



Australian Government

**Department of Industry
Innovation, Science, Research
and Tertiary Education**

**SENATE STANDING COMMITTEE ON EDUCATION,
EMPLOYMENT AND WORKPLACE RELATIONS**

**INQUIRY INTO THE SHORTAGE OF ENGINEERING AND
RELATED EMPLOYMENT SKILLS**

**RESPONSES TO QUESTIONS ON NOTICE – DEPARTMENT
OF INNOVATION, INDUSTRY, SCIENCE, RESEARCH AND
TERTIARY EDUCATION**



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Transcript from Canberra hearing, 7 May 2012 - page 67

Senator McKENZIE: As an employer of choice—and we have been hearing a lot about public employment of engineers—in all your consultation around this area how do you employ engineers—what traineeship programs or cadetships are there? How do you employ engineers? Do you have traineeship programs or cadetships? Do we walk the walk is my question around publicly employing engineers and young graduates?

Mr Luckhurst: Across the whole of the industry department I would not be able to give you a figure on how many engineers might be employed. We cover the skills area and so I guess the background is a general policy administrative focus rather than having a requirement for special skills around engineering. We can provide an answer across the whole of the department but certainly we would have to take that on notice. Generally, as a public service agency, our expertise is around policy development and those sorts of things. I am happy to take that on notice.

ANSWER

Employees provide qualification information to the department on a voluntary basis and as a result it is not possible to determine all employees that have an engineering qualification. Thirty four employees of the department have indicated that they do have such a qualification.

Qualifications held by departmental staff include Diplomas, Graduate Certificates, Bachelors Degrees, Masters and PhDs. These qualifications span a variety of disciplines including Electrical, Mechanical, Microwave, Fire Safety, Power, Computer, Engineering Management, Electronics, Radio, Mining and Chemical.

It should be noted that even in cases where an employee of the department has indicated that they have an engineering degree, they may not necessarily be working in engineering roles.

The department does not have any specific traineeship programs or cadetships for engineers. Please see page 4 below for information on cadetship programs administered by DIISRTE.



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Senator McKENZIE: We heard about the commercialisation of research and how researchers tend to be focused in universities and not within industry around engineering. Does the department have any comments to make about that?

Mr Luckhurst: Not from our particular area.

Ms White: It is not our area of expertise.

Senator McKENZIE: Is this the innovation part that is with the economics committee—somewhere else.

Mr Luckhurst: That is right. We could take it on notice though.

Senator McKENZIE: That would be great.

ANSWER

Cooperative Research Centres (CRCs)

The Department of Innovation, Industry, Science, Research and Tertiary Education as well as Australian Research Council (ARC) administer a number of programs which are designed to improve collaboration between researchers based in the higher education sector and industry.

The CRC program is the government's premier program for supporting medium to long term end user driven research collaborations to address clearly articulated, major challenges facing Australia. Collaborations involve researchers, industries, communities and governments, but must include at least one Australian end-user and at least one Australian higher education institution (or a research institute affiliated with a university). Education and training is a central component of the CRC program. It is compulsory for each CRC to have an end user focused education and training program which includes, but is not limited to, a PhD program.

In the area of engineering, the CRC program currently supports one CRC with a specific focus on engineering, the CRC for Infrastructure and Engineering Asset Management (CIEAM). This CRC aims to improve the efficiency of infrastructure and engineering management through improved asset management systems.



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CIEAM has received a total of \$29.5 million under the CRC program, including \$17.5 million as the CRC for Integrated Engineering Asset Management (2003-04 to 2009-10) and \$12.0 million as CIEAM (2010-11 to 2012-13).

Engineering Cadetships

The [Joint Research Engineering \(JRE\) – Engineering Cadetships](#) was announced in December 2011 by Prime Minister Julia Gillard and former Innovation Minister Senator Kim Carr. The initiative fosters partnerships and linkages between universities and businesses and is an important step to ensure that Australia has engineers and scientists with the research and technological skills necessary for an innovative economy and the transformative industries of the future.

Over the next four years, the Australian Government will provide more than \$13 million to support 265 commencing engineering cadets a year under the initiative. The JRE - Engineering Cadetships will enable universities to support the research training costs associated with higher degree by research (PhD and research masters) students undertaking a cadetship in relevant areas of engineering or science. Cadetships will involve a combination of formal research training with the university and concurrent employment with a business to carry out R&D Activities.

