



COMMONWEALTH OF AUSTRALIA

Proof Committee Hansard

**HOUSE OF
REPRESENTATIVES**

STANDING COMMITTEE ON INDUSTRY, SCIENCE AND
INNOVATION

Reference: Research training and workforce issues in Australian universities

WEDNESDAY, 6 AUGUST 2008

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HOUSE OF REPRESENTATIVES
STANDING COMMITTEE ON INDUSTRY, SCIENCE AND INNOVATION

Wednesday, 6 August 2008

Members: Ms Vamvakinou (*Chair*), Fran Bailey (*Deputy Chair*), Mr Bidgood, Mr Champion, Mr Cheeseman, Dr Jensen, Mr Johnson, Mr Ramsey, Ms Rishworth, Mr Symon

Members in attendance: Fran Bailey, Dr Jensen, Mr Ramsey, Ms Rishworth, Mr Symon, Ms Vamvakinou

Terms of reference for the inquiry:

To inquire into and report on:

1. 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.
2. 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.

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Committee met at 9.18 am**McINTYRE, Associate Professor Ellen, Private capacity**

CHAIR (Ms Vamvakinou)—I declare open this public hearing of the inquiry into research training in Australia, being conducted by the House of Representatives Standing Committee on Industry, Science and Innovation. The inquiry arises from a request to this committee by Senator the Hon. Kim Carr, the federal Minister for Innovation, Industry, Science and Research. Written submissions were called for and 102 have been received to date. The committee is now conducting a program of public hearings and inspections. This hearing is the fourth for the inquiry.

I welcome Associate Professor Ellen McIntyre. Although the committee does not require you to give evidence under oath, I should advise you that these hearings are formal proceedings of the parliament. Consequently, they warrant the same respect as proceedings of the House itself. It is customary to remind witnesses that giving false or misleading evidence is a serious matter and may be regarded as a contempt of parliament. We thank you for your submission and now invite you to make a brief opening statement before we proceed to questions.

Prof. McIntyre—Thank you, and thank you for inviting me. It will be brief, because I am looking forward to the questions that you have to ask me. Basically I am here to present information about the Primary Health Care Research Evaluation and Development Strategy, which is an initiative of the Department of Health and Ageing. It has been funded since 2000. One of the components of the strategy is to provide training and support for researchers in the area of primary health care research. I have been involved with this since 2001, so I have been contacting and working with people from the departments of general practice and rural health who have been funded under this strategy to provide this research support and training.

There have been some successes but there have also been some limitations, and I am happy to talk about those later. But, overall, there has been a lot of support for this to be an ongoing strategy, and we certainly look forward to that in the upcoming review. Thank you.

CHAIR—That is it?

Prof. McIntyre—That is it for the moment, yes. I am happy to take any questions.

CHAIR—Are you able to give us a bit more information on the role of the Primary Health Care Research and Information Service and how it encourages collaborative research?

Prof. McIntyre—I am the Manager of the Primary Health Care Research and Information Service; perhaps to shorten it I will use the acronym PHCRIS. Most disciplines have acronyms; we are not going to try and have the most but we certainly have a lot. PHCRIS is often seen as the gel that keeps the primary health care research community together, in the sense that we try and keep people in touch with each other. One of the biggest events that we have is an annual conference where we invite people to attend and to submit abstracts. Since I have been involved with PHCRIS since 2001, there has been an increase in abstracts from, I think, 106 in 2000 to

285 this year. So there has been an increasing interest in that and also support and encouragement for people to present their research. Subsequently, there has also been an increase in the number of delegates attending.

The feedback that we are getting from people coming to this conference is that it is a very friendly conference; people are very helpful to each other; there is a lot of mentoring; people are willing to help others to work together, to collaborate. Some of the spin-offs are that groups are formed to collaborate on future research proposals and research projects and encourage others to develop their career further in that area. It has been a really good way of establishing and promoting and continuing to develop collaborations in primary health care.

CHAIR—One of the issues that has come through in many of the submissions has been the appropriateness of the income that is available to researchers generally. You, like many others, call for more appropriate income and research support for primary health care researchers, and particularly note the disparity between practice salaries and a PhD scholarship. Can you please elaborate on what you have in mind.

Prof. McIntyre—The disparity between practitioners' salaries and when they decide to do some research and get a fellowship or a scholarship is quite dramatic. That, I think, is a real deterrent for a lot of people to doing that. Some of them decide, 'No, it's not financially viable for me to go and do research,' so we lose potential researchers that way. I would suggest that we need to have equivalent salaries or income if people want to do research. It is an important part of growing and improving primary health care, so it should be given that credibility in terms of financial status as well.

Then there are people that are interested in becoming researchers full time and, again, as a lot of the submissions have mentioned, the scholarships are fairly low in terms of financial reward and can be quite a deterrent to people, particularly if they have families and other commitments. It is really difficult.

CHAIR—I am particularly interested in general practitioners who might be interested in going into research. Are you aware of how many may do that? Are there any figures that indicate that movement from practice to research? Is it very low? Is it adequate?

Prof. McIntyre—I do not have actual figures. I do know that the departments of general practice and rural health that have been funded under the PHCRED Strategy have grown, so there is obviously a move there. But a lot of them would only stay for a while and then go back to their practice because they are not able to continue for financial reasons. That is a real challenge. The other thing is the duration of income: a scholarship is three years. There may be other funding that the individual departments offer which could be for six to 12 months part time, so it is quite minimal and there is no security beyond that. To try and develop a research career in general practice or primary health care—we really need to look at not just general practice but all the other health care providers—there really is not a very clear path and certainly financially it is very difficult to move from one grant to the next without having some gap where there is no income. People just cannot sustain that.

CHAIR—Would you agree that in relation to the problem of general practitioners going into research, because it is not sustainable for them in comparison to the salaries that they may be

receiving, for all the valid reasons that have been raised, that we face a problem in this country in developing our research and enhancing it because it is ongoing? It obviously has to grow. You can never stop with research; certainly not medical research.

Prof. McIntyre—Yes, I think so. If we could build research into a general practitioner's or health provider's practice, and somehow there are incentives for them to do research via whatever means—

CHAIR—How do you envisage that? Would that be part time?

Prof. McIntyre—It could be.

CHAIR—Could they do both?

Prof. McIntyre—That is often what happens currently. There is a real bonus to that, because the research that they do is very relevant to their practice. They will only do it because they are passionate about research; there is no other real incentive to do it. The research that they do is then able to be taken up into practice fairly quickly and fairly easily. But if we can only provide them with a small amount of money to do research, then not many will do it and some of them will find that they have to give it up after a while and go back into practice just to make ends meet.

Mr RAMSEY—Thank you, Professor, for coming along. I have a bit of a lack of basic understanding of the primary health care sector. I come from a background of hospitals and things like that; I have had some interest in that. When you get to primary health care, who are the stakeholders who actually fund research? Are we talking about a purely government sector or is there a private sector out there as well that needs research, wants research done, for their own purposes?

Prof. McIntyre—It is primarily the Department of Health and Ageing and the NHMRC, and so there is a lot of competition with other disciplines, of course, for that funding. There may be some from drug companies, but I am not sure of how much there is. Certainly, for the people I have been working with in these departments of general practice and rural health, most of their funding is government funding.

Mr RAMSEY—It is quite unlike some of the other areas of medical research in that way. In your submission you touch upon how we need to reduce the competitive nature of applying for grants. We have all sat around a lot of tables and heard people say, 'We shouldn't be competing. We should be all working together.' In effect, normally when someone is saying that, they are just working out how to cut your lunch. We can talk about things like that, but what can we actually do to foster cohesiveness and noncompetitiveness, in an environment where all the researchers want funds?

Prof. McIntyre—I have been concerned for quite some time that the success rate of getting an NHMRC grant is about 25 per cent. 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.

Mr RAMSEY—I agree with you entirely, but I do not know how we devise a system for grants that is not competitive in nature.

Prof. McIntyre—The PHCRED Strategy, or the component that funds the departments of general practice and rural health, is not competitive funding. It is funding allocated to each department each year to provide research training, basically. It does not fund actual research but it helps develop the skills of people who are interested in research to go on and apply for research grants and so on. That is one step towards it, but there needs to be some non-competitive funding to at least provide an infrastructure for research and research training, and that will allow some of the early to mid career researchers to at least develop a proposal or do literature research or something so that they can use that to then apply for competitive funding. But, yes, it is a real dilemma. I am not sure what the answer is. It seems such a waste of resources when we have such a low success rate, but I gather that it is not any better overseas. I was talking to a paediatrician in Iowa and he said that their success rate is eight per cent in the US.

Mr RAMSEY—And it is common across industries too, I can tell you.

Prof. McIntyre—Yes. So I am not sure what the answer is. It just seems that there is a waste there.

Mr SYMON—My question goes back to what we have heard from previous witnesses about the limitations of the APA scholarships' three-year funding. What in your opinion would be an appropriate time for those scholarships to run?

Prof. McIntyre—In the past it was for four years, I think, and then it was cut to three years. I guess that limits what you can do. When you look at the type of research that PhD students do, some of them may just step into a program: the proposal is already there, the funding is already there, and they can just get started straightaway. But I certainly found when I was doing my PhD—and this may be the case in other disciplines as well—that I had to develop the research proposal, get the funding and get the ethics approval. That all takes heaps of time, so there is very little time to actually do the research and write it up. It would be nice if we could be a bit more flexible with the time, depending on what the student proposes to do, and that needs to be approved, of course, through some committee or whatever, but that will give them adequate time to do what they have set out to do. We know that ethics approval takes some time, and we know that applying for funding can take some time, and yet they are skills that are really important to have if you are going to be a researcher. We should not be saying, 'You must do it in three years, and you should have all these other things already in place so that you can start doing the research,' because research is more than just collecting data. It is proposal writing, ethics approvals and so on.

Mr SYMON—We heard yesterday that only in very exceptional cases would a student complete the PhD in three years. It happens, but almost never.

Prof. McIntyre—Yes. I have also heard that people may trim down their project so that they can complete it in the three years, because if you only get funding for three years, you need to go off and earn income from somewhere else.

Mr SYMON—Which is then, I take it, leading to a lessening of the quality overall—

Prof. McIntyre—That is my concern, yes.

Mr SYMON—of the research that is done.

Prof. McIntyre—Yes, and the skills that you can develop in that time as well.

Mr SYMON—So, following on from that, have you got a particular view of what the right time for that support would be?

Prof. McIntyre—I do not think we can have just a one-off time. One size does not fit all. I think we have to develop more flexibility in how we do our research training and the PhDs, depending on the disciplines and the actual projects.

Mr SYMON—So would there be, rather than a set time, a set of reachable goals?

Prof. McIntyre—Yes, something like that; some sort of contract that you complete and that is agreed upon at the beginning.

Mr SYMON—To switch to another subject, you talk about the need for mentoring and making sure that knowledge that has already been gained has not been lost along the way as people move on. Is there any of that happening at the moment? If not, is there a way that you can see that it can happen far better than it is now? I for one think it is a great waste of effort that people come and apply themselves and find out facts in the various areas that they are studying and then it may not get passed on to someone that comes later. We should be building on that knowledge, not trying to rediscover it.

Prof. McIntyre—No.

Mr SYMON—Do you have suggestions in that area?

Prof. McIntyre—There is some mentoring going on. The 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. It is a form of succession planning. 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. I know some of the departments of general practice in Australia do have some mentoring programs. They bring in the early career researchers to become part of a team so that they are not on their own.

Research can be quite isolating at times, but if they are nurtured and developed as part of a team then they are more likely to stay, because they feel like they belong; they get the help that they need. Mentoring could actually be a lot more important and a lot more obvious and more

structured than it is at the moment. It is important for the individual, but I think it is also important for the whole research community.

FRAN BAILEY—I would like to follow on with this theme for a moment. I was interested in your comments about collaboration in research. If we were sitting back and looking impartially at the research sector, I think in the main our view is that we have all of these very bright people beavering away doing their thing, often with a great deal of stress because of the issues that some of my colleagues have mentioned—the time, the funding—but, in looking at this whole issue of collaboration and picking up what you were just saying about the mentoring aspect, have you actually considered formulating a model for collaboration that perhaps would incorporate overseas work that people could be doing too? One of the themes that has been coming forward to us is the need for greater flexibility through the research period, especially for the PhD students, so I am interested in this whole concept of collaboration and how realistic that is if it is cutting through this competitive spirit that exists in the research area as well.

Prof. McIntyre—In primary health care, because it is a fairly small community in Australia, there is a tension between collaborating, to make sure you have everybody on board that you need to do the research, and yet having enough people left to peer review what you have proposed and them understanding what you do. There are dilemmas there. I have known that there are a lot more people being asked to review PhDs and so on overseas rather than just within the country, so there is the dilemma of the size of the community.

But in terms of collaboration there is a real plus to doing that, particularly in primary health care research and other health or allied professions, where you need to consider also collaborating not just with other researchers but with potential end users of what you are doing. We have found, with the research we are doing, that research has a lot more impact when you have brought people on board at the beginning of your project who are likely to want to use your findings. The challenge is collaborating with people who are not just researchers but from other disciplines as well and potentially users, so that the research you do does have an impact and a relevance. There are those challenges.

We certainly encourage collaboration from our organisation because we see that it is of value to everybody involved, but we also acknowledge that it takes a fair bit of time and effort and skill to do it properly. You cannot just say, 'I nominate you.'

FRAN BAILEY—Have you considered ways in which greater encouragement of collaboration could be fostered—perhaps linking to some funding? Have you thought about ways that this could be encouraged?

Prof. McIntyre—Something like the NHMRC Partnerships call at the moment. At a more practical level, from PHCRIS's point of view, during our conference we encourage people to network, to collaborate. We do that by having concurrent sessions where people present papers on similar topics, so they get to hear each other's research. We also encourage them during the breaks to discuss topics. We have tables with topics on them and people can come and sit and discuss those. We have a database of research profiles, so people can submit their profiles there and others can search the database. If you want to find out who is doing some work on asthma, you can put in that search term and find those people.

FRAN BAILEY—The primary health area, probably more than some other areas, lends itself to greater collaboration.

Prof. McIntyre—Yes, we are fortunate that way.

FRAN BAILEY—Are you aware of any evidence that there is a greater application of the research through a collaborative model?

Prof. McIntyre—Yes. We have just been doing a project on research impact and found a few cases where the research would not have had any impact except for the fact that there was an advisory committee of people that were brought in to advise on the project and took those findings back to their own organisations; so building those links with other organisations and other fields is important.

FRAN BAILEY—Is there any evidence over a period of time, where those links have been established, that that in itself fosters further research in the future because of the links that have been made?

Prof. McIntyre—I cannot think of any specific projects offhand, but I know from my own experience that, if you already have a network or have worked with people in the past, then you keep in touch with them because you have that common interest and you keep meeting them at conferences and so on, so you will more likely continue collaborating with them rather than find someone else. You have worked with them and it has worked well, you know what their skills are and you will use them to get advice to bring other people on board if you need them. It is all about people.

Dr JENSEN—Thanks very much for your evidence. I am not sure if I misunderstood this: you were talking about the small size of the research effort in Australia in your particular field and the problem of examination. I assume you mean theses having to go off overseas for examination?

Prof. McIntyre—Also peer reviewing grant applications: often people would have a conflict of interest because they are closely aligned with the person putting in a proposal.

Dr JENSEN—I would not have thought that going overseas for peer review or examination was necessarily a bad thing. It is a form of quality control.

Prof. McIntyre—No. I think it is something to be encouraged.

Dr JENSEN—Okay. I think I misunderstood that.

CHAIR—It does not happen as a rule? I always thought that that happened with the reviewing of PhDs.

Dr JENSEN—It does.

CHAIR—That it was just a standard procedure that at least one of the examiners would have to be an international examiner. It does not necessarily happen?

Dr JENSEN—I think so.

Prof. McIntyre—I am not sure across the universities.

CHAIR—I always thought it did.

Prof. McIntyre—I know it was the case in my situation.

Dr JENSEN—You also mentioned the necessity to enhance skills for transferring and disseminating information and research findings. Could you expand on that a little, please.

Prof. McIntyre—That is an area that needs a lot more development. Most researchers will see that it is important to publish in peer reviewed journals, which I agree is correct. They will also present at conferences, which is also appropriate; but it is getting to other people who can use those results to do their work.

Dr JENSEN—You are talking about outside the field here?

Prof. McIntyre—Yes. I am talking about policy advisers and other practitioners and so on who may not have access to those journals or go to those conferences but need that information; so it is working out ways of expanding that whole research translation.

Dr JENSEN—This is personal network development you are talking about?

Prof. McIntyre—It is, but it is also knowing how to present yourself in different forums. You might have some research results that you think a policy person needs to know or a department needs to know. How do you go about contacting them or setting up a meeting? What is the best way to present what you have done?

Dr JENSEN—So you are talking about formalised structures here that maybe we should look at introducing?

Prof. McIntyre—That would be good, yes.

CHAIR—Between government and researchers?

Prof. McIntyre—Yes. That is certainly what we are working on with PHCRIS. We are promoting a new product called Research Roundup in the department tomorrow, to look at how we can best present current research to policy advisers so that they can make better-informed decisions.

CHAIR—What I am understanding is that there appears to be this gap between what researchers are doing and how that is then feeding into the policy, which is then the domain of government.

Prof. McIntyre—Yes.

CHAIR—There is such a gap?

