe they are being ignored or, at the very least, discriminated against when it comes to government funding.

In its submission to the committee, the Council for Humanities, Arts and Social Sciences calls for a review of the different funding levels for research conducted by science and technology academics and their research postgraduates, and those in the humanities, arts and social sciences.

As the council explains, universities receive some government operating funds for the research higher degree students they train. This compensation is at two levels in a ratio of 2.35:1.0 according to the research field.

Most science-technology-engineering-medicine or STEM disciplines are nominated as high cost and most humanities-arts-social sciences or HASS disciplines as low cost. The council says this allocation assumes that STEM students are 2.35 times more expensive to train, presumably because they require access to more expensive equipment, "an assumption that needs to be reviewed in light of current discipline costs".

The Research Training Scheme finances basic human and physical infrastructure but not the costs of the research project—including consumables, specialist equipment, travel and so on—and these are almost always met from other research funds.

In some circumstances, the council says, STEM students do require access to more expensive equipment, but HASS students may also require access to similarly expensive equipment and specialised workshops such as in art and design.

More importantly, HASS students tend to work on individual projects that are separate from their supervisors' research and must be mentored individually. In contrast, STEM students often work on group projects and can share experiences, facilities and even supervision time, as well as being mentored by post-doctoral colleagues—and they may also require less per capita supervision time than HASS students.

The council notes that the average time for full-time PhD students to submit their theses in HASS is 4.48 years, or some 2.5 months longer than for other disciplines. The current period for a PhD scholarship, however, is three years, with a possible extension of up to six months.

"CHASS recommends that the funded period be extended to 3.5 years, with a further six months extension possible on academic grounds. This would align the period of the scholarship with the period for which the university is remunerated," the council says.

In its interim report, the committee seems to have taken this on board. It says the extra money it has called on the government to provide would render obsolete the high cost-low cost funding differential that exists between research disciplines.

It does add, however, that this should be subject to "interim arrangements to ensure that no discipline is disadvantaged" while also calling for an extension of the funding period, as CHASS had proposed.

A quarter of the university workforce will retire within the next seven years.

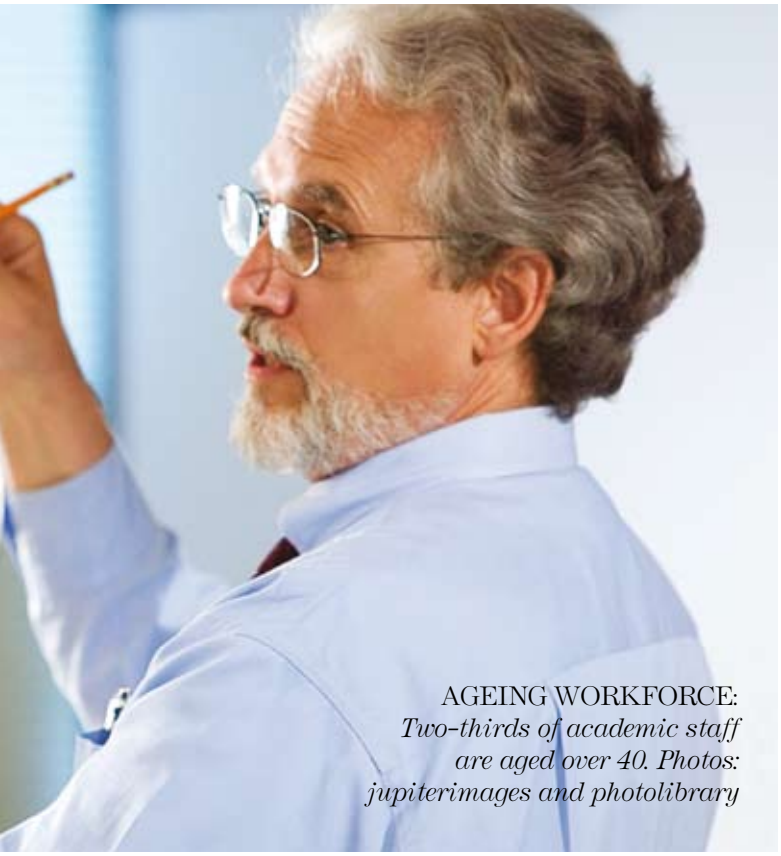
"Without higher student numbers, innovative thinking and new funding, Australia will risk falling well short of the goal to create a world-class knowledge economy. To promote and harness the benefits of research training, Australia will need to address three interdependent key issues: the number of research graduates, the quality and breadth of research training, and the funding to support increased numbers and quality."