Participating universities will receive an additional \$5,000 per student annually to supplement the research training costs for each student participating in the program. Businesses that engage cadets are able to claim eligible expenditure under the R&D Tax Incentive. Already 35 universities are involved in this program and placing cadets with our industries to build a stronger innovation base in our economy.

Australian Research Council (ARC)

The ARC supports a range of schemes aimed at linking researchers in universities and industry. The ARC's Linkage Projects scheme supports collaborative research and development projects between higher education organisations and other organisations, including within industry, to enable the application of advanced knowledge to problems. Proposals for funding under Linkage Projects must involve a collaborating organisation from outside the higher education sector. The collaborating organisation must make a significant contribution (equal to, or greater than, the ARC funding), in cash and/or in kind, to the project. [Linkage Projects - Australian Research Council \(ARC\)](#)

As announced by the Government, the ARC will also administer a new Industrial Transformation Research Program (ITRP). The Program will: (i) focus on research



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areas that are vital for Australia's future economic prosperity—such as engineering, materials science and nanotechnology, communications, chemical engineering and biotechnology; (ii) support Industrial PhD students and researchers to gain 'hands-on', practical skills and experience in these important areas; and (iii) foster important partnerships between business and universities. [Industrial Transformation Research Program - Australian Research Council \(ARC\)](#)

Data from the Excellence in Research for Australia (ERA) exercise administered by the ARC show that, between 2008 and 2010:

- The highest percentage of all CRC income at Australian universities was assigned to engineering research (27.79%).
- The second highest percentage of all Industry and Other income (Cat3) at Australian universities was assigned to engineering research (11.44%).

Additionally, ERA data show that, between 2008 and 2010, engineering research in Australian universities has generated almost \$21.5 million of research commercialisation income – the fourth highest amount of all disciplines. [The Excellence in Research for Australia \(ERA\) Initiative - Australian Research Council \(ARC\)](#)



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Senator McKENZIE: What is the department's view of using HECS as a lever to increase or decrease demand? We have heard a variety of suggestions—and not just in this inquiry. They include through aged, maths and science and whether we say no to HECS or yes to HECS.

Ms White: It was certainly mentioned in the agriculture inquiry.

Senator McKENZIE: This morning we have had a number of submitters suggesting that there would be a possible increase of people wanting to do engineering by getting away from HECS. Delving a little deeper, it seemed that the people making that suggestion were the ones that had just left uni, and it was obviously front of mind for them because you have to pay it all back. But, for the 18-year-olds who are making the decision, it might not be so. I am looking for evidence, I guess.

Ms White: I think we would be better to take it on notice. I do know that HECS applies to units of study rather than to whole courses.

Senator McKENZIE: Yes—and it does to engineering. But I am talking at a conceptual level, because I think the government has just done something about maths and science HECS. What evidence is there for using HECS as a lever to increase demand?

Mr Luckhurst: I think we will take that on notice—sorry about that.

Senator McKENZIE: No, that's good. It saves me having to write to you.

Ms White: We can turn these round relatively quickly.

Senator McKENZIE: That would be great.

ANSWER

There is limited evidence to support discounted student contribution amounts ('HECS') as an effective mechanism for encouraging students into a particular field of study. Students are predominantly motivated not by price but by their interests, abilities and career preferences when selecting courses. This is particularly the case when students have access to an income contingent loan, such as HECS-HELP, that allows them to defer payment of their contribution amounts until they are earning enough to do so.



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The Bradley Review of Higher Education (2008), found that “there is no evidence that the lower price cap has had any positive impact on student demand for the disciplines [of education and nursing]” (p. 166). In response to a recommendation of the Bradley Review, the Government removed teaching and nursing units of study from the National Priority rate in 2010.

The Bradley Review also noted the affect of HELP loans on price signals, stating that students “are much less likely to seek out alternative, lower-priced courses when they are able to defer the fee and repay it on an income contingent basis” (p. 163). This suggests that reductions in student contribution amounts are unlikely to have a significant impact on students’ decisions regarding which course to study.

The Higher Education Base Funding Review (2011) found that “there is no evidence to suggest student demand is affected by reducing student contributions.” It recommended that

the Government should phase out these types of national priority programs. Instead, the Panel considers that strategic objectives such as alleviating skill shortages would be better pursued through labour market measures, such as improved wages and employment conditions, and information about job openings and careers, rather than adjustments to base funding.” (p. 100).