Prof. McIntyre—There is. It is just trying to get two groups of people to understand each other when there are different characteristics in those groups.

For researchers, to do research takes a lot of time and it is rigorous. Policy people want to know, ‘What’s the bottom line from all this?’ and they want to know it yesterday to inform their decision making.

CHAIR—And how much it costs and how you sell it.

Prof. McIntyre—Exactly, so it is trying to bridge those gaps.

Dr JENSEN—This is an important area that you are touching on and it is not just policy. There are all sorts of areas. You are talking about scientists in different groups and some commercial stakeholders and so on. This is an area where something does need to be developed that formalises it, because the problem that you tend to find with researchers when they are discussing it with, say, policymakers or commercial stakeholders is that they get bogged down too much in the detail rather than giving an overall view of things. You are quite right: in terms of talking to people, you need to know what sorts of things they need to hear. For instance, with us, there is no point giving us a lot of detail. We have so much reading to do that we get swamped with it.

Prof. McIntyre—That is right. Basically you are looking for, ‘What are the recommendations?’ or, ‘What are the implications for policy?’

Dr JENSEN—What mechanisms could you introduce to facilitate better communication?

Prof. McIntyre—The journals will get you to provide an abstract and to maybe also say, ‘Well, what we’ve learnt from this,’ in a nutshell type of concept. I guess it is about developing skills to know who to target and how to tailor your message to them, and at what time.

CHAIR—There has been a lot of talk about PhD students requiring special skills in how to translate their research to the market, to industry; people skills; all those things that are not necessarily part of the research process itself. It is becoming obvious that researchers are now perhaps being required, in order for the sake of their research, to find some meaning in government policy. They need to be able to lobby and find contacts and sell the research.

Prof. McIntyre—Or you need to develop, dare I say it, a knowledge broker.

CHAIR—Or there should be another body.

Prof. McIntyre—Somebody that can transition—

CHAIR—Like a government liaison officer.

Prof. McIntyre—But, as you said, it is other industries as well. How do you communicate appropriately with them? There are certainly some good ideas around. There is the Australian

Science and Media Centre here that was set up by Baroness Greenfield from the UK, as a thinker in residence. It is worth looking at some of those models, but I think researchers need to realise that there is more to research than collecting data. On the other hand, we also need to look at how can we make the end users of research more receptive to taking it on board. What other skills would a policy adviser need to make sure that they have got all the evidence they need?

CHAIR—It should work both ways.

Prof. McIntyre—Exactly. Also, how can the practitioners use their research to inform and improve their practice? That is another area of research training—whether it comes under research training or not—and certainly needs to be considered.

CHAIR—It has not emerged before. I had not thought about separating it, because we have been thinking about it in terms of training and researchers doing all of that. In fairness to research, too, this is a bigger issue.

Prof. McIntyre—Yes. It is training people how to use research.

CHAIR—Yes. I want to take you back to the issue of general practice and doctors. There is obviously quite a lot of debate and, as members of parliament, in our own communities we are acutely aware of the shortage of GPs and the ageing of the GP population, which applies across a lot of other areas as well. In relation to general practitioners as potential researchers, how do you see the impact of that shortage on research generally? What would your view be on introducing an international or overseas trained GP—on the complex issue of doctors from overseas practising in Australia? Do you see that being of assistance to what appears to be a problem?

Prof. McIntyre—It sounds like a really good research project.

CHAIR—I think there are quite a lot of research projects that might come out of this. We need to start bringing all of those issues together to see how we can use them to address the short-term shortages that we have and balance them out against our own domestic population, and immigration, and the use of international researchers and doctors. How do you see that working?

Prof. McIntyre—I was in Mount Isa last year where there was a lot of discussion about workforce issues and the research that has been done in that area to try and address the shortages, the challenges and so on. There seems to be quite a lot of research being done in that area because it is seen that there is a real need to sort it out. I will be going to Mount Isa again later this month to hear what has happened in the last year. The shortages change some of the research priority in the area and some of it is towards looking at a more multidisciplinary team of care rather than just the GP. There are a few models that are being explored, examined and trialled. Queensland are doing something with physician assistance, as well as getting more GPs, and so on. There is certainly a lot of work in that area and it is something that perhaps could be grouped together to present to the appropriate departments.

FRAN BAILEY—A question has occurred to me in listening to you talking about those workforce issues. We know that there are more females graduating with medical degrees but

only a small percentage of them are actually practising. Are more women going into medical research?

Prof. McIntyre—I have not looked at figures.

FRAN BAILEY—I thought that you might know.

Prof. McIntyre—But just thinking about people at our conference, yes, there are more females than males.

CHAIR—To add to that, I have been told by general practitioners in my electorate that the feminisation of general practice—and we talk about this quite a bit, because there are more women now practising than there are men—is contributing to shortages in the sense that women obviously at some point in time require flexibility because of family commitments and so forth. They are running this line that that is adding to the problem: in a way you have resolved one problem but are adding to another problem. This is where I am interested in increasing the number of people we train and being more receptive to overseas trained doctors; loosening up a little bit there, without jeopardising our primary health care or the quality of our research, but being a little bit more open to that. I asked you that question before. Do you ever think in those terms?

Prof. McIntyre—The other challenge is that the male students who come out are also not willing to work as many hours as the older GPs.

CHAIR—That has been put as well, yes. This generation of doctors is very different to others.

Prof. McIntyre—Other professions are taking on some of the roles of the GPs. The practice nurses, the paramedics, the emergency services and so on are taking on some of those roles as well.

CHAIR—We are having that debate at the moment, aren't we, about the role of other professionals in different practices?

Prof. McIntyre—Yes. So there are the practice nurses and nurse practitioners, particularly in the rural and remote areas. There is also how the public see their health, what they see are their responsibilities, and whether we need to provide some initiative for the public to be more responsible for their health. I could be touching a really hot spot there.

CHAIR—You have got seven minutes, if you would like to go into that.

Ms RISHWORTH—One particular aspect that you have spoken about is that of the scientist practitioner or the researcher practitioner. Coming from my background of a psychologist, it is very difficult to do that in practice and you need someone almost to drive it. Who do you see as the best people to do that? Other than perhaps universities, are there other groups that can drive that researcher clinician model within the community?

Prof. McIntyre—I think it is great if there can be the link with the universities, which is where most of the research occurs, but it would be good to look at other organisations that do

research or are interested in supporting that. The Divisions of General Practice are doing more research, and linking with those would be quite appropriate and quite suitable, as long as the research is done in the rigorous manner in which it is required to be done to be able to publish and to present and so on.

Ms RISHWORTH—Who would you see supporting those publications, knowing from a clinician's point of view that you do not have a lot of time to reflect on some of the research or data that you might collect? Is it universities? Is it the bodies that are driving the research?

Prof. McIntyre—This is where it is important that they do collaborate with other researchers so that collectively they put together the publication or whatever. The Divisions of General Practice certainly will be quite suitable there, but there are also the departments of general practice and rural health in the universities that would be really good, too. It is a great opportunity to have people wearing both those hats—the practitioner and the researcher—so that the research they do can be really relevant and meaningful. It gives them a broader scope of work too, so their work life is a lot more interesting than if they are just doing 15-minute consults with people with coughs and colds. So I am all for it. Can I make one more point?

CHAIR—Yes, absolutely. Feel free to do so.

Prof. McIntyre—It is about leadership in the area. We tend to spend a lot of time talking to people about doing research, PhDs and so on, but developing leadership in research is very critical if you want to grow the profession and excel in those areas.

Having some sort of incentive or initiative to do that is really important. There is nothing in place that I have come across, other than your track record. Maybe this is part of the mentoring suggestions that we have mentioned before, but that is something worth considering: how do we build leaders in the field?

CHAIR—In order to promote the research.

Prof. McIntyre—To promote research as a profession.

CHAIR—That comes up quite a bit in the sense that there is a lot of talk about future researchers. We have talked a lot about younger people, especially in secondary school, and what they understand research careers to be, and it appears they do not have an understanding of research careers and they do not opt for them and so forth. We have had discussions about what universities themselves or research institutions themselves could do to link back the sort of work that they do. Leadership and mentoring could play a role in making research generally more obvious to those younger people who would not think about it in any way unless they were particularly keen from a very young age. Most pursue other careers because they are out there being promoted. You have touched on something that could be valuable in an overall strategy to promote research as a career path at an earlier age, when kids seem to be making decisions about all the things they want to be doing, rather than just at undergraduate level.

Prof. McIntyre—Thank you.

CHAIR—Thank you very much, Professor.

[10.00 am]

MARLIN, Professor Christopher David, Deputy Vice-Chancellor (Research), Flinders University

CHAIR—I now welcome the representative of Flinders University. Do you have any comments to make on the capacity in which you appear?

Prof. Marlin—I am the Deputy Vice-Chancellor (Research), Flinders University, and acting vice-chancellor today.

CHAIR—While the committee does not require you to give evidence under oath, I should advise you that these hearings are formal proceedings of the parliament. Consequently, they warrant the same respect as proceedings of the House itself. It is customary to remind witnesses that giving false or misleading evidence is a serious matter and may be regarded as a contempt of parliament. We thank you for your submission and now invite you to make a brief opening statement before we proceed to questions.

Prof. Marlin—As Deputy Vice-Chancellor (Research) and as acting vice-chancellor today, it is a great pleasure to welcome you here today and to be able to address you. I am very pleased that you have been able to meet on our campus. Given the nature of your inquiry, meeting on a university campus is very appropriate. In welcoming you, I acknowledge the Kaurna people, the traditional owners and custodians of this land, whom we respect. It is a particular pleasure, of course, to welcome back one of our graduates and one of your committee members, the member for Kingston, Amanda Rishworth.

I would like to commend the submission from Innovative Research Universities Australia, of which Flinders is a member. As well as our own submission, I am happy to expand upon or answer any questions you have about that particular submission. We were active participants in the development of that and so I am fully familiar with that submission.

In terms of our own submission, I would only like to emphasise a few key points. The first one is that research students are an important part of our research effort, and that is often forgotten, even by academics themselves. Those research students contribute a huge amount to the research that is done in Australia. It is hard to estimate how much that is, but I think I said in the submission that it was at least half, and that would be my belief from my own experience as a researcher. Effective researchers often rely very much on numbers of postgraduate research students. In my career I have often had up to about six or seven PhD students working in my team and they are an important part of the research program. For that purpose, overseas students make an equal contribution, in general, to the research effort.

The other thing we need to be concerned about, of course, is that maintaining an appropriate research workforce and an appropriate number of research students are important components of getting that adequate and appropriately trained research workforce. Those highly trained

researchers are an important part of our innovation system. So research students fulfil another role, which is as a supply of people into that workforce. For that purpose, domestic students are more likely to contribute to the workforce need, because they are more likely to remain in Australia at the end of their studies, obviously, but overseas students, I believe, could make more of a contribution in that area than they have in the past.

Furthermore, as pointed out in the Innovative Research Universities Australia submission, the number of domestic students commencing higher degree studies in Australia has been declining since 1995. We are faced with a shrinking supply of people to this workforce from domestic sources, so the options that students have for continuing further study need to be made more attractive relative to other options that students face.

I see many examples of students who get to that brink of having completed a first degree and who choose not to go down the research path, even though they have the interest and the inclination. That includes my own two daughters, for example, who did very well within their studies but both of whom have decided not to go on and do research, despite their father's interest at least. We have to make that option of going on to research more attractive. In order to do that and in order to help them complete their studies there are a few things we could look at.

The options include increased stipend levels so that the remuneration the students are getting is comparable with what they could get outside. My own discipline area is computer science and it has been challenging throughout my career to retain high-degree research students because they could immediately leave the university and get quite high salaries compared to what we could offer them in terms of study. We need to increase the tenure of scholarships so that it more closely matches the length of candidature. Again, in my experience, a lot of my students got to the three-, 3½-year point of scholarship support. As soon as the scholarship ran out they could go out and get a job and so the completion rates were very much affected by that. I have a number of very good former students who work in the industry locally who never completed PhDs, and they would have, I think, had the scholarship support continued for the full length of their candidature, rather than the time that they managed to get.

The other thing we could look, which is in the IRUA submission as well, is remission of HECS and HELP debts and those kinds of things, which would be an incentive. We also need to make it more attractive for overseas students to stay here after their studies. Australian attitudes in that area are similar to what I observed in my first academic position in the United States in the early 1980s, where there was an obligation to send overseas students back. If the US did not do that then those countries would be offended in some way that they had hung onto the best students.

The world has changed. What we need to do is to think more actively about how we are going to keep the best students here, and those countries do not resent that so much any more. China, in particular, has very attractive options for employing people in their research workforce and they know that eventually they will go back and they have confidence in that now. So things have changed. We need to look at changes to visa arrangements and allowing students to stay more easily in the country, and even, as I suggested in our submission, targeted postdoctoral positions for the best overseas students so that we can keep them here for at least a few years longer and contribute to our innovation system.

Overseas experience is also essential for our own graduates, but we need to combine that in some way with an option to come back again. If you give people an overseas fellowship and there is no job at the end of it, you are actually encouraging them to look for jobs overseas, whereas things like the CJ Martin fellowships, which have a two-year tenure within a foreign country and then two years tenure back here, are an ideal kind of way to encourage people to get their overseas experience, but they have got something to come back to and, in a sense, an obligation to come back. It does not always work, but it works much more often than it would if you did not have that kind of structure.

It is also necessary, as indicated in our submission, to address the insecurity of typical research-only employment. Our best and brightest have the least job security within the university system. I really feel for people who are on three- to five-year fellowships. A year or two before that, they have to start applying for their own jobs, and it seems ridiculous that the very best people are on that kind of system. We could perhaps look at better-funded, career-long, research-only positions. I know the NHMRC face a huge difficulty funding people who have been on fellowships for perhaps 10, 20 years, and then being able to provide enough for new people to get into the system. I think we need to look at that as a country and work out whether we really want people in research-only positions and, if we do, how we are going to fund that. Future Fellowships, which is being discussed at the moment, is a good idea in that regard, and that is being worked through, but there are still some issues around what happens at the end of that period. In a sense, you are just deferring the problem, and so there are certainly issues in that kind of scheme.

Finally, as I indicated in our submission, all of what I have discussed is perhaps best achieved through continuing what the government has already been doing, which is to encourage and reward universities to specialise and to invest in those specialisations. If universities in Australia are specialised in particular areas of research and have a high international reputation in those areas, then a lot of these other issues are easier to address. We will attract the best overseas people and we will retain our best in Australia because the best research is going on here and the best infrastructure is here. So that kind of specialisation helps to address some of these other issues as well. That is all I am going to say for the moment. I am happy, obviously, to answer questions.

CHAIR—I will very quickly take you up on your proposal of career-long researchers. If you proceed down a path like that, it would certainly be great for the person who wants to have a lifetime career in research. I know research does not ‘run out’, but you must at some point in your career have to move on to something else, because you would have dealt with whatever it is you were researching. Wouldn’t that prevent younger researchers from moving into similar career paths? If those career paths do not expand and there are only a certain number of jobs, wouldn’t that then have the effect of preventing younger researchers from pursuing a lifelong career in research? The reason I ask this is because the ageing academic population raises issues of tenure. Younger academics cannot get tenure. They drop out. Casualisation has disrupted that process. We are in a situation now where our academic workforce is ageing and about to retire and that generation that could have replaced them is not there, so I am just wondering what your thoughts are on that—without prejudice. I think what you are saying has merit.

Prof. Marlin—Yes, I understand.

CHAIR—But you do not want to fix one end and cause a problem elsewhere.

Prof. Marlin—No. You have to do a long-term plan. It is not a three-year plan. It is more like a 20-year plan. You have to develop a pool of people. It is much like having a collection of positions alongside the teaching and research positions in universities. You are going to have to fill that pipeline over a long period of time and end up with a pool that has a mixture of people at different stages. The problem at the moment is that we get these five-year plans and no-one has thought about what happens at the end of the five years, except that somehow the universities will take over that obligation.

Most of our funding comes from teaching. We do research as a loss leader. We do not have the full cost of doing research in our budgets. The idea of creating research-only positions out of that teaching funding really is beyond the ability of most universities, unless they have endowments specifically for that purpose. I think we need to plan it through and work out what would be these kinds of positions. It would obviously have to be performance based so that, if someone does not continue to perform appropriately, there are ways that they can be moved out and, effectively, another slot is created, but you have to, I think, have a pipeline that develops over a fairly long period of time in order to address the kind of thing you are talking about. If we had had that in place for, say, the last 30 years, we would not be in the situation we are in, in terms of the ageing workforce.

What really pains me is to see some really very bright people who get to the point where they are in their forties, early fifties, they have been on this treadmill for 20, 25 years—they are often female—and then they think, ‘Do I really want to go on doing this?’ because they really sweat at that point that they have got one or two years to go. Within NHMRC you get two goes at it, so you can apply two years in advance. If you fail, you have got another chance. Can you imagine the pressure at that point for someone who has got a career of this kind, and may be in their late forties, early fifties? It is really no way to treat the best people, in terms of research, and that is really what is motivating me. We have to be able to use our collective intelligence to come up with a better system.

FRAN BAILEY—I am particularly interested in your comments about the shortage of research in mathematics and languages. I did raise the question yesterday in Sydney, and I was very quickly told by the universities of Sydney and New South Wales that this was not the case, that they have their own departments of mathematics. One of the concerns that I have is that at so many universities now there are not dedicated departments of mathematics; they tend to be a discipline within other areas. Can you tell me what the situation is here? And what are your suggestions for improving the deficiency in both of these areas?