While most of the submissions call for an increase in higher education spending, along with lifting the number of Australian students undertaking postgraduate research degrees, many also point to the need to boost enrolments by international students.

Despite the huge rise in the number of foreign students on Australian campuses over the past decade or so, they comprise only 17 per cent of total research training students compared with a staggering 40 per cent in the United Kingdom.

As CAPA notes, overseas students now make up 22 per cent of undergraduates and a remarkable 53 per cent of those undertaking masters by coursework degrees (largely because these represent a means of gaining permanent residency). Fewer than one in five PhD students, however, are from other countries.

Many of the submissions point out that current visa restrictions mean international students are not permitted to



AGEING WORKFORCE: *Two-thirds of academic staff are aged over 40. Photos: jupiterimages and photolibrary*

switch to part-time studies, they cannot take a break to get jobs and gain additional income or practical work experience, and their families are inadequately supported.

Foreign students also have limited access to scholarships and many proposals to the committee say more should be available as it is in Australia's long-term interests to educate and train international graduate students—admittedly with the option of keeping some in Australia.

In response, the interim report says the government should simplify the suite of international student scholarship programs to improve their accessibility and international competitiveness "while recognising that Australian students must remain our priority".

Likewise, the committee says visa conditions for international postgraduates should be amended to allow greater flexibility and opportunity, "especially in cases where those students conclude a course of study in Australia".

Groups that made submissions were delighted with the interim report's recommendations. CAPA President Nigel Lawson said they represented "the right kind of vision if we are to sustain our capacity for teaching and research into the future".

"Reform in the area of research education and research workforce planning is long overdue," Mr Lawson said. "The committee has made some innovative recommendations for improvements in research education. We are optimistic the government will . . . capitalise on the efforts of the committee."

The Group of Eight research intensive universities said that, after six months of site visits and consideration of written and verbal evidence, the committee was clearly convinced of a strong case for reform and additional investment in research and research training.

"The Go8 notes that all recommendations with budget implications have bipartisan support, and that both government and opposition members have recognised that high quality research training is vital to Australia's future," said Professor Doug McEachern, Chair of the Go8 Deputy Vice-Chancellors Research Committee.

The fundamental issue is that Australia must invest greater effort in education, training and research in science and technology, to retain any advantages in the global market place.

NTEU President Dr Carolyn Allport said the report provided "a new charter for postgraduates and for researchers". Dr Allport said the phased lifting of government expenditure, initial rises in postgraduate stipends and extensions to the PhD candidature period had been ignored for some years.

"Even those in government understand how important it is for Australia to lift its level of investment in research and development. In the context of the ageing of the academic workforce, this report begins to chart a new blueprint for the Australian research workforce and for our research effort."

But welcome as any additional government support might be, it has to be directed to the right places. As the Academy of Science says, the fundamental issue is that Australia must invest greater effort in education, training and research in science and technology, to retain any advantages in the global market place.

A significant part of this investment is the research training of Australia's next generation of scientific contributors, the academy notes. And it makes the often-overlooked point that the quality and adequacy of research training available to students in universities is dependent on the more deeply rooted issues of science and technology awareness in Australia, beginning at the school level.

"In the academy's recent report, *Research and innovation in Australia: a policy statement*, a direct link in the causal chain leading to the looming shortage of scientists and engineers is identified as the lack of high school students opting to study science subjects," the Academy of Science submission states.

"Further, 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.

"This includes higher salaries for adequately-trained science and mathematics teachers. 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." •

The interim report on research training in Australian universities by the House of Representatives Industry, Science and Innovation Committee is available at www.aph.gov.au/house/committee/isi/research/interim_report.htm or for more information email isi.reps@aph.gov.au or phone (02) 6277 4594.