A review undertaken by Deloitte Access Economics (DAE), *The impact of changes to student contribution levels and repayment thresholds on the demand for higher education* (2011) suggests that “demand for higher education has demonstrated a negative response to the price increases resulting from recent HECS policy changes” (p. 58). However, responses to policy changes were not uniform across all fields of education. Demand for engineering was found to have a “negative relationship with the relative price series” (p. 45).

As it is unclear whether student contributions amounts are a key driver of student demand for courses, the Government believes that their reduction is not a cost effective mechanism for increasing demand for particular disciplines. This is consistent with the recommendations of both the Bradley Review of Higher Education and the Higher Education Base Funding Review.

In the case of the reduction in student contribution amounts for mathematics, statistics and science units of study, the majority of the cost of this policy was in providing transitional loading to compensate universities for the lower student contribution amounts. It would have cost between \$300 million and \$350 million a year when fully implemented.



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While the number of commencing domestic students in bachelor level natural and physical sciences increased by 19.4 per cent between 2008 and 2010, this was only marginally above the overall growth rate for the sector (16.0 per cent). Further, the majority of students undertaking maths and science units in 2009 and 2010 were not enrolled in a maths or science course of study, nor were they engaged in teacher education. For example, in 2008, 11.3 per cent of students undertaking maths and science units were enrolled in engineering and related technologies courses, falling to 10.8 per cent in 2010. On the other hand, there was an increase in the proportion of students undertaking maths and science units while enrolled in health, society and culture and creative arts courses. The original policy intent was to increase the number of maths and science graduates entering the workforce, especially into teaching.

The policy was therefore not well targeted, did not deliver value for money and was not having the desired effect of substantially increasing the number of maths and science graduates in the workforce.

This is why, as part of the 2012-13 Budget, the Government announced that, subject to the passage of legislation, from 1 January 2013, the maximum student contribution amounts for all students enrolled in mathematics, statistics or science units of student will increase from the National Priority rate (\$4,520 per EFTSL in 2012, indexed annually) to Band 2 (\$8,050 per EFTSL in 2012, indexed annually).

In terms of encouraging students into a particular field of employment, the Government is offering a HECS-HELP Benefit. The Benefit is a mechanism to encourage and recognise employment outcomes and retention in a specific employment field. This is consistent with recommendation 22 of the Higher Education Base Funding Review that,

The Australian Government should phase out existing measures that aim to increase student demand in areas of skill shortages using student contribution reductions and should consider more targeted measures to address skill shortages. In some cases, this could be in partnership with employers and state governments to provide information and incentives for students to undertake courses in priority areas and seek employment in relevant industries on graduation. (p. xxvi)



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Transcript from Canberra hearing, 7 May 2012 - pages 69-70

Senator McKENZIE: Could you expand on the relationship between the Office of Chief Scientist and Skills Australia? In your submission you referred us to them rather than making your own submission to the inquiry.

...

Mr Luckhurst: It is fair to say that we have only recently joined the industry department from employment, education and workplace relations. It is an area where we have to develop our relationship further. We do not have, certainly in the skills area—

Ms White: But other areas, I would imagine the innovation area, would have links to the Chief Scientist. We will get that for you as well, Senator.

Mr Luckhurst: Higher education would be likely—

Ms White: Yes.

Mr Luckhurst: We will get some appropriate—

Senator McKENZIE: You are with the Office of Chief Scientist. Could you flesh that out, please, because I would be keen on that as well.

ANSWER

The role of the Chief Scientist is to provide specialist, expert advice to the Prime Minister, the Minister for Tertiary Education, Skills, Science and Research and other relevant Australian Government Ministers on matters affecting science, engineering and innovation.

The Chief Scientist sits within the Industry, Innovation, Science, Research and Tertiary Education portfolio, but is appointed independently of the department. The staff of the Office of the Chief Scientist (OCS) are members of the Department of Industry, Innovation, Science, Research and Tertiary Education (DIISRTE), and sit functionally within the department's Science and Infrastructure Division, which provides management and strategic advice to the OCS. The Chief Scientist liaises regularly with policy areas of DIISRTE and agencies within the portfolio. There is no direct relationship between the OCS and Skills Australia.

The Higher Education Division of the Department of Industry, Innovation, Science, Research and Tertiary Education has worked closely with the Office of the Chief Scientist to assist in the development of the Chief Scientist's *Mathematics*,



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Engineering and Science in the National Interest report. The Division is also in regular contact with the Office of the Chief Scientist to discuss issues regarding the study of mathematics and science in higher education and proposals to increase student engagement in these subjects. It is anticipated that this relationship will develop further as the Division becomes more integrated into the new Department.