Prof. Marlin—What has happened here, which is not necessarily a bad thing, is that mathematics has been more merged in with other areas. We have a school of computer science, engineering and mathematics, which is one school. There are mathematicians within that school. I came to Flinders in 1992 as the head of computer science. At that point there was a separate mathematics department. I cannot remember exactly, but there would have been of the order of eight to 10 academics in that group. Now the number is much less than that; it would be below five, certainly. A lot of concern has been expressed that mathematics has sort of disappeared at Flinders, as it has in a number of other universities, and it is difficult to know whether that is true

or not because of this kind of merging process, which puts people in mathematics, in a sense, in closer proximity to the applications of mathematics.

That is not necessarily a bad thing in itself, but what we are seeing, of course, comes back to my earlier comments. University funding is driven by funding for teaching. The demand for mathematics as a specialisation has died out in most universities, to the point that not many people come into universities wanting to study mathematics specifically. Mathematics is a component of other degree programs, but there is not that flow of students, coming out of schools, who want to do mathematics specifically. Go back to the school level—and I think you were commenting on this with the earlier speaker. You need to go back and see what is happening at the school level and increase interest at that level. There is not really an interest in doing mathematics. That is being driven, I think, by the lack of specialist mathematics teachers—people who have a passion for mathematics—and, of course, it is a cycle, because then you do not have people coming out of school, going into university, wanting to do mathematics and mathematics teaching, and so it goes around and around, and it is getting worse and worse. So I think there is a problem in mathematics.

It may not be as much of a problem in the really big universities but, if you look across the country, there is a lot of concern being expressed, often by universities of the age of Flinders University. Because of our situation with students studying in that area, we have not been able to maintain the same concentration of mathematicians, and, of course, that just leads on: we do not have the concentration of mathematicians; the students who come into university do not have those passionate mathematicians in front of them when they go to lectures; they do not get interested in it; they do not go on. It just goes on and on.

We have to find a way to break out of this. It is quite complicated, but I think it does go back to the schools, and we need to encourage people to take an interest in science and mathematics teaching. You may or may not be aware: we have the Australian Science and Mathematics School on campus here, which is the only specialist school in that area in Australia on a university campus. That is trying to, in a sense, validate the interest of students in science and mathematics at the school level, years 10 to 12, the last three years of school. It is having a significant impact in nurturing students who have that kind of interest and, hopefully, it will have an impact going forward in terms of people having more interest in studying that at university and so forth.

Mr SYMON—Professor Marlin, my question goes back to something that I think I have seen come up in every submission so far, and that is the level of the APA stipend and its effect on PhD candidates, and also the length of that stipend. Is your experience here that it is too short in every case? Are there exceptional students that get through in that time without having to cut back on the quality of their work, or is it more the case that the vast majority get towards completion and then get cut off financially?

Prof. Marlin—I am not sure whether it is the majority but there is a distribution of completion times. The experiment is disturbed when the stipend is cut off, so you do not know what would happen if the stipend were to continue. Those that drop out at that point to get employment go part time, lose commitment to their studies and get other distractions: all that kind of thing will impact on whether they complete or not.

My impression is that it is a significant problem but there are a number of students who get through in 2½ years or three years. It depends on the area, whether you are talking about things that are experimental or not, and if there are individual circumstances in terms of both the research and personal circumstances. There are a lot of factors that come into play here. It is a long chunk out of somebody's life and lots of things can happen over that time.

In general what I was talking about was that we can influence the probabilities. We can make a difference to how many completions we get and to whether people start or not in terms of the stipend level. People do look at that. The fact that it is tax free means that it is worth more. We promote that when we talk to people. If people look at it without knowing that, it looks depressing. What happens now is that the situation we used to have in Australia, where students would go to university out of school and do nothing else and then go on and get a job, has changed.

There would be few students in this university overall who do not work and often they work reasonable amounts. Sometimes we are talking about 10 or 20 hours a week of work while they are studying at undergraduate level. They know what money is out there. It is not that they are totally ignorant. We used to rely on that. I can remember my days. I had no idea what sorts of salaries were available, so you just kept drifting through the university system in ignorance until you got to a point where you knew. I remember the first time it happened, when I worked in the United States, where I found out the people that the graduates that I had taught were earning more money than I was. That rather surprised me. That kind of realisation is now more prevalent in terms of students understanding what it is they are comparing. In that way, we need to be more realistic about the remuneration we give them and make it more like what they could earn if they were to leave studying and go and do some work.

Mr SYMON—Perhaps you have a suggestion here: is there a better measure for the length of an APA scholarship than just a time based measure? Is there some other way of putting it forward so that it matches that research, rather than being one size fits all which obviously does not work, from what we have been hearing so far.

Prof. Marlin—You could do that in terms of having stages towards the end, say after the three-year point, where a case has to be made. Then someone looks at that case and determines whether it has the right kinds of elements in it. I would prefer that you keep giving scholarships to people who are making progress; if you can see progress towards the goal and it appears to be finishing. We do that internally in terms of candidature. Our candidature rules have a standard amount of about four years and after that it gets harder to continue.

We have good systems for looking at the cases that people bring forward because we do not want people to be wasting their time, or indeed ours, continuing to work when they are not getting anywhere. As it gets past the five-year point, we are strict about looking at why it is that it has not been completed because that is tying up staff resources and other things to continue to supervise the student. Often, students need a jolt to think that they are never going to do this and they go and do something else. That kind of system might correspond to what you have in mind, but I cannot think of any other way you could do it.

It has to have an end point that is further out than the current system. It is too compressed. In the IRUA submission they talk about the kinds of things that we expect from graduates now,

which are more and more sophisticated. We expect people to have interpersonal skills; to have worked in a team; to do a whole range of other things. Flinders has a system of professional development for higher degree research students that is regarded as best practice in the country. Other universities have copied that. It has led to the masterclass system within IRUA. All of that is oriented towards giving our PhD graduates the best set of skills, but that takes time. Students are keen to do that but you then need to make sure that you allow enough time to do the research that leads to the thesis.

Ms RISHWORTH—My question follows on from that and the submission from the Australian Technology Network, in particular the concept of PhD placements in industry. Are you able to elaborate on that concept?

Prof. Marlin—This relates to another review that is going on at the moment, the innovation review, which includes the cooperative research centre review. I always say that the biggest contribution the CRCs have made to the country is in the area of higher degree research students and in taking whole generations, by now, of students and broadening their job prospects from working in a university to working more broadly. There have been lots of PhD graduates go through those centres.

So, to get back to your question, those kinds of things are brilliant because we have to make use of our PhD graduates in the innovation system. That is not just the universities. We do a lot of work with industry and it is good when you are dealing with a company that has employed somebody who knows about research. You are not starting from behind and you are able, therefore, to build a more effective partnership. So what we have to do is end up with more PhD graduates with industry experience and with the idea that they will go into industry.

There used to be an idea, and some academics still harbour it, that the purpose in having PhDs was to create more of ourselves. It was our self-replication mechanism. We have gone beyond that as a country. The turning point was the early 1990s when the CRC system came in, and a lot of PhDs going through that system. It has broadened the prospects of PhD graduates. To have placements, and often that occurs through CRCs, is a good way in which you can broaden those kinds of job aspirations and so forth.

My own PhD graduates often worked in industry during their PhD. My area is software engineering, so it is fairly applied. We had Motorola here, and active at one point, and that was a good area for my students to work in. They benefited a lot from that.

Ms RISHWORTH—Do you feel that we would have to increase the candidature to take into consideration some of those elements: the extra work that they might be doing; the extra involvement in industry that they might have?

Prof. Marlin—Yes. You would have to be realistic about it, but it relates to what I was saying before; that you could do that within the context of saying that when somebody wanted to go beyond the four-year point—for example, if they said, ‘The reason I need to do that is because my particular PhD program involves a placement and that involved getting up to speed with what the industry partner was doing,’ and those sorts of things—that would be part of the case. There should be scrutiny but you can work it in, rather than saying, ‘Everybody gets a long length of time just in case they go into industry.’ That would not be the way to go about it.

Mr RAMSEY—I would like to take you back to something that Ms Bailey was talking about and which was raised yesterday, with mathematics and languages difficulties. Right at the end of your answer to Fran, you got around to the schools, which has come up repeatedly.

Prof. Marlin—Yes.

Mr RAMSEY—I raised yesterday with the university that some of the solution—in fact, a lot of the solution—may well be in their own hands, in that the school system is now absolutely focused on getting the kids the highest TER they can possibly get and we do not offer any incentives for kids to do the mathematics and science subjects. They will be counselled, they will be pushed away from doing it, because everyone will want to ramp up their score. In a lot of cases we have dropped the prerequisite subjects for university, so there is no real incentive: ‘I’ll pick it up later. I’ll do all that kind of thing.’

When they get there, that leads to high drop-out rates and the universities are competing for students—we know they are—so they lower their standards to let them in. It is a downward spiral that we are allowing ourselves to get into. Dr Jensen suggested yesterday that we should rate mathematics higher, for instance, so that when it contributes to the TER it contributes at a higher level or by a multiplier factor, or something like that.

Prof. Marlin—Those kinds of things can work but you have to be careful. Anything you do about the TER calculation can lead to perverse behaviours, and we have seen that before. So we need to be careful about that, but it can be done. You could do a study in which you looked at how much you could increase that, and whether that would be fair in terms of the student’s performance in other subjects—the sort of moderation that tends to go on within those systems anyway—to ensure you are not disturbing it too much. Otherwise, you will end up leading to unusual behaviours you had not intended, because you have got a whole lot of people out there with their advisers who are trying to optimise the system from their point of view.

Mr RAMSEY—They are distorting the system?

Prof. Marlin—Yes. They are already, but you do not want to end up with other distortions.

Mr RAMSEY—The market is not sending any signals at the moment.

Prof. Marlin—Yes.

Mr RAMSEY—Just as the market is not sending signals to teachers that we need people in mathematics and so on.

Prof. Marlin—Yes. Language is another area. Another area is the humanities and so on. Again, look at the workforce situation. When I was in school, I studied French longer than I was advised to because I was interested in it, and in the final year I had someone who had a PhD, who had come to Australia. They were only there for about six months or something, so it was kind of an accident, but it was just brilliant. You hear lots of stories from people about how a particular teacher in a particular circumstance changed them around. In many ways that is more powerful, but I agree with you that in order to break the cycle we might have to do something to distort the incentives in terms of the TER calculation. But I think that should only be a

temporary measure so that we get back to basics and ensure we have teachers in the schools who are well trained, who are enthusiastic and who are well paid.

A problem in this area is that, quite frankly, the remuneration is better outside teaching. Over the years, in teaching computer science both here at Flinders and at the University of Adelaide, I must have taught hundreds of teachers, because a lot of the classes had teachers in them who had taught themselves computing in the schools and wanted to know more about it and so on. I have run into many since. They are no longer teaching and they did not last very long. As soon as they got their degree in computer science they left teaching because there was better pay outside it in computing. We have to really think about that and the kind of remuneration we are giving teachers and ensure that, in areas where we want to encourage it, we encourage people into the profession and they are appropriately qualified.

CHAIR—In relation to teaching—and I agree with you—whatever it is that is happening now has been a long time in the making and schools cannot be separated from it.

Prof. Marlin—No.

CHAIR—They are very much an integral part of it. Yesterday I asked the postgraduate association that appeared before us what their thoughts were about PhD students going into schools and assisting with the teaching of perhaps mathematics and other areas, and their legitimate response was that there would not be enough time, that they would not do it. It also underpinned the thinking that you do not have PhD students in schools, that if you want to do a PhD, you are going to end up in academia or in industry or somewhere else. It is becoming obvious that we are at a stage in our knowledge, economy and society where a career pathway for a PhD could be back into schools.

Prof. Marlin—Yes.

CHAIR—You talked about a doctor of the French language who obviously inspired you. You are absolutely correct. That is absolutely key to encouraging students. This is not to denigrate the quality of teachers, because I am a teacher, and a language teacher at that, but it is about introducing an incentive for teachers to develop their own knowledge and feed that back into a system which is the bedrock of what goes on at universities in the future. Can you elaborate on that?

Prof. Marlin—There are various ideas that might or might not work. I mentioned the Australian Science and Mathematics School before. One of the roles of that will be to have teachers from schools come into the ASMS for a period of time, as a specialist school, in close proximity to a university. The teaching system needs to allow for that professional development in that form: rather than get one hour one week and two hours the next week, to actually get a sabbatical to go and upgrade the schools and to work with people who are at the leading edge of the particular discipline area. I can see it more clearly in the sciences, but it probably applies right across the various areas of teaching, to kind of refresh teachers. But the education system needs to be funded in a way that allows for that. We have a starting point here, but I do not believe it is really working yet. That kind of thing will also validate that interest that teachers have in that particular area.

It is particularly an issue as the number of students in science and mathematics, for example, drops within schools. Then it becomes a situation where you do not have specialist teachers in those areas in every school any more, particularly outside cities, and so you end up with people having to teach across multiple areas. They need the professional development more than anybody else, because they are going to be teaching something in which they are not really a specialist. We need to do all those sorts of things. That is probably a more effective way of going about it, but it is something which is going to need some planning.

CHAIR—Of course, you cannot have PhDs teaching in schools if their salary is not responding to that.

Prof. Marlin—That is the other thing.

CHAIR—That is an important area, too.

Prof. Marlin—The French teacher that I had at the time was passing through, effectively, from one academic appointment to another. I was very grateful he did that, but it is not the kind of thing that happens routinely.

Dr JENSEN—You have put in a very valuable submission. You have touched on something that has not gone into it directly, but it might actually be the nub of a problem that we have, and that is this nexus in the grant scheme, effectively, where universities will hire career researchers with a proven track record in their ability to attract grants. You could call it the Nobel problem where obviously it is advantageous to hire someone who has actually got a Nobel prize because they can pull in grants.

Prof. Marlin—Yes.

Dr JENSEN—But the problem is that it acts as a barrier to other potential career researchers, to those who want to have a career in research. In terms of grant schemes and improving career prospects, should there be some mechanism put in place to allow people who do not normally attract grants to attract them? You get a Nobel laureate putting in a grant application. Pretty much, they are going to get it, whereas someone else might actually have a more worthy grant application and yet they will not get it simply because they do not have this proven track record yet.

Prof. Marlin—Yes, in a sense you do need to give people the benefit of the doubt for a while, until they can prove themselves or otherwise. The system at the moment is so focused on track record that it is hard to compensate for people who are trying to get in.

Dr JENSEN—Yes.

Prof. Marlin—That is what you are saying. You could give more allowance for the fact that people need to establish themselves and give them a bit longer to do that, because in most areas it is not a one- or two-year thing, it is at least a five-year thing. The way I see it working in universities in the future is that we are likely to have a greater diversity of people in terms of how they contribute to universities, so more people who contribute through doing teaching, some who contribute through doing a little bit of research and some who contribute through

doing a lot of research. But we are going to have to be careful, as we put people into those slots, that we give them the benefit of the doubt initially so that they can prove themselves as researchers if they want to try that track, and we are going to have to be, at some point, hard-nosed about whether they can cut the mustard and whether your investment in them having that kind of job is working out or whether they should be doing something else. It relates to the granting agencies as well, as you say.

Dr JENSEN—Yes.

Prof. Marlin—The way our current funding formulae works is essentially on university averages. You get funding out of a pool of funding based on, for example, your total grant income. That encourages you to hire people who are very high performers that bring up your average. So you can have a whole lot of others who are not really doing a great deal. That tends to sort of drive the high end of the market in that sense.

Dr JENSEN—Yes.

Prof. Marlin—It is more important over time—and I was hoping that something like the RQF would do it, and maybe the Excellence in Research for Australia will do it—to encourage, as I said before, universities who specialise. Then part of the reward should be the extent to which you are actually getting concentration of effort, rather than just having some high peaks that are isolated individuals who do not work with anybody else and who are not necessarily creating the kind of concentration in which you can bring in research students and give them a good environment.

Those kinds of things are not really encouraged by the current system because we do not really have that sort of focus at the moment. Flinders as a university has tried very much to be focused. We have 17 areas that we have invested in. We are very much around that kind of model of saying, ‘These are the things we are doing. We are putting our resources into those. We are trying to build up the performance of those,’ and not necessarily looking for the high-performing prima donnas but more looking for people who can lead these areas and bring in other people and look after students and all those kinds of things.

Dr JENSEN—Yes. I know this did not happen in Australia, it was in Britain, but it is a classic example of the problem of bringing in people with high reputations who do not necessarily provide the research impetus. The person was Josephson who won the Nobel prize for physics on superconductivity.

Prof. Marlin—Yes.

Dr JENSEN—He had a tenured position at Cambridge, and yet all he was doing was metaphysics. How do we prevent that and end up with the sort of aid structure that is obviously optimal, where we do not have a top-heavy aspect of senior career researchers taking up effectively all the tenure-track positions, and the most able, younger researchers may very well leave the field entirely and go into something else and we have lost considerable talent?

Prof. Marlin—I agree with you. I think that what you are getting at the moment is the behaviour that you have encouraged. The funding system you have at the moment encourages

those high peaks of those individuals, which brings up the average. There is discussion at the moment around the possibility of having compact discussions with universities, which might say, 'Well, what areas are you investing in? How are you doing things?' and those sorts of discussions are the only way to do it. You cannot do it on straight numbers, which is the way it works at the moment.

Dr JENSEN—Should we perhaps have a certain amount of grant that is given to your senior researchers but in effect have a de facto age or experience structure within the grant application scheme so that it forces some funding to—

Prof. Marlin—You could do that. But I have in mind, too, that you might say that universities might have to demonstrate how they are dealing with succession planning, how they are building up capacity, and it might be that there is funding that universities do not get if they are not doing that. But it is not something that is going to be easily discoverable through statistics. It is going to have to be something where there is a discussion around strategic directions and then looking for evidence of adherence to those kinds of directions, I believe. It requires a sophisticated level of discussion with universities that has not happened in the past. At the moment we provide the government with some statistics and we get some funding back, and I think it is going to have to get beyond that.

Dr JENSEN—An area that is quite dear to me is the enabling sciences, mathematics, and you have pointed out languages. You made the point that, for instance, mathematics might very well be buried in other faculties and so on. I have a great concern about that sort of development track, because when people start getting out of the mathematics research or the physics research and, in effect, get whittled into other departments, you are going to end up losing that enabling ability. That will ultimately affect the quality not only of research but of the teaching that you have in that area. How do we go about addressing that? You have dealt with some of it, with the issue of schooling, which I agree is critical.

Prof. Marlin—My attitude to some extent is that if you go back 100 years the discipline structure of academia looked different. There was no electrical engineering, and a lot of the other things that we take for granted now did not exist, and that will continue to evolve. Mathematics has been around for a few hundred years so it might be regarded as fairly fundamental. But, on the other hand, if you look at an area like statistics, although it has been identified as a separate discipline in the past, it has always worked in concert with other areas, so the researchers always did research in medicine, in biology, in geology or in other areas that use statistics. That all went on below the surface. What has happened now is that that has become more merged. That is not necessarily a bad thing if it encourages and attracts more students into statistics because they can see the applications of it.

I think there are fundamental areas of mathematics that do not fit that model and we need to encourage that, too. But I think to have some of your mathematicians embedded in application areas in a sense is a good thing and it overcomes another problem that you observe: a lot of discipline areas that use mathematics and statistics do not employ people with recent degrees in those areas. They tend to have people who learnt it a long time ago and are not really up to date with the most recent techniques. Having areas of application working directly with mathematicians who are at the leading edge of their discipline is going to be better for the

research. We need a mixture of the things, and I certainly would believe that we need to identify mathematics as a special area.

Dr JENSEN—I think you are right with things like statistics but, for instance, if you get all your statisticians effectively embedded within the different sciences where statistics are used, you are going to have effectively statistic experts applying the known statistics but you are not going to get the development of new statistical techniques.

Prof. Marlin—That is true. Yes, I agree with you. You need to do both, I think, yes.

Dr JENSEN—Thank you.

FRAN BAILEY—Can I just follow up on this. I spoke earlier to Professor McIntyre about the opportunities for collaboration. It strikes me, listening to your responses now, that when trying to encourage greater collaboration, especially in the mathematics area, it would be more likely to occur if you had separate mathematics departments where other areas would be able to collaborate, except for some of the major universities who have their mathematics embedded in other departments.

Prof. Marlin—I think it can work either way. Having separate departments of mathematics sometimes leads to a silo of mathematicians, which occurs with all discipline areas; they somehow look inside the walls too much and do not look outside enough. If you have that, you can encourage it. We have certainly done that here by building links between faculties in terms of the areas that we have; biomedical engineering and things like that are a collaboration between the engineers and the hospital and medical people. That spans across our campus. You can do that kind of thing. You have to work harder sometimes to be able to do that.

Here at Flinders, if you were to try and count the chemists and physicists you would probably find that difficult because they are in a single school together, and our main concentration is in nanotechnology, which kind of blurs the distinction. If we look forward 50 years, we might not see chemistry and physics as separate disciplines. I remember in the past when I did chemistry, it was physical chemistry, inorganic chemistry and organic chemistry, and they were all separate departments. Now all that has disappeared. I think that we are seeing a sort of moving of the discipline boundaries and we have to realise that it has always happened. We feel that this 50 years we are in at the moment since about the Second World War somehow is a kind of classification that was God-given. It is not. There have been changes over time and there will continue to be that evolution. If you look at the molecular biology revolution, that is changing the distinctions between disciplines inside biology: between botany and zoology and all those kinds of things. It is all being changed, and that is a good thing, as we learn more about the science.

Mr RAMSEY—You think there should be a national workshop analysis of European and American research and investment practices. Has there been nothing done like this before? We don't have a clear understanding of what is going on in other leading countries around the world?

Prof. Marlin—We do. We need to start to look at some of these problems in industry specific sectors. We have had things like innovation summits and those kinds of things, but they tend to

be very broad. If you want to start engaging industry, you need to go to sector by sector. That is more the idea: try to do that, rather than do something overall. As you do that, you can then look at what is happening in other countries.

Ms RISHWORTH—We heard yesterday about universities choosing their areas of discipline or the research programs that they want to focus on. There was some general discussion about countries choosing that and how that has worked in the past, and failed in the past as well. I am interested to know whether it was emerging research where you decided, ‘Right, we’re going to pin our hat on this and choose these areas,’ or it was strategic for the area? What drove the research areas that you have chosen here?

Prof. Marlin—The way I would describe it—and I described it at the time internally—is that capability meets opportunity. It was about both: looking at where we were capable; what our strengths were, in a sense. But often strengths in university research are based on people who are about to retire or have already retired, or have left or whatever. It is not just about strength; it is also about opportunity. So it was also an analysis of where the state was going, where the country was going, and where there were partners in some sense. Sometimes the opportunity was opportunity in terms of traditional funding agencies. One of the areas is Eye and Vision, which is ophthalmology. That was purely targeted at the National Health and Medical Research Council and traditional grants.

Another area is medical devices, which you will see this afternoon. It has become crucial to Adelaide, South Australia, with the closure of Mitsubishi. Medical devices is a new industry sector and Flinders is leading that through a partnership with industry. Certainly we had the research strength and it was a very good area of research, but we could see that there was an opportunity and that, if we invested in that, we would be able to do something significant. So it varies a lot. I think Australia needs to do that. South Australia needs to do that.

One of my roles here is I chair the Information Economy Advisory Board for the government, so I advise the minister for information economy on the IT—information technology—sector. We did a basic industry plan for South Australia in the IT area last year. That is not about pure IT. It is about how IT can work with other sectors: where can we find links between information technology and the wine industry, or information technology and the aquaculture industry? How can we encourage industry sectors to get together and create new industry? I think that universities have to work the same way and, in the end, only invest in a small number of areas rather than try and cover the whole spectrum.

The comment about overseas is a good one in a way, because I think what has happened in the past is that we tend to look overseas, see what somebody is doing and then start working towards it from ground zero. That is ridiculous. We should look at where we have the capability, where there is an opportunity to do something that links up, something that is good that we can do that others cannot imitate easily, and then go for it with some investment. Certainly that is what the university has done with these areas. That has been our strategy and, as you will see this afternoon, it is working.

CHAIR—Professor Marlin, the ageing academic population is now a stated fact through the submissions and so forth, yet we are not getting the impression that the universities, although they are acknowledging that they have got this problem, have come forward with any

mechanisms or ways in which they are going to meet this inevitability. Have you got any thoughts on that? I am sorry to ask you the question.

Prof. Marlin—No, that is okay. It is fair enough.

CHAIR—The question is: whose problem is it?

Prof. Marlin—It is everyone's.

CHAIR—It is everyone's problem, I agree.

Prof. Marlin—Everyone's problem, absolutely.

CHAIR—And ours, in a way.

Prof. Marlin—Yes. 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 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. It is not easy, and I think sometimes we feel we are doing it on our own, so I think it would be good to have a conversation more broadly with the government and other parties about how we can work together on this. The two areas we propose to show you this afternoon are both led by relatively young academics who have fairly senior positions and who are good leaders from our point of view. We have not chosen them on that basis; it is just because they are in our sort of showcase area.

CHAIR—Thank you very much. It was a very interesting and valuable conversation. Can I take the opportunity, too, on behalf of the committee to thank you for hosting us here today. We look forward certainly to looking around the university just after lunch and perhaps having more of an informal discussion as well.

Prof. Marlin—I will see you at lunchtime. Thank you.

Proceedings suspended from 10.51 am to 11.12 am

BOLAN, Professor Nanthi Sirangie, Dean of Graduate Studies, University of South Australia

CHAIR—I welcome the representative of the University of South Australia, Professor Nanthi Bolan. Although the committee does not require you to give evidence under oath, I should advise you that these hearings are formal proceedings of the parliament. Consequently, they warrant the same respect as proceedings of the House itself. It is customary to remind witnesses that giving false or misleading evidence is a serious matter and may be regarded as a contempt of parliament. We thank you for your submission and now invite you to make a brief opening statement before we proceed to questions.

Prof. Bolan—Thank you very much. Firstly, I would like to thank you for bringing the rain! We desperately need rain.

CHAIR—We will take it home with us when we go back to Melbourne!

Prof. Bolan—The University of South Australia would like to thank the committee for the opportunity to contribute to the inquiry and looks forward to the committee findings on this matter of major national importance. It is clear that research trainees are absolutely critical to the health of our research and innovation system and also the knowledge based economy. They engage in the process of discovery, often supporting senior researchers move into newer and untested fields of inquiry; they engage in deep scholarship within discipline areas and, through the process of engagement and training, they develop as research educators, professionals and leaders. Higher degrees by research—what we call HDR—students contribute to 65 to 70 per cent of the research activity and 23 to 30 per cent of the research publications, so HDR students provide the linkage for education, innovation and knowledge dissemination and community engagement.

There are 11 recommendations and I just want to highlight them. (1) A research and innovation workforce road map for Australia should be developed which integrates the national research workforce requirements in specific academic discipline areas. (2) The Australian Postgraduate Award, which is known as APA, stipend should be raised to at least \$27,000 per annum and the length of the stipend should be increased to a maximum of four years. (3) It is important to ensure that any funding mechanisms associated with the introduction of ERA should provide incentives for the growth of institutional HDR activities in the areas of emerging strength. (4) There are significant opportunities to value-add to a PhD candidature through the development of both generic capabilities and specific workplace experiences which ensure that the PhD graduate is workplace ready. The University of South Australia is very proactive in developing generic capability of the candidates. I have given you a number of documents to highlight that.

(5) There should be the development of a coordinated national strategy to recruit international HDR students to Australia. (6) Australia should invest on a whole-of-country basis in at least one major international consortium. (7) Australia should calibrate its strategic research allocation to

universities against international benchmarks and move to increase the research block grant funding to 55c per dollar earned. That is what is happening in many countries. (8) Australia should set a target of doubling the number of HDR students and, more generally, set a target of three per cent GDP. The current GDPs are on 1.76 per cent. (9) HDR training is critically dependent on a well-funded research environment. Funding to the ARC must be at least at a level which allows 30 per cent success and full cost recovery. We are aware of the submission by CAPA, which is the Council of Australian Postgraduate Associations, and we strongly support the recommendations, in particular in relation to the following: increasing the number and value of APAs; providing support to enhance generic skills; enhancing employment opportunities for research trainees. Thank you.

CHAIR—I am very interested in this program that is incorporated in your research training that prepares students with skills that are necessary, once they finish their research, in the workplace. You talk about 150 mandatory hours of skill development. We have heard a lot about that. Can you please tell me a little bit more about what kinds of skills you are actually imparting to these PhD students?

Prof. Bolan—Traditionally PhD is considered to be what is known as an I-model. It is a vertical model, what we call digging deep. So we concentrate on one research activity. I came from a traditional PhD, but I believe the students should have other capabilities. One good example is communication. Communication is very important. So now we call it a T-model. So you dig deep but, at the same time, you have some lateral input. We provide training for students. I have given you the document about Research Education Support Activities, University of South Australia.

CHAIR—Yes.

Prof. Bolan—That provides information right from the beginning: how to develop your research project, how to write your research proposal, how to write a publication, how you communicate with the community, how you engage with the community. In association with Australian Technology Network of Universities we also offer a graduate certificate program incorporating all this. What is happening is informal. We want that to be more formal. It should be embedded in the PhD program so that they develop their general skills.

CHAIR—Where is the demand for this additional skills training coming from? Is it coming from the workplace? Is it coming from the changing nature of education? Where is it coming from in order for the university to feel the need to respond to it?

Prof. Bolan—There are a number of reasons. It is definitely coming from the workplace. They want general skills; they do not just want a person who is in-depth in research. That is the important criterion. In addition to that, there is the destination of the workplace. Traditionally, when you do research, you end up in the universities—in some cases in the industry, but increasingly more and more the destination is going into industries. That is the capacity they want. So it is coming from the workplace.

CHAIR—I understand the destination part of it because clearly, in some areas, PhD students are recognised for highly specialised knowledge of a particular area. Why would the general workforce, whatever that may be, want a PhD student if they can get all these other

communication skills and everything else from somebody else who is not doing research? I know the answer to that, but obviously PhD students, in addition to their research, are being asked to train in areas that are general work skills that the rest of the population are also being assessed for, but they carry with them a specialty that others do not. So shouldn't that be sufficient?

Prof. Bolan—For example, if we join an industry as a research manager, there is always a criticism that we do not communicate effectively. Scientists are poor communicators.

CHAIR—So this applies to some disciplines more than others?

Prof. Bolan—Yes.

CHAIR—So we are talking about scientists?

Prof. Bolan—Yes. There is a criticism that scientists are not good in communicating with the community, so it is important for them to understand how you communicate and engage with the community. That is why the University of South Australia is promoting what we call 'engaged PhD'. We engage with the community and engage with industry. In the health sector, if you go and work within a hospital, what are the requirements? There is a need for this in certain disciplines.

Mr RAMSEY—On page 3 of your submission you say:

These are very significant challenges given the ageing demographic of our University workforce (two thirds of Australia's lecturers and tutors are over 40) ...

Then there is a reference to a \$3.9 billion wage funding gap. Firstly, on the demographic that two-thirds of our tutors are over 40: we all understand that things are changing, but, given that you do not get to be a tutor until you are probably in your late 20s and about one-third of your work life would be on the bottom side of 40 and two-thirds would be on the top side of 40, are we actually overselling the problem? Is the problem as bad as people are saying? I look at that and think, 'Well, that's a fair reflection of that age group.'

Prof. Bolan—This is not unique to research and science areas. The reason why it is a major issue in research and science areas is because it is very difficult to attract young people into this profession. For example, I am more than 50 years old. So if I look at all my colleagues, they stay in the university, they die in the university. That is what we call 'job for life'. So age is a factor in the research community, simply because we cannot attract young people into the profession.

Mr RAMSEY—I was just making the point that if one-third is under 40, I think we are looking at our glass being a bit half empty instead of being half full. I would have thought that is probably a fair reflection. But what do you mean by the \$3.9 billion wage gap?

Prof. Bolan—This is the thing I was discussing with my colleague yesterday. My understanding is that the government is not giving the right indexing for the increase in budget.

For example, in 2000 you would have got \$1.3 billion due to inflation and indexing. We may be requiring much more than the government is providing. That is how I understand it.

Mr RAMSEY—Over what period of time has this \$3.9 billion gap developed? What are you basing that off? What is the base year? Was there a time when the funding, in your mind, reached all the requirements?

Prof. Bolan—This is in relation to the Research Training Scheme which started in 2001, so probably the base will be in 2001. We got a certain amount of funding and the government put an index into that which is not matching inflation. That is my understanding. I did raise this point with my colleague.

Ms RISHWORTH—This is a question of clarification on your recommendations. One was to avoid funding models such as those based on ERA which discourages research growth in areas of national importance. How does ERA work and how does that discourage research growth and multidisciplinary work?

Prof. Bolan—Again, I raised that question. (1) ERA is following the RQF. If you look at the RQF model, it is based on the output or outcome for the last six years. We are recommending that it should be based on the last four years. So what we are trying to say is that the outcome is based on the past achievements. The University of South Australia is a young university. We are moving into emerging areas, which ERA may not be accounting for. But it is very difficult. How do you predict the future? No. 1 is based on the previous output.

(2) There are new areas that are coming, like climate change, to pick an example, or obesity. We are trying to capture those areas. The ERA funding mechanism may not allow that to happen. Our submission for the innovation submission is output or outcome only for four years, and research income for the last two years, because the research income will go for the future. So, based on the research income, you can predict what are the new areas. That is what we meant. It should capture the future areas rather than the past.

Ms RISHWORTH—At the moment the ERA is focusing on past research over the last six years?

Prof. Bolan—Yes. RQF is for the last six years, and ERA may follow the RQF's six years, but we are not sure. It could be just four years. That is the only way you can quantify the output. You cannot predict the future. That is the reality, but we would like that to capture—

Ms RISHWORTH—More of a focus on capturing the future.

Prof. Bolan—some of the future, yes. That is what we meant.

FRAN BAILEY—Could you give us more explanation about your recommendation where you want Australia to invest on a whole-of-country basis in at least one major international consortium. Is that in terms of funding students or are you suggesting that the Australian government should be funding a certain amount to an international group? How would you see that benefiting the development of research for Australia?

Prof. Bolan—In relation to that particular consortium, that is more into a research consortium, so we would like to establish a research consortium on climate change at a global level. We have identified Canada, for example. Australia and Canada have similar populations and similar geographical distribution. Answering your question, it is in relation to research. We would like the government to fund a major consortium on climate change. How is this going to help students? One of the problems is that research is becoming a global issue and there is not much migration of students at the research level. I would like to send my PhD students to the US or Canada to gain some experience in these international global issues like water, climate change or obesity. This consortium will help that migration of students in working with other international collaborators.

FRAN BAILEY—Would you see this as a two-way process: that other countries would be following the same pattern and investing in Australia?

Prof. Bolan—Yes.

FRAN BAILEY—In a consortium that is established in Australia?

Prof. Bolan—Yes. Definitely it is a two-way process. For example, one we are suggesting is with the Scandinavian countries. They are successful in such training and research, although they may not be the top.

FRAN BAILEY—What particular area of research are you looking at with the Scandinavian countries?

Prof. Bolan—In Scandinavian countries we are thinking about IT—information technology—and engineering; for example, mobiles and communication. If you look at some of the communications, Scandinavia's countries are very successful. Ericsson phones are sold out of a small economy, so we look at communications. South Australia is successful in IT communications, so we thought that is one area where we can have an international consortium.

FRAN BAILEY—How would you ensure that Australia benefits from that?

Prof. Bolan—If it is a two-way process, we can protect the IPs. That is the only way. By protecting the intellectual properties you can provide positive training for our HDR students and if we can retain the students, we can benefit from that.

FRAN BAILEY—We have had some suggestions put to us about the need for greater international collaboration and for our students to gain experience in researching at international organisations. The suggestions that have been put forward to us in that regard have been really about increasing the amount of the scholarship fund to enable students to conduct research overseas. Your model seems to be suggesting to me that you are asking the Australian government to fund a consortium. I am having difficulty understanding how we are going to get the benefit of that. I understand protecting IP et cetera, but I cannot see how that is going to be of benefit to Australia.

Prof. Bolan—The benefit is in relation to that providing a vehicle. That consortium will provide a vehicle for students to engage in and gain that international experience for Australian

students; similarly the overseas students will engage in that and look at some of the things happening in Australia too. That is what I believe to be the benefit that Australia will gain. I am happy to provide you some written answers for some of these questions.

CHAIR—That would be useful. Thank you.

Mr SYMON—Professor, I would like to go to your submission on page 3. It talks about:

After an increase in the number of Australian students commencing HDR between the 1980s and 1995, there was a 30 per cent decrease in HDR students enrolling between 1995 and 2006.

Could you expand on why you say that has affected this university and, if possible, overall?

Prof. Bolan—Just before coming here I was looking at the number of PhD students currently in Australia—HDR students. We have something like 37,000 to 40,000 students. I do not know the reason for this particular decline because I just arrived last year. I was in New Zealand for the last 22 years. I do not know the reason for this particular decline, but that decline is affecting our completion. University of South Australia used to have a PhD completion rate of 200 students per year. Now that has declined to around 160 because of a reduction in load. Unless you have the load, you cannot have the completion. Because of the reduction in completion, we do not get enough PhD graduates for postdoctoral fellowships, so there are chain reactions happening. I took over this job just two months ago. One of my important KPIs is to increase the load, because they realise if you do not increase the load, you cannot achieve the completion.

CHAIR—Can I pitch in with a question. You said you have just come up from New Zealand.

Prof. Bolan—Yes.

CHAIR—You had been there for 20 years?

Prof. Bolan—Twenty-two years.

CHAIR—Is there a similar situation in New Zealand or a similar trend of a decline in students taking up PhDs or completing them? Has this become apparent to you, or are things different there?

Prof. Bolan—Yes. Recruiting PhD students is an issue in many Western countries. In New Zealand there is also the same problem. I am just in the process of recruiting domestic students. We do not have any problem recruiting international students. What the New Zealand government did—they were clever—was to remove the tuition fee for international students. The normal international students are paying tuition fees but they are paying the domestic students tuition fee, which is something like \$4,000 per year. The international fee used to be around \$20,000, so the government said, 'If you are international student or domestic student, you just pay one year \$4,000.' Interestingly, it is cheaper for the New Zealand students to come and enrol in Australia because they do not pay any tuition fee, but it is cheaper for the international students to go to New Zealand because we charge international students around \$20,000 whereas New Zealand charges only \$4,000. So, answering your question: yes, recruiting domestic

students is a problem everywhere. That is why, more and more, they are going for international students.

CHAIR—What does that do, though, to encourage domestic students or a generation of potential researchers to take up research? The immediate short-term solution, if it were international students, is at what cost, if any, to correcting what may be happening domestically, and that is domestic students not taking up research? Is that part of the thinking as well?

Prof. Bolan—That is a very important question. I asked my son, ‘What attracts you to your profession?’ He tells me there are three that all start with S: salary, security, status. Unless we provide that, I think it is very difficult to attract domestic students. On top of that, unemployment is only four per cent, I think, in Australia and maybe six per cent in New Zealand. To give you a simple example: when I met Cornelius, his son was doing geological engineering in Canterbury university. For his summer job, he went to Kalgoorlie. He was a straight-A student. He went to Kalgoorlie in Western Australia. They were paying him \$87,000 per year. He was working for three months and he did not want to come back. His dad had to go all the way to Kalgoorlie and ask him to come back and complete his course. So I think the reason is that we have good employment opportunities. But I totally agree with you: this is a short-term solution. We need to promote this. One way to overcome that is that Australia and New Zealand relax the employment opportunities for international students, so you build up the capability and capacity using the international students, but that is not the solution.

Mr SYMON—Professor, I would like to switch tack with the questions now and go to your recommendation 7, regarding setting up a professional body. Is there anything that operates on campus? There does not seem to be anything across universities that would represent that group. I think it is a wonderful idea. In most areas of work, there are professional bodies—whether they be unions or associations; however they are set up—that are set up to look after the interests of members of that group. That has not been implemented, I take it, by reading your submission. There are people out there wandering around with good intentions but no common purpose to make things better off for them as a group of very qualified people.

Prof. Bolan—Thanks for the question. In fact, all the questions that you have been asking me I have discussed with my colleagues. This is another one that I discussed with my research manager. For example, I belong to what we call Science in Society. That is my professional association. That is my discipline and profession.

Mr SYMON—Yes.

Prof. Bolan—So I got stuck into him. They have something called ARM—an Australian research managers association. That is a very successful one. We do not have a separate body of Australian university associations. We have the Academy of Science, which is a very successful organisation, but that is only by invitation; not like the Royal Society of New Zealand. Anybody can become a member of the Royal Society of New Zealand, whereas it is only by invitation to the Australian Academy of Science. So we do not have a professional organisation where anybody can become a member.

Mr SYMON—I would envisage any professional association like that would obviously be there and be able to advocate, on an ongoing basis, for many of the things that are in your

submission. I would see that some of the problems that we are looking at have not just appeared overnight; they have been building up in the system over many decades. Probably, sitting where I am, there has not been an overall advocacy to say, 'Here are these problems. Take them to government, or take them to various universities, and say, "What can we do about them as a group?"' It would seem that that has not been happening as a coordinated approach over many years.

Prof. Bolan—Yes. I do not know the reason why it has not happened but, with the increasing pressure in recruiting students and maintaining the profession, maybe in a hundred years time there will not be a profession called 'scientists'. You obviously have an association or a professional body for two purposes: one is to protect your profession and the other is to bargain—I do not want to use the word 'bargain'; it does not seem to be a good word—with the government and also to communicate with the community. I think it is important to have this; I think this is the right time. How we are going to achieve that, I am not sure. My Science in Society is protecting me in relation to my work. If I want to go and do a soil fertility for a farmer and advise, I have to go through my professional body, of which I am a registered soil scientist. But this one is more into the general.

CHAIR—Would you envisage that this body could also be a point of contact for younger students, who are still at secondary school, to understand pathways to knowledge and innovation and research, which is also lacking in terms of their capacity to come into contact with what they could do as a future career? It is a good idea. It seems to be addressing a very interesting area that is lacking at the moment.

Prof. Bolan—I was reading the paper for the last couple of days. It seems that union members are going to school because the schoolkids should understand the values of the union. This is just an example.

CHAIR—Yes.

Prof. Bolan—So I think that, unless we develop the culture at the school level, it is just impossible to attract students to the profession. I think this body will go all the way at the root level. This body will encourage teachers. If the teachers are not infusing that research interest in the students, it is very difficult to attract them. To go back to your previous question—how can we attract domestic students to research?—I think we have to go out maybe to child-care centres. That is where you develop that interest—at the secondary school level.

CHAIR—I agree with you: probably even the child-care centres, but certainly at secondary schooling level, yes.

Prof. Bolan—My partner was a child-care assistant, so she tells me, 'Probably you should be teaching them.'

CHAIR—Yes.

Dr JENSEN—In your submission you said that block funding should be set at the level of 55c per dollar earned. Do you know what it is at the moment? How do you actually calculate that in the first place?

Prof. Bolan—The government is giving something like 26c. I think the current level is around 20c per dollar. What we are trying to say is that, for example, we have this Research Training Scheme—RTS. My university is getting something like \$10 million per year. They have a certain calculation that is 50 per cent completion, 50 per cent publication, and 10 per cent research income. Based on that, we get only \$10 million. But we have around 800 PhD students, so, if you look at the calculation, it comes out at around \$12,000 per student. To train a PhD student, we need three times more, so what the government is giving is only 20c per dollar earned to our research income. If you look at Scandinavian countries, it is much higher. That is why we believe that we should be increasing it to 55c per dollar.

Dr JENSEN—You also mentioned that, in your view, block funding should be increased to the point where 30 per cent of submissions are approved. Do you have any thoughts about what the distribution of that 30 per cent should be? When the last person was here, it struck me that part of the problem with this whole thing is the distribution of those grants: the grants go to people that have proven effective at getting grants. People at the younger, less experienced side of the scientific continuum are not able to get those grants because they do not have a proven track record.

Prof. Bolan—I agree with him, because when I was in New Zealand we had a funding body called FST—Foundation for Science and Technology—just like ARC funding. The problem with this complicated funding is that track record and delivery are the main criteria. So once you are in the system, if you are successful in the ARC, you make sure you deliver, so that next time when I apply for that, the funding body says, ‘Yes, this person can easily deliver. I would rather give it to this person than take a new person.’ So, I think, yes, there is a problem with the distribution. Breaking the barrier for the young person to get into the ARC is very difficult. One suggestion for young people is to piggyback, so you get rid of a senior professor and become an associate investigator, so slowly you get into chief investigator.

I am new to this place. I came last year. I put in an application for the ARC Discovery grants and, right at the beginning I was told very clearly, ‘Unless you know the system, it’s very difficult to penetrate the system.’ What I did was combine with other researchers—one from Macquarie University. So I am an associate investigator. I think that is the way to get into the system. I totally agree that it is very difficult for young people to break the barrier, but it is better once you are in the system.

To answer your 30 per cent question, yes, I was unsuccessful last year and I got a grade B-plus. B-plus is the top five per cent of unsuccessful. That is satisfying. I commented to my colleagues that, in the next round, they should give to those people who got B-plus. They said, ‘It doesn’t work like that, because you get into new areas.’ I do not know how to overcome that.

Dr JENSEN—Do you think that, with the ARC—and it would be pretty much the same thing within the NHMRC—part of the problem there is that, in effect, the funding model is such that it is going to lead to research that is inherently cautious, in that if you need to ensure that you deliver, you are going to come up with a research proposal where you may not be pushing the boundaries as much as potentially you could or should, simply because of that impetus to deliver; in other words, some of the research that leads to breakthroughs is inherently risky and yet, with the ARC program it would, in effect, lead to research where you do not want to take those risks so that you can deliver research outcomes?

Prof. Bolan—That is a very good question. It is what we call ‘blue sky research’. Going back to New Zealand, they realised that, especially in basic research and fundamental research where you take the risks, you may not come up with an output. They came up with a model called the Marsden Fund. This is named after a famous scientist. I think you should have a mechanism within the ARC to be able to take risks, a breakthrough, a blue sky. In fact, there was a project talking about the social community in birds: how they build their nest. It may not have any immediate impact on the community, but that is what they taught in very breakthrough science. I think they got funding from Marsden, and I think we need to have a pool of funding for this kind of activity, and also a pool of funding for young scientists. This is exactly what the government is doing in relation to Future Fellowships. It is a brilliant idea—a thousand Future Fellowships. The government understands that, to bring back the people who have left Australia, ‘This is our opportunity. There’s a thousand Future Fellowships.’ You need to have some component for early career researchers.

Going back to your argument: yes, there is an issue. Because we have to deliver, we focus on some research which will come up with an output so that we can meet the delivery mechanism, but we may not be doing research which has high risks. I think we need to have some pool of funding. Marsden funding is \$20 million or something, so it is a very good model.

Dr. JENSEN—I have two final questions. I am after the simple answer to something that does not have a simple answer. If you could do one thing to attract secondary school students to doing undergraduate science, what would that be? The second question is: if you could do one thing to attract undergraduate students into becoming postgraduate science, what would that be?

Prof. Bolan—On the first one, from secondary school to undergraduate program in science, I would tell about my own personal experience. When my son finished at school, the school took the kids to the universities so that they could explore where there are opportunities, and I was in the agricultural faculty and I told him, ‘Please visit the agricultural faculty.’ In the evening I went home. He did not come to the agricultural faculty and I said, ‘Why?’ He said, ‘All my friends told me that there is no what you call “life”.’

CHAIR—No future.

Prof. Bolan—Yes, there is no future and there is no life. He said, ‘If you become an agricultural scientist, you will be working in a rural place and you will not be having any what they call “life”.’ For these kids, work is not the only thing in life.

CHAIR—There is no lifestyle.

Prof. Bolan—We have to tell them, ‘Look, there is life. If you do science, still there is life there.’ I think that is the message; we have to go and hammer the message. At secondary school, they are just looking for fun and life. Attracting undergraduate students to do a PhD in New Zealand we found was a problem. We said, ‘It’s not very easy to attract students,’ and one mechanism we came up with was an honours program where they finish third year in the undergraduate program and you give them a scholarship of \$17,000 at fourth year. The moment you bring them to the fourth-year honours program, they know they are getting some money. Then they have a taste of money and a taste of the research. Now they know, ‘Yes, I can go to research and then I’ll be earning \$40,000.’ There is some money there and there is funding. So I

think one way to encourage undergraduate students to come to research is to have an honours pathway with a good attraction of a scholarship. So at my university, Massey University, we introduced a lot of honours scholarships. Seventeen thousand dollars is very attractive to a young third-year graduate. If he goes to Oxford, he may be earning \$30,000, but he has not realised that. You are providing mere bait, to be honest. You bring them here, and then they enjoy the research. I think this is one of the approaches we should be taking. That is my answer.

CHAIR—Thank you.

Prof. Bolan—At the University of South Australia we have a lot of honours programs at the regional level, but we want to bring that to the university level—a very prestigious honours scholarship.

CHAIR—Professor, it is probably unfair to ask you, who have only been in this country for a couple of years, but maybe you have the benefit of a different perspective. I want to refer to the so-called ‘war for talent’. Australia is a very wealthy country; I think we are one of the wealthiest countries in the world. We have obviously had the benefit of successes in medicine and science. Our education system, we feel, is pretty good, but it appears that there are some serious problems. Are we just resting on our past successes and laurels at the expense of the next generation and the quality of our education by not investing enough in our education system to address, obviously, some of the problems that have suddenly emerged but have been in the making for some time? Are we not putting enough money, as a wealthy country, into our education system and therefore our innovation and research and everything else that follows?

Prof. Bolan—I think if you look at the GDP, we support something like less than two per cent. I did my PhD in the University of Western Australia. I was in Delhi. I was looking for an opportunity to go overseas, so I looked at the important Western countries. I could not get a place in the US, so I came here. A good example is that now we want to attract a lot of students from IITs—Indian institutes of technology. A very prestigious one and the one that most of them would like to go to is the US. That is their destination. If we want to bring them here, we need to engage them at undergraduate level, so what we are trying to do is provide them a vocational scholarship. You bring them here. You tell them that the University of South Australia may not be as good as MIT, but we have certain other strengths which are better than MIT. We bring them for a vocational scholarship and expose them to the area, so then we can easily bring them back. So, answering your question: yes, unless we increase our investment, it is very difficult to maintain that war for talent. It is very competitive. Yes, we should be investing much more. Being a wealthy nation, we can afford it.

CHAIR—Thank you very much, Professor. It was very enlightening. I can say that on behalf of everyone on the committee.

[12.02 pm]

RUSSELL, Professor Richard Alan, Pro-Vice-Chancellor (Research Operations), University of Adelaide

CHAIR—I welcome the representative of the University of Adelaide, Professor Richard Russell. Do you have any comments to make on the capacity in which you appear?

Prof. Russell—Yes. I am also the Dean of Graduate Studies at the University of Adelaide.

CHAIR—Thank you. Although the committee does not require you to give evidence under oath, I should advise you that these hearings are formal proceedings of the parliament. Consequently, they warrant the same respect as proceedings of the House itself. It is customary to remind witnesses that giving false or misleading evidence is a serious matter that may be regarded as a contempt of parliament. We thank you for your submission and now invite you to make a brief opening statement before we proceed to questions.

Prof. Russell—Thank you very much. It is a great pleasure to be here. I feel considerably odd at having put in such a brief submission, but I was glad to take the opportunity to come and talk with you because there are a number of very basic points which I would like to make to the committee. Even if you have heard them 50 times before, the 51st time, I think, might be useful as well.

The first point I would like to make is that Australia never sits alone in the world. This committee sitting here is undertaking a task which is going on elsewhere in the world at the moment. Within the European Community they have just set up a whole complex committee to review the issue of doctoral education across Europe. That will impact on us undoubtedly, one way or the other. So your role is really part of a global exercise now in looking to future education.

The second point I want to make is one which I feel very passionately about, and that is not just because I hold a PhD. I think, unfortunately, in Australia PhDs are often devalued. If you look at the number of PhD graduates we produce per 100 university graduates, if my memory serves me correctly it is in the order of about three. If you look at Germany, it is in the order of about 10. It is very interesting that most people tend to think, quite wrongly, that PhDs are people who lock themselves away in a back room, put on a white coat and do not interact with society. The reality of life is quite different, however, because 50 per cent of PhDs—certainly those who graduate from the University of Adelaide—never come back into academia to work as academics. They work elsewhere. Certainly, studying what is happening in Europe, you will find that many big companies—newspapers right the way through to automotive manufacturers—have top directors all of whom have PhDs. Their CEOs have PhDs. That is really important,

because I think it does relate to some of the questions you were asking my colleague, which I might return to later on, about how you educate people for a PhD.

The other really important point relates right back to my opening statement: that we are in a global marketplace. This very fortunate country of ours now has to work harder than ever to attract the best brains, and I emphasise ‘the best brains’. We as a nation do not want to collect second-rate brains; we want to foster the best that we can. If you look at what is happening to the north—and I have recently come back from China, so I am very attuned to this—you will see that countries that we saw as being developing have overtaken Australia remarkably in the research environments they provide. You go through the National University of Singapore. Go through some of the big universities in China. What they are doing is staggering. There is a very clear message in that, I think, for Australia, and that is: ‘Watch out, Lucky Country, because before long we are going to come and take your best brains.’ I think it is really important that we understand that.

A decade ago I was laughed at by a large number of people when I predicted that my children’s children would probably go to Asia to be educated. Everyone thought I was completely potty. But I do not think they are laughing quite so loudly now. There are some very real challenges out there that we as a nation must face, and if we do not do it then I think the work of this committee, no matter how hard it applies itself to the task, will largely have been wasted.

The other comment that is perhaps worth making, even though it is somewhat more general, is that we are a small country in terms of population but, if you look at our universities, by and large they have a good world standing. My own university I think is ranked about 100 on the Jiao Tong index. You might say, ‘Well, 100 is not very good,’ but if you look at the population of South Australia, you suddenly realise it is remarkably good. And, yes, I know the University of Melbourne ranks higher, and I accept that, but the point is that we have, over the years, as you were saying earlier on, built up an education system which is really quite impressive. Australian doctoral graduates have always been highly regarded around the world. They have been sought out as postdocs.

We need to preserve that, but we also need to make sure that we maintain our universities to be at least world recognised. I do not expect—and I have said this to my own vice-chancellor—that the University of Adelaide is going to leap 100 positions and suddenly bypass Cambridge or Oxford. That is not practical. But it is certainly our intention not to drop back from where we are, because we see that as important not only to the country and to our students but also to the state. Education to this state is important, just as education is important to the whole nation. There are a range of broad things that I thought were worth bringing forward. Most of the detail that was put in through the deans of graduate studies revolves around those key points: what sorts of things might be done to try to move these higher agenda items, to let the government get the best value it can for the dollar? One is always conscious that governments, like universities, have finite buckets of money and it is easy to spend everybody else’s money but much harder to spend your own. That is perhaps sufficient in the way of opening comments. If there are some questions, I would be happy to try to answer them.

CHAIR—Is there anyone who has a question first up?

Dr JENSEN—Yes. I might ask the same one-liner questions that I asked the previous person giving evidence—that is, if you wanted to attract a high school student into doing undergraduate science, what single thing would you do, and then the same question as to attracting a science student who is near completion of undergraduate studies into doing postgraduate studies.

Prof. Russell—Let me give you a cynical but, probably nevertheless, honest answer to the first question. If I ever became Prime Minister—which heaven forbid—I will not, not having the intellectual capacity to do the task—I would say that the only way you will ever get more students interested in science these days is to make sure that the salaries go up by a factor of about three and that there are some proper career structures in place. I hate giving you that answer and I will tell you why: because I am a scientist. I am a chemist by training. Amongst the various things I have done in my life is collect prizes for teaching, so it hurts me to be honest and say that to you. But when you talk to young people today, they are conscious of where their career is going; not all of them but a significant proportion are conscious of where their career will lead them. They will look to see what career prospects they have and what money they will earn.

To answer your second question I will be somewhat less cynical because I think there you can do things. My experience of students coming to university is that when they come into uni they have one ambition—that is, to take out their first degree. I was an example of that. It is only when you get into university that you begin to understand that there is a lot more that goes beyond just a bachelor's degree. Science students become involved in research as they progress through their bachelor's degree; they begin to understand. Many of them find it attractive and when they get to the end of their third year, they will go on to do honours.

This is a peculiar aspect of the Australian education system. It is one of our great credits and one of our great problems because no-one else understands it, but that honours year is a taste of research. It says, 'Put your toe in the water and find out whether you like it.' The point that my colleague Professor Bolan was making was that that is a critical year because, in making that decision, you have almost won their soul; but not quite. Having good financial support for honours students is a worthwhile exercise.

Universities are good at spreading the gospel. They can all enthuse students about science but at the end of the day, when you have been at university for three years and you see the opportunity to go and get a job, \$50,000 starts to look attractive. Probably providing some scholarships to get students to go on is a worthwhile thing, and most universities do try to fund those themselves. Again, it comes back to a finite bucket. They are interesting questions and quite different, I think, in their solutions.

CHAIR—Just on that issue, as a teacher myself—so I will make life harder for you, too, by asking you a question—it is becoming obvious that in this entire inquiry you cannot exclude the role of secondary schools or teachers. I agree with you that they get paid a pittance and have to constantly fight for the right to be paid at a level which should be acceptable to not only their place in society but to the role that they have in terms of educating children. So, obviously, our problems go further, and I would like you to comment on that because that is emerging as a key issue in trying to rectify a problem within this country which is, as I said to a previous witness, a wealthy country. It has the capacity to get the best out of everybody, if it chose to do so, in a proper and targeted way.

Prof. Russell—I have no expertise to talk about secondary education. The best I can do is give you a personal opinion which is based on my own life's experience. I ended up doing chemistry because I had a chemistry master who was inspirational. Full stop.

CHAIR—It always goes back to that, doesn't it?

Prof. Russell—It really does. The tragedy that we have now in this country is that scientists, mathematicians, who you would dearly love to teach in our schools, no longer see this as attractive.

CHAIR—Other disciplines as well, I would imagine.

Prof. Russell—I am sure. I cannot venture out there, but I am sure you are right. From time to time various ideas come up internationally and nationally that you will pay science teachers more, mathematicians more to go and teach in schools. It does not seem to make the problem go away, though. It is a very vexing problem.

Dr JENSEN—One of the things that is being alluded to here is the issue of the status of teachers. That is quite a nice segue into my question that I was going to ask—that is, what do you think we can do about the status of scientists, because certainly in my view the status of scientists today is not what it once was and therefore part of the problem with attracting people into science is that issue of status.

Prof. Russell—It is an interesting question and I do not know that I have an immediate answer to it. Society has moved in my lifetime and it has placed more and more value on the concrete and on the dollar than it has on the intellectual.

CHAIR—Yes.

Prof. Russell—We are probably less intellectual as a nation now than we were 50 years ago, in terms of thinking, and that is a problem for us because you look at the countries we have bordering us to our north. They value education more than we do. It is difficult. It is a confused area, I think, because scientists will argue amongst themselves, which is what they are supposed to do, but the public do not understand that that argument is part of the scientists' job. They see it as the fact that they do not know or they want to make the issue more complex. It is very hard. But I think there is also another side to your question. You ask what can you do, which is a good question.

There have been some changes in recent times and I think scientists and engineers in particular have become more open about the way that they interact with society. Here in South Australia we have a whole organisation that deals with helping to get scientific information out into the media. That is very successful. So it is about trying to get the message across in language that is understood by the layperson because every discipline—it does not have to be just science—has its own gobbledegook. It really is about things like that that help to get the message out there.

I always say to students when I talk to them—because I, like you, like to think that I can enthuse young students to build a career in science—'You don't have to spend all your life

wearing a white coat. There are a lot of other things you can do.' I do not know that this message always gets through at school. I have not touched a test tube now, heaven forbid, for six years. I sadly miss it, but I still manage to keep myself pretty well occupied, I hope.

Dr JENSEN—You can even get into politics.

Prof. Russell—It is possible. But it is a two-way street. I do not think there is a panacea that will make it better.

Dr JENSEN—Thank you.

Ms RISHWORTH—I wanted to come back to the honours year. I am trying to think of what other things, other than just scholarships, might make it more attractive or interesting. Certainly I found that, when I did my honours year, being linked in with a larger area of research within the university was useful but other honours students did not have that same experience. So what can you see other than scholarships? There is also a HECS incurred with honours.

Prof. Russell—Yes, there is a HECS issue.

Ms RISHWORTH—I was wondering if there were any other things that you think could make the honours year much more attractive, (a) to do and, (b) to then lead into PhD and research?

Prof. Russell—It is interesting to hear you talk about your honours year. You hit a couple of chords immediately that I hear from my own children and from students. The honours year is an interesting beast because there is a big difference between doing an honours year and doing a PhD. Not only are they intellectually different but they have a different temporal aspect to them.

You will remember, I am sure, your honours year—what it is like the week before theses are due in. Anyone who has ever taught or been part of the system knows what it is like. It is purgatory on wheels. That can be good and it can be bad. I think you have reflected on the fact that you had a good experience, but I am fairly sure that some students find that pressure to be too great. My guess is that over the next few years we are going to see some very dramatic changes which are going to challenge us in this country, because I think that that honours year—which is, as I say, largely peculiar to Scotland and Australia—will probably morph into a master's degree.

There, again, are some challenges because it is two years instead of one, but one great advantage with two years is that it gets rid of that terrible compression. Whilst sometimes commercialised research is compressed to meet deadlines—and it is important to understand how to meet deadlines—a lot of other research is not entirely open-ended, but ideas come in the most marvellous places. I always like to get on aeroplanes: I hate the damn things in one respect, but at least it is quiet. You can think.

I am sure all of you have had these experiences when all of a sudden an idea comes into your head—whilst standing under the shower, for instance. Research is a bit like that. People talk about wanting to strategise research. That is what they pay me to help do. Yes, you can do that, but there also has to be that willingness to pick up that one piece of serendipity that will come

across your desk in a day and say, 'Now, that's worth thinking about,' or, 'That's worth pursuing.'

To go back to your question—and I do digress, I am sorry—if we see a transition towards masters degrees as early training for research, I think that will ease some of the pressure. Of course, it raises financial problems for the government, but I am pretty sure that is what is going to happen in Europe, and it sort of happens de facto in America but kind of the wrong way around. The best indicator of research ability is really to get someone to do something, no matter how big or how small, and see what they come up with.

In the United States, when they want to assess students largely for their research capacity, the first thing they do is run through a couple more years of coursework. We pull their leg a little bit about that. But grade point averages do not tell you with great precision how well a person is going to develop as a researcher, because it is a different style of learning and it is a different set of networks that you use in your mind. So that honours year is critical. Whether it be a one- or two-year master's degree, it is the best indicator of a poor bunch that you will find shows you the way forward to predict PhD outcomes.

Ms RISHWORTH—Do you think that, if you were doing an honours/master's degree over two years, it would result in better research but also more translation in terms of publications and things like that?

Prof. Russell—Yes. I certainly think it will result in more output, because you, again, would know from your own experience that the number of honours students who can write a paper at the end of their honours year is probably only about 20 per cent. It is a pretty impossible task to start with a blank piece of paper, learn the process of doing research and then still have enough outcomes to write up a paper. There are exceptions to that. Yes, I think it would have better outcomes and it would probably see a better flow through into doctoral learning. That is certainly my view anyway.

Ms RISHWORTH—Thank you.

FRAN BAILEY—Professor Russell, I want to go back to your opening comments and the importance of what is happening in the rest of the world. I know that you were present when the previous witness was discussing the concept of funding this international consortium. I would like to get your views on that. As you rightly said, the work of this committee is vitally important, not just in making it more attractive for domestic students to increase the knowledge base and therefore for us as a nation to benefit from the application of that but making sure that Australia does not fall behind the rest of the world. Could I invite you to comment further on that concept. Perhaps you have some other suggestions yourself.

Prof. Russell—I will try. I have to admit that I have not read Nanthi's report, so I am not entirely familiar with what he is asking for. That is my fault, for which I apologise. I think that the real crux of all this is probably solved in a relatively simple way, because at the University of Adelaide we do try and encourage our students to go overseas. We would like them to have an overseas experience as part of their PhD, and you know where, of course, the finite limit is. It comes down at the end of the day to funding: how many can you afford to send away?

There are various mechanisms that are already available that the government supports: the Cotutelle mechanism, where students can spend half of their time working in an Australian university or half of their time in a European university, and they get a joint degree at the end of it. There are mechanisms there which universities can manage. The government provides some funding into the Cotutelle scheme, particularly with France because the French government puts in matching funds. I think to a large extent the opportunities are there for PhD students. The problem is, of course, having enough money to ever say, 'All our PhD students will go away.' Perhaps you do not even want to do that, because some of them do not want to go.

I am not quite sure what more we could build that we cannot build already. Having said that, there are areas of infrastructure where I think the federal government does need to put in financial support. There are global networks already in existence. Most of you probably know, when you look at our own synchrotron, that on a global scale it is a very nice piece of equipment, but there are some bigger ones elsewhere. For many years the government has funded Australian researchers and research students to go to Switzerland and places like that to work. There are lots of networks there. Because of my ignorance about what was in the paper, I am not sure what more we would achieve by creating another one.

There are lots of mechanisms to get students to move around. Most of them, of course, eventually come back to the university and say, 'We want some money to do it,' and that becomes an interesting challenge. We have to sit down and rank them and say, 'You, you, you and you will go.' It is very important, you are 100 per cent right, because we want our students to see what is going on overseas, just as we want overseas students to see what is going on here, and there is nothing like a three-month period working in another lab to find out what is going on—stem cells and things like that. There are advances going on all around the world. Each country has different advances and has different approaches. If you were thinking about putting money forward, I would say facilitating movement of students for short periods of overseas study is probably very much to the national benefit.

FRAN BAILEY—Thank you.

Mr SYMON—Professor, I note in your submission you touch on competition in the mining industry affecting universities' ability to attract domestic research students and I also note that that would seem to come down initially to a money proposition. We have certainly taken plenty of previous evidence about the level and length of APA stipends. Are there any other issues that would go with that beyond money? Further to that, has there been any thought given to sharing that position between an industry position and a university position, whether it be over a number of years or part time? Has there been thought given to that, or is this just an idea that is fermenting in my own mind?

Prof. Russell—No. We think about these things all the time; perhaps not always as clearly as you do. We are always looking for ways of finding new partnerships to promote things, and we do have students who spend quite a lot of time working out in industry. Is there anything else other than money? We will certainly keep looking. I think it is just a sign of the times, but the point that really comes out of that is that this country needs mining engineers right now. Those people are going to move on. They are not going to be underground or in an open-cut mine all their life. They are going up to management. So we need to keep replacing them. Because there

are a relatively small number of these people, of course they get sucked out of the university system almost before they graduate.

The answer is not to throw megabucks at it and say, 'Well, we'll offer you \$100,000,' because no-one is going to do that, but there are great opportunities to bring in talented students from overseas who bring all sorts of interesting skills. That is one of the dilemmas at the moment. We have not yet integrated our thinking into the global world of academia. I am sure you are trying and I am sure everyone has harassed you about it, but a brain is a brain and we are in the business, as I said at the beginning, of getting the best ones.

For us at the moment we try very hard to recruit top quality engineering graduates into PhDs, and in some parts of the world they are still very happy to do this, because they do not have the world's largest hole sitting right up to their door. The real answer is to look at it globally and to say, 'We welcome brains from anywhere who can come here and make a significant contribution.' Some of them, we hope, will stay in this country, but not all of them, because some of them genuinely need to go home if their own countries are ever going to develop.

Mr SYMON—I could certainly see that is a problem in mining with our own: once they get into that area, that is most definitely a global business. If you are employed by a multinational miner, you may spend a couple of years in the big hole in the north of Australia, but be equally then dragged off to Africa or somewhere else and maybe not come back here for a vast number of years.

Prof. Russell—That is true.

Mr SYMON—By which stage, I think, it would be beyond that person to ever want to come back into a university scenario after being outside it for so long.

Prof. Russell—That is very true. Let's go back a little bit. That question you asked actually links back to the question that Dennis was asking earlier on about science and scientists and how you get them. We focus in on our own country quite reasonably, because that is where we see a lot of our investment going, but there are people outside of Australia who see the world differently.

There are still lots of young people globally who think that doing science is a great thing to do, and I have this deep hope somewhere inside me that that will never change. If that never changes then we are probably okay, as long as we interact and bring these people to our shores.

Mr SYMON—Thank you.

Mr RAMSEY—Professor, what is it about our culture, our society, that no longer values the higher degrees, as they once were? You said it has changed in your lifetime and we would probably all agree with that. Other countries still place a high value; industry places a high value; even respect across the community. Where do you think we have gone then?

Prof. Russell—It is a hard question to answer, but overall the enthusiasm around the Western developed wealthy world for extended periods of study has diminished. People have seen that there are other things you can do.

CHAIR—Victims of our own wealth.

Prof. Russell—In a sense I think we are. These days I talk to my own children, as I am sure you do, and they have a different view of going to work. It is quite different to the view that my generation had in this country.

Mr RAMSEY—An unfortunate side of the universalisation of education is that we have made it available to everybody across the spectrum. To some extent, everybody can access it, regardless of their background, even though we know there are some financial penalties in there, and people no longer put those that have achieved degrees on a pedestal in our community. That is a Western phenomenon; I cannot change it. In countries that still place a very high premium on education, it is seen as an absolute privilege; it is not seen as a right.

CHAIR—It is also a cultural thing. We have a culture here, strangely, which does not necessarily hold academics and people who are gifted in that way in high esteem, and yet if you look at Europe there is a tradition of academics being very important people and having very important things to say and contribute to society. The issue of attitude and culture has come up in a number of submissions and there is something about the way we view education generally that at the moment is not allowing us to hold it up in the way that it should be, in order to then go on and compete in the global community, as well as this war on skills or whatever.

FRAN BAILEY—We do not make heroes of our scientists the way we do our sporting people, for example.

CHAIR—We do not. We do not celebrate our academic successes.

Prof. Russell—I had better be very careful what I say. I hear what you are saying. Even in the last week, if you flick the television on, the first thing you will hear about is Beijing and the second thing you hear is, ‘Well, how many medals are Australia going to win?’ Then there is the argument, ‘Are we going to have more than we had last time or are we going to have less?’ You do stand back a little bit and think, ‘Well, yes, but is that really what is going to drive us forward in the future?’ Yesterday someone said we should be investing more money in sport. I have no problem with sport.

CHAIR—Who designed the bathing suit? It was probably a scientist, wasn’t it?

Prof. Russell—I have no desire to take on Australia over its sporting interests. It is a national characteristic. But I do honestly agree that there is some real scope to try and elevate a few other things, if we want to stay and keep our lucky place in the world. How you do it, I do not know. It is largely about communication.

As for your point, Rowan, you are dead right. When I went to university, we were a very small minority who were fortunate enough to go there, and you knew that you went there with one aim in mind, and that was walking out with a degree. It has changed. Part of that is due to society, part of it is simply due to the pressure of the world—that we need more and more educated people. There is demand for university graduates to run an increasingly complex technological world.

I try not to go back and remember the good old days because I am not really sure they were always the good old days. I would rather look forward and ask the question: 'What can we do as a nation?' We will, I suspect, in reality have a long fight to elevate the status of scientists and academics. I would love to think that we could do something about schoolteachers, but that is an even tougher job. It is really hard now, but that does not mean to say that we should not try.

CHAIR—It is a good thing that we have made education available to more people, because somewhere out there in a disadvantaged area there is a brain that is waiting to be developed.

Prof. Russell—That is absolutely true.

CHAIR—Money seems to be underpinning a lot of the issues that we have discussed here—investment from government. But what is your view in terms of investment from industry as well, given that it is industry in many ways that is the beneficiary of a lot of our brain capacity? Do you see a role for a coordinated long-term investment in education and in research from industry?

Prof. Russell—The standard answer is that industry pays its taxes; therefore it is a government responsibility.

CHAIR—That is the standard answer.

Prof. Russell—Yes, that is the standard answer.

CHAIR—They make a lot more money, too, than they pay in taxes.

Prof. Russell—It is not entirely true. My own university has very close contacts with some very big companies and they are in fact extremely generous, not necessarily in terms of giving money to students, although they do provide a lot of scholarships one way or the other, but in terms of university infrastructure and things like that. It would be totally wrong of me to walk out of this room and leave the impression that we were all desperate for a penny and no-one ever gave us one.

CHAIR—Sure.

Prof. Russell—There is a very interesting model to be explored between industry and government as to how you fund us, because it is very nice to have a constant supply of well-educated people that you can employ. In some other parts of the world, it does not quite work like that. It is an interesting thing to explore but, again, we will have an interesting culture shift in getting there. The real crux of the matter is, irrespective of the mechanism—and we can debate the mechanism until the cows come home—the one thing that this country has to understand is that investment in young people, particularly the brightest of the young people, is our future. If we do not invest in them, we do not have a future at all. Global climate change or none, it is the most important thing any country can do.

CHAIR—Thank you. That was a very provocative discussion. Some of the issues that are coming forward are controversial potentially but if you are going to do justice to an inquiry like this you have to discuss all issues, irrespective of the controversy that may arise. Thank you very

much and we will persevere with our inquiry. We hope that you maintain an interest in what we are doing and we hope to be able to catch up with you again if we have to.

Prof. Russell—Thank you for the opportunity to come here. I shall anticipate your report with great interest. I shall look forward to it. Thank you very much.

[12.41 pm]

KIMURA, Mr Jun, Postgraduate Student, Flinders University

MANICOM, Mr James, PhD Candidate, Flinders University

MUECKE, Mrs Sandra Elizabeth, PhD Candidate, Flinders University

SPRICK, Mr Cyle Duane, Postgraduate Student, Flinders University

CHAIR—I now call Flinders University postgraduate students to give evidence. Although the committee does not require you to give evidence under oath, I should advise you that these hearings are formal proceedings of the parliament. Consequently, they warrant the same respect as proceedings of the House itself. It is customary to remind witnesses that giving false or misleading evidence is a serious matter and may be regarded as a contempt of parliament. We thank you for your submission and now invite you to make a brief opening statement before we proceed to questions. James, perhaps you would like to start.

Mr Manicom—I just had a look at your terms of reference. I am obviously a foreigner from Canada so I am not sure how much I can contribute. I had a few thoughts that will not take too much time regarding the second group of terms of references as to the challenges Australian universities face in training. I heard the tail end of the last witness and it seems to come down primarily to funding; funding in terms of, instead of structures, creating opportunities.

Adequacy of training support: more money would be helpful. Factors for graduates that determine pursuit of a career in research: it is about money compared to other opportunities, whether it is in industry or elsewhere. Opportunities for career advancement: more funded positions at universities; again, more money. Factors determining pursuit of research opportunities overseas: is there more money overseas? I am sorry, it is like a broken record but, as far as I can tell, it seems to come down largely to funding. Where the funding comes from, whether it comes from you guys or from industry, I do not think makes any difference to the average postgraduate student; but it comes down to money. That is the crux of what I have to say.

CHAIR—Thank you.

Mr RAMSEY—Chair, could I just ask if each student would mind telling us what area they work in.

Mr Manicom—I am in the social sciences. The reality in the social sciences is that there is a perception that there is little opportunity for full-time work, period; much less advancement because of the number of academics that stay in work. The trend of baby boomers retiring does not seem to affect academia for a variety of reasons. My suspicion is that academics like myself have egos and it is nice to stay in an environment where you are getting paid and where people

listen to your views, so there is little retirement incentive for academics. The result is that there are increasing numbers of postgraduate students who finish their degrees, become PhDs and do not move on to full-time employment; they may move overseas. That is the reality in my faculty.

CHAIR—I am sorry, I should have made it clearer. In your opening remarks—sorry, James, because I did not give you that direction—could you tell us what you are studying; the fields that you are studying in; what your status is, whether it is full time, whether you are an international student; perhaps why you chose to do a PhD and how you are supporting yourself during your studies—is it a scholarship that you are studying under?—and what you would like to do on completion of your PhD. Just refer to those areas in your opening remarks, then we will go to questions and tease out some of the other areas that I am sure will be of interest to you as well.

Mr Kimura—First of all, thanks for giving me this opportunity. It is interesting and definitely the first time. I have no idea normally about public hearing systems. Even with my Japanese background I have not been in this sort of public hearing before.

I am a PhD candidate on an Australian government scholarship called Endeavour. In 2007 I got this scholarship. Before this I did my master's degree in maritime archaeology in 2006. Now I am nearly finished first year of my PhD candidature. My topic is East Asian maritime shipbuilding technologies. One of the reasons I selected this university and Australia is that one of the Australian researchers in South Australian Maritime Museum has done a lot of work; I can say, more than East Asian researchers. This is interesting for me because people easily think in the field of archaeology, 'Local researchers are familiar with local topics.' However, in the academic world, in theory or methodology, some researchers in Western countries in universities are more familiar with local topics. About my program, could I elaborate a bit, just give an introduction?

CHAIR—Certainly.

Mr Kimura—This is the program I have been on. My field is unique in terms of general things. The flyer is also important, I think, because one of the reasons I selected Flinders University is that four years ago, when I started my master's degree, Flinders University clearly showed the detail of the contents of the programs on the website at the time. Maritime archaeology is popular, getting popular, but other universities did not clearly show information about what they would provide in the future.

CHAIR—Thank you.

Mrs Muecke—I am a fourth and final year PhD candidate. I am in the department of critical care medicine in the faculty of health sciences. I have been a full-time student up until last week. I am now a part-time student because my scholarship has run out and I am getting no money whatsoever now and am completely reliant upon the charity of my family to support me through the rest of my candidature. I will get back to that in a minute. To answer your other requirements, my study is involved with looking at prehospital management of blood pressure following severe traumatic brain injury. I hope to improve the current resuscitative protocols used by prehospital care providers when they are looking after gravely ill patients before they arrive in hospital.

My particular focus is on the rural and remote patients who have extremely long prehospital times. We talk about the golden hour. These patients have a golden half-day or even longer and we know from previous studies that patients who have low blood pressure immediately following a traumatic brain injury do very poorly, but we also know that if you have a brain injury outside the metropolitan area your outcomes, functional and mortality outcomes, are a lot worse than metropolitan patients. So I am trying to look at ways to improve the management of resuscitative procedures for these patients: for the rural and remote patients in particular but obviously it will have spin-off for the metropolitan patients so that they can have better functional and mortality outcomes. Did you want some more detail about what I am doing or can I make some comments now?

CHAIR—What would you like to do on the completion of your PhD?

Mrs Muecke—I have a couple of things I would like to say. I was interested in the statements of Professor Russell. He talked in a bit of detail about how the PhDs are devalued. I would like to agree with that statement. I would also like to quantify it by saying that I think that the PhD candidature itself is devalued but I am very pleased to say that I think in Australia the actual qualification is not. I think that the qualification is highly regarded amongst employers in Australia and overseas, but the nation certainly devalues the experience or the candidature itself, and that is clearly reflected in the stipend arrangements, which I am sure you have heard about ad nauseam.

From my own experience, I was fortunate enough to get an Australian postgraduate award scholarship, but not all students even get that. There are a lot of students who have no money at all. My scholarship lasts for three years, with an option to extend it for six months at the end of that time. Flinders University fortunately have been very generous, and it is just a matter of filling in a form to get that extra six months of scholarship, but I do not believe it is the same in all universities. Sometimes it can be difficult to get that extra six months.

My six months expired as of 1 August, and I have been forced to go into part-time PhD candidature now and I am also now forced to find employment. This is all dragging out my PhD because I have to go part time. I also have to start working part time, because I am completely reliant on the charity of my family in the meantime. As you can imagine, it is not a very nice experience knowing that you cannot contribute. In fact, you are negatively contributing to the family.

You can look at it simplistically like that but also you are trying to get quality researchers doing quality projects. You cannot do a quality project when you know that your bread and butter is about to run out. A cynic might suggest that perhaps PhD candidates really do rush through projects—that they probably could have been done better or further exploration could have been carried out—but because of the inevitable drying up of the essential scholarship funding and limited resources, the opportunity is not there for PhD candidates to necessarily fully explore their topics.

Sure, some faculties and some departments are able to offer additional support, but by and large I do not think this happens. It is very unfortunate that the stipend is set up like it is. I do not know the numbers, but I doubt whether there would be many students that would complete a PhD within three years. At the very least, even if the stipend was not increased, as in the weekly

payment, it would be useful to have it be automatically 3½ years with an extension to four years. Realistically, in terms of the number of students that complete it in three years, when your funding dries up, they do not match. As I say, even if the amount you get in your pocket each week does not increase, which is totally inadequate anyhow, because it is a three-year scholarship it does not encourage students to fully explore their topics.

Dr JENSEN—Are you still conducting research or are you just doing write-ups?

Mrs Muecke—I am doing both. Because the part of my study I am doing at the moment, which is the very last part, is being conducted in a prehospital environment, I work through the intensive care unit at Flinders Medical Centre. Data is being collected during retrievals of patients, mainly from outlying hospitals at the moment. As you can imagine, data collection is extremely unpredictable and extremely difficult to conduct. Even if you are lucky enough to have an eligible patient, given that they are very critically ill patients, they are not always able to be recruited. So the data collection is taking me longer than I thought it would. If you look at it from the point of view of the stipend arrangements, it is very unfortunate for me, but that is the way it goes. I really have no choice.

I have fortunately been able to write up everything else I have done, so I am just trying to tie the two together. I would hope to be submitting it by the end of the year at the very latest. But that means six months without any money coming in and, as I say, I am now actively looking for part-time work. It does make life a little tricky, yes.

CHAIR—We will come back to some of those issues that you have raised.

Mrs Muecke—Thank you. And you, Mr Sprick?

Mr Sprick—You can tell from my accent that I am not from Australia. I am American. I did my undergraduate studies at Carnegie Mellon University in Pittsburgh and worked for an aerospace contractor for 10 years after that. I moved to Australia in 2000 and have worked as a paramedic through that time. My eventual long-term goal is to do robotic or powered prosthetics research. I have been interested in that since I was a small child.

I did the engineering thing and worked for a NAS contractor. I got my paramedic certification and did the medical thing for a while. I seriously considered doing med school and then met Professor Owen, one of my supervisors here, and he asked me to do some projects for him. I got introduced to the folks in engineering and decided to take that route. Instead of the medical route, I decided to take the PhD route in engineering.

From some of the things that have been said before, I think there are two aspects to it. One is the passion for engineering and the passion for science, and you have to have that. If you have that, then you will go to any lengths to do what you would like to do. You will suffer through a stipend and the small pay and the lack of recognition to be able to do the things you love, but you are suffering through those types of things and it does not make for a completely pleasant experience.

I am at the end of my PhD now. I am in the last stages of writing up. My topic is medical simulations, so it is not completely within my area of expertise. Currently you do medical

training in one of two ways. You can use a mannequin, or a dummy, to train on, and those have gotten fairly technically sophisticated in recent years, but when you come down to it, it is still a lump of plastic sitting on the bed that you are trying to interact with, diagnose and treat. The other way that it is done is to use what they call a standardised patient, who is an actor who is trained to portray an illness or an injury in a particular way. The problem with that is that they are not really sick. So you get all the good interaction but you do not get the physical signs that you need to be able to diagnose them properly.

My project is to take the smarts out of the mannequins and to put them in the tools that are used. For example, in relation to a stethoscope, instead of having the speaker in the chest of the mannequin that you listen to to hear breath sounds, you put the speaker in the stethoscope and then you can hear whatever breath sounds there are on whatever patient, whether it is a mannequin or an actor. You do that not only for a stethoscope but for all the tools. Anything that you hold in your hand that you use to help diagnose a patient, you simulate those tools to provide feedback to the student.

That is what I have been doing and I am in the last stages of writing up. I was a full-time student up until 1 July, when I took full-time employment with the university in the school of medicine, teaching and doing research on simulation. Eventually I hope to get back into engineering and do some more work on powered prosthetics.

CHAIR—Thank you. Obviously all of you are either in the process of completion or have completed. The obvious question from me to all of you is: now that you are staring at the future, what do you see for yourselves in terms of the work that you have done and your commitment in that research? What are your future prospects? Cyle, you made some references to where you want to go. Sandra, James and Jun, if you could elaborate on that as well, that would be very useful to us, because it is nice to see where you feel you are now able to go and make a contribution and translate those skills and that knowledge to that infamous workplace and the community and everything else.

Mr Sprick—Like I said, I have taken employment with the university now and I am using my project directly in my current job, but I would like to be able to take the general degree of PhD and create a research group and do some other types of medical devices in the future. Whether that is going to be possible here in Adelaide, I do not know.

Mrs Muecke—I can look at my future in two ways. My future can be a research future or not a research future. I have to say that the closer I get to completion the more I am seriously considering not a research future. From a student's perspective, it is extremely difficult to get NHMRC and ARC funding. It is very competitive and, realistically, very few people get that sort of funding. Even if I were to get that sort of funding, I do not really know how inviting it is to be living from a two- to three-year funding, to a two- to three-year funding. There is not a lot of appeal in having a very uncertain future. There is no guarantee that you will even get your funding. You might start a project; you cannot complete it because there is no funding. You will get funding in one round but not the next. It is not a very appealing future. However, if I were to go into business or a big corporation, I would be on a much higher income. I would have job certainty and it is a lot more appealing.

I do not know how young people manage these days—I am sounding very old here. I have had the benefit of having worked for a number of years during my studies and having savings and things like that. Those that come straight out of school, do their undergraduate and honours here and then go straight into a PhD, have got nothing. It must be extremely offputting to try and get home loans and things like that when they are on this very tenuous funding system for their income. Hats off to them! I do not know how they do it. I am not finding it appealing from where I am, and I am in a much better financial position than these people would be. So I am certainly considering all my options.

One good thing about a PhD is that it does give you a lot of options, so you are not stuck with just doing research. It is great to have choice but, from the research perspective in Australia, there is no incentive to follow that pathway. If you want to have a secure future, there is not a lot going for you. There is also a perception in South Australia—and this may be true or false, I do not know, but nonetheless it is a perception—that there is a lot of inequity with distribution of the NHMRC and ARC funding; that it is a little bit inequitable from New South Wales across; that the eastern states seem to get the lion's share of the funding. That may be true or false but, once again, it puts you off. You are thinking, 'What chance have I got? I've got a competitive market and it seems to be not necessarily that equitably distributed anyhow.'

From the undergraduate experience, you have to make the PhD experience attractive early on and, in reality, it is not, which is rather unfortunate. It can be, but I am talking about the research perspective, and there is not a lot going for a research career when you compare it to the choices that you can make elsewhere.

Mr RAMSEY—Sandra, I hesitate to categorise people by their ages, but I am guessing that you may have done your graduate degree earlier and then been off in the workforce—

Mrs Muecke—Yes, a lot earlier.

Mr RAMSEY—and come back.

Mrs Muecke—Yes.

Mr RAMSEY—What drew you back to do your PhD? What had you been doing in the workforce that led you back here?

Mrs Muecke—I have a critical-care-nursing background and, as everyone here who has been listening to the news recently will know, nurses leave the health care system and I am one of those nurses that left the health care system because of the multitude of problems within the system and within nursing itself. From my critical-care-nursing experience, I then went into research, clinical epidemiology. I really quite enjoyed it and, with a bit of inspiration from my honours supervisor, decided that I would like to pursue a PhD. At the time I did it because I wanted to have my own project, to increase my research knowledge, and the research pathway seemed like a good way to do that. However, as time has gone on, and the reality of, 'What am I going to do next year?' has come up, there are a lot of holes and it is certainly making me, as I said before, look elsewhere.

Mr Kimura—In the field of archaeology I can divide it into probably three different types of jobs just briefly: one is in industry as a consultant, an environmental consultant; the second is working in a government agency for the museum or heritage office in each state; the third one is of course the academic world, working for the universities. I am keen to develop my career in the academic world in the future, because I am very interested in doing research work. The next question would be, ‘Where can I get an academic job?’ There are a couple of choices. Obviously, with my Japanese background, I will be able to go back to Japan and work for any archaeological department. At this moment, there are no maritime archaeology programs in Japan. Even though there are over 400 universities, unfortunately we do not have this kind of program, so there is the possibility to establish a new program in Japan for me, because I have done a master’s degree and hopefully in the future, after three years, I will complete my PhD. In the English countries there is also the opportunity, I think, to get a job. However, again, it is very difficult to become a professional academic researcher. Probably I need to get a fellowship after completing the PhD. That is my ambition at this moment.

CHAIR—Thank you.

Mr Manicom—My ambition is to be an academic and work in universities. I decided that during my master’s degree. I enjoyed researching and I enjoy teaching, and academics do not usually starve to death. They are not rich people, but they are comfortable. So the combination of lifestyle and interest factors draws me to academia. I am in my third and final year. My concerns regarding my immediate future are about opportunity. As I mentioned before, academics do not leave the workforce, and that is fine, but there is in my field a lack of opportunity. I am in international relations, which is a subfield of politics. The best way to get work when you finish is to be highly competitive on your CV. The way you are highly competitive on your CV is that you have finished your PhD; you probably have three individual publications, at least one in a journal that is refereed internationally; you have done some teaching. You probably have not necessarily convened a topic but you have done teaching in all three or four years of your PhD. The other major academic field of work is contribution to the running of your department, some sort of administrative work, and the capacity in which I am here is as a board member on the faculty board. You would also have offered commentary and things and done the community work. You have to do all that during your three-year PhD, which is not easy.

So as I approach the end of my time, the question is, ‘Have I done enough?’ and of course there is no way to know until you can actually call yourself ‘doctor’. You can apply for work in your faculty here. I have not had much success in getting interviews as of yet, largely because I do not have the PhD; the PhD is a prerequisite. I have publications, but they are not going to look at the publications without my having the PhD. That is fine.

So that is where I sit. There is a great deal of uncertainty, but uncertainty is a fact of life. Something that would ease the uncertainty would be some way to bridge the gap between the finishing of a PhD and full-time academic work. In the United States and in Canada these are research fellowships. You do a research fellowship with a university or a think tank, you teach one topic, and you are doing research designed to produce outputs. You are almost researching full time. From that you develop the publication list required to apply to universities for jobs. That does not seem to be the way things work in Australia.

Dr JENSEN—How is that different to postdocs?

Mr Manicom—Those might be postdocs, but those do not seem to be as widespread, at least in my field. There is one offered at the ANU, but realistically the next best thing would be to be attached to someone else's ARC project as a research fellow, where you would not earn as much money as you would if you were a full-time academic, but you would have the opportunity to publish. So I suppose postdocs are what I am talking about, but in my field at least there do not seem to be a lot of them. I am not sure what the other areas have.

CHAIR—You are suggesting that maybe in the United States and Canada there is a more institutionalised practice of providing think tanks—I think you are right in that sense in a lot of fields—for postdoctorate students.

Mr Manicom—Yes, there is a bridge.

CHAIR—Yes.

Mr Manicom—In the physical sciences in Canada you are expected to go overseas for a postdoc after you finish your PhD prior to applying for university work.

Mr Sprick—In America the PhD is not seen as the end point but rather the beginning.

Mr Manicom—Yes.

Mr Sprick—Somebody said before that there is coursework leading up to a master's and PhD work and there are a lot of coursework PhDs. I know in physics it takes that many years of undergrad, master's and PhD, all coursework, to learn the topic enough to be able to start making a contribution, which you then start doing in your postdoc field.

Mr Manicom—That is certainly different from the social sciences, but, yes.

Ms RISHWORTH—My question is quite specific for the international students. Are you an international student?

Mr Manicom—Yes.

Ms RISHWORTH—We have heard a lot from the universities about changing visa requirements; for example, if you have got a PhD from an Australian university, that it counts more towards permanent residency. We have talked about things that can make it more attractive for international students while they are here: waiving school fees for dependants and things like that.

I do get a sense that visa requirements do not seem to be an issue in your mind for employment after your PhD. Where does the difference come? Firstly, the universities are saying that there are huge issues with visa requirements once you have finished your PhD so that you can stay and work here. I am not getting that sense from you as international students. Secondly, what requirements could be changed, such as schooling for dependants, while you are doing your PhD? What are your comments on that?

Mr Manicom—My understanding is that if you have a degree from an Australian university that does increase the number of points you are awarded on your permanent visa application already.

CHAIR—Yes, it does. In fact, I think you are in excess of 65 points on your way to that 100 points or whatever it is.

Mr Manicom—Yes, 100 points, and if you speak English you are almost there anyway.

CHAIR—Yes.

Mr Manicom—I cannot really speak about dependants, although I know a lot of the international people that come here do have dependants. I do not know what could be done regarding child care for those dependants. I share an office with two Indonesian PhD students, both of whom have children, and they are not in the office much. They spend a lot of time looking after their kids. But I do not know what the requirements are regarding child care and whether or not dependants for internationals can access child care. I know there is a child-care crisis. But that might be something to investigate down the line.

Mr Sprick—I am a permanent resident through personal relations so I do not have that problem.

Mr Kimura—Visa requirements and applying for a visa, frankly speaking, is very annoying always. The first reason is obviously it costs me and my family as well to change visas. The charge is \$480.

CHAIR—Is that \$480 to change your visa status?

Mr Kimura—Yes.

CHAIR—Or to renew?

Mr Manicom—And if you extend. For example, if I apply for a three-month extension, I have to apply for a new visa because of the expiration of my visa. It is three months out of date. The last time I was at DIAC they actually snickered when I said, ‘Look, could you waive the application fee? Come on,’ which is aggravating. There is also the issue of the tuberculosis test, which I could not have possibly gotten because I did not leave Australia, but it is part of the visa process. It is a tick in the bureaucratic box.

CHAIR—Every time you extend you have got to do a TB test?

Mr Manicom—If your old TB test is more than a year out of date.

CHAIR—If it has expired, yes.

Mr Manicom—Presumably, it is if you are extending after the initial three-year application. So you have to go to take the—

CHAIR—But you have been here anyway? You have not gone anywhere, presumably.

Mr Manicom—I have left the country, but they are not interested in knowing that. If your x-rays are out of date you have to have a chest x-ray and a doctor's appointment regarding TB, and it costs more money.

Mr Kimura—Yes, exactly. My wife has the same issue as well. Originally, before I attend here, I just got married and my wife belonged to my student visa. After I came to this country, she decided to start her program at Flinders University. So she changes her student visa to student visa. This is for a six-month program. After six months she suddenly had to change back to my visa from student visa to student visa, and then she had to pay again for the total cost for this.

CHAIR—That is what they might mean when they talk about visa restrictions and flexibilities. Thank you for that example because they were not forthcoming with examples of what they were referring to in terms of more flexibility in the visa system. I am feeling that that is what they might be referring to.

Mr Sprick—The permanent spouse visa that I am on, that has now expired. I have been here for eight years and I had to renew my visa, to get a new sticker, which cost several hundred dollars as well just to get a new sticker.

CHAIR—You are a permanent resident?

Mr Sprick—I was spouse permanent resident and now I am just permanent resident.

CHAIR—Permanent residency expires?

Mr Sprick—Apparently. Every few years you have to get a new sticker.

Mr Manicom—There are a lot of problems.

CHAIR—I must confess that I did not know that. I am quite happy to confess to that. I thought once you got it you got it; you were a permanent resident. Your next step is citizenship.

Mr Manicom—The sticker expires, apparently.

CHAIR—There is a sticker involved.

Mr SYMON—I want to change tack quite dramatically. I want to ask a question about resources and how you feel you are supplied with resources by the university—whether that is enough; are there things lacking. We spoke to some witnesses yesterday who gave evidence that not all students could even have their own desk or computer. Despite being under RTS grants from the government to the university, there seems to be no guarantee in that process that a student can get the basics to be able to pursue their path. Has there been any personal issues with that from any of you?

Mr Manicom—I have always had a desk and stuff. The access to office space in my department is actually contingent on you teaching. Your entitlement as a PhD research student is that they will try to find you shared office space with a computer. They will try to find that for you, but they are not obligated to, and office space is only guaranteed if you are doing part-time teaching as a place to have near your students. That is shared office space.

So it is not automatic, although I have been very fortunate of always having the space. There is a tradition, if you leave your space for a period while you go on a research trip, someone else will move in. So I try to leave my desk in as much disorder as possible. I am only kidding!

Mr SYMON—That is the excuse.

Mr Manicom—Yes. ‘I can’t work there. It’s a pigsty.’ Well, it is there for a reason. So that is my experience.

Mrs Muecke—Resources are very much faculty dependant. I am in the faculty of health sciences, as I said, and they are fantastic. We are all given, in lieu of our first-year RTS funding, the opportunity of getting a laptop computer. I did that and it has just been so useful. I have used it for data acquisition at the bedside in an intensive care unit and for writing up my thesis. It has just been so fantastic. But I know that people in other faculties have not had that, so it is very much faculty dependent. I have also had very good experience with desk space and things like that.

Talking about resources more generally, I am on the faculty of health sciences research committee as postgraduate student representative, and I also have been convener of one of the postgraduate student groups in the school of medicine. It has come to my attention, from interaction with other people and also from my own experience, that honours students seem to be the group that really miss out. Honours students are in this sort of in-between world of not being an undergraduate and not being a postgraduate. They have done their undergraduate studies but they are still classed as an undergraduate when they finish. At this university at the moment the PhD students and master’s students have access to this fantastic research higher degree professional development program that they run through the university. You can go to sessions relating to anything from computer programs and note the statistical packages, right through to how to write up a thesis, what examiners look for—a whole heap of programs which are really brilliant and well utilised. But honours students are not allowed to use these programs because they are not postgraduate students. It seems like such a waste. You have got this group of students already at the university who are absolute prime targets, as far as I would see, for the university for PhD candidature. So you have already got them; they are here; you do not have to go and find them. They are there already, and yet this group of students is virtually ignored.

I know from my own honours experience that you have this feeling of, ‘Well, they want me to do a research project but really they’re not supporting me at all, so I’m really feeling like I’m handing up a bit of a second-rate project. No-one really thinks it’s very valuable because they’re not giving me any support.’ I know that students feel like that and I know that supervisors of these students also feel like that because what I am hearing from them now is, ‘We’d really like to see some more support for our honours students so that they can feel that the university will look after them while they do a PhD.’ If they do not feel the university is looking after them during their honours year, they are hardly going to feel that they are going to be looked after

during their PhD. From this university's perspective, it would be fantastic. I am certainly, in my role as postgraduate student representative on the research committee, making moves for this to change. I do not know whether that same problem exists in other universities, but you have got this wonderful group of students there, ready for the picking, and you are not fostering any sort of trust in the system for these students to continue on, which is a great pity. You can spend all the money you like on recruitment but, if you cannot retain the students once you have got them into the university, there is not much hope for you really.

Mr Manicom—On the issue of funding, I have limited understanding of how researchers are rewarded. But my understanding is that when an academic publishes something there is a payment made to the university from DEST. Is that correct? It is something like \$3,000 that DEST pays the university. At this university, the academic keeps 10 per cent of that—\$300—and it gets put into a research fund which they can use for conference travel, books and things like that. That courtesy is not extended to PhD students. Honestly, I kind of wish it was. I could use 300 extra dollars in my research account to use for conference travel or books. That would help to stretch the stipend, make the research process a bit easier. I do not know why that happens. I do not know if it is a university thing. I have not really raised this because I am reluctant to push people's buttons or ask for too much money. But that would be a way to better fund research for postgraduates because they would have their own money that they could allocate in their own way.

FRAN BAILEY—Could I have your comments on the value that you would see in getting access to pursue your research internationally. Have you engaged in any international exchange?

Mr Sprick—I presented some posters at an international conference, and it was a struggle to be able to undertake that travel. There was a student travel grant that was available but it was a big hassle to get, and there were some other expenses. You mentioned DEST. It seems to me that the university's currency is publications. If that is what funding is tied to, then they should be encouraging and funding people to do publications and to go to conferences, particularly if they are presenting. That should be funded, and there should not be an expectation on the individual, particularly a PhD student who is living on \$20,000 a year, to fund their own way to a conference. That is just ridiculous. If industry wants to send you to a conference, they send you to a conference and they often send you business class.

Mr Manicom—It depends on the business.

Mr Sprick—There is no question about buying your own meals or paying for your hotel or anything like that. That is all paid for by the company, and that should be the same here. If the student is presenting for the university, then that should be all paid.

Mr Manicom—I agree that they are worth that.

Dr JENSEN—I think Sandra has answered the first part of this question for herself. There are two parts. Firstly, if you could do anything with undergraduate students to enthuse them about doing postgrad, what would you do? Secondly, if anything could be done to improve your situation as postgraduate students, what would that be?

Mrs Muecke—I have already answered the first part of that, with particular emphasis on the honours students. But, do you know, I think it goes even back to primary school. I have had children. My eldest daughter has finished; she has done two degrees. My youngest daughter is just starting her university career. I am thinking of the comments made by Professor Russell about why students do not do science. My daughters went through the state primary school system and there was an incredible emphasis on mediocrity. I am sorry, but the tall poppy syndrome is alive and well. It is not cool to be an achiever, it is not cool to be brainy, and certain students cope with that in different ways. Apparently girls cope with that by conforming to normality, the norm being mediocrity, so you lose students in science, or probably postgraduate university students, back in primary school. Perhaps you need to be looking even further back than undergraduate years. You need to be looking at what is happening to kids in primary school and what messages they are getting very early on.

Mr Sprick—Not to take anything away from sportspeople, but I have heard of several cases where the physical education teacher is also the science teacher and that does not seem right to me.

Mr Manicom—Regarding the first part of the question, I would expose the undergraduate students to the most entertaining lecturer in the department in the first year. That is the best way to do it really, because that is where you engage students. Our best lecturer unfortunately left. He was good at engaging students and that is what I try to do in my lecturers. Regarding the second part of the question, it is about that bridging opportunity that I discussed. I survived the PhD process rather well. I did not have the same kinds of issues regarding the stipend. I am single and I have no kids so I am doing fine under the PhD process, but the next step is what I am worried about. So what I would change would be postgraduate opportunities—lots of postdoc opportunities. That is what I would change.

CHAIR—Jun, would you like to answer that? You come from an education system that I dare say may have a slightly different focus to ours. We would like to hear from you.

Mr Kimura—I am sorry, I do not have any comment. The rest of the people here represent very much my opinions.

CHAIR—Thank you very much to all four of you for your evidence. It has been very interesting. It has also been very consistent with what we have already heard and what is coming through submissions. Thank you for the detail of your life as postgraduate students. That does not come out as much in the written submission as it does in the dialogue. That certainly has been very helpful for us. At this point we will finish today's proceedings.

Resolved (on motion by **Mr Jensen**, seconded by **Mr Symon**):

That this committee authorises publication of the transcript of the evidence given before it at public hearing this day.

Committee adjourned at 1.31 pm