

to our politicians. And as you've also just heard in our introduction, Professor Gillies has some strong views, and I know that because I was discussing it with him yesterday, some very strong views about both the importance of and the need for, a fresh approach to innovation in this country.

Please welcome our guest today, Professor Malcolm Gillies.

[Applause]

PROFESSOR GILLIES: Thank you Laurie.

In re-thinking Australian innovation, we need to recognise that we're dealing with a series of issues which are taking us from industrial models through knowledge models to talent models.

For many of you who are here from the humanities, arts and social sciences, you probably haven't felt as though you have been included in the national debates about innovation.

Now before I go on, I did just want to say that I'm sorry to those viewers out there who thought that the M. Gillies who was giving this talk was a distant relative of mine, known for giving Gillies' Reports back in the 1980s.

Before you switch over to *Days of Our Lives* or whatever else is on some of the other channels, I'd

just like to say this: that my message is that in a time of skill shortages, we must make sure that we use all the talents of all Australians to be as innovative as we can. That means everyone. We can't afford to have a mindset that says some talents are not needed in this innovative Australia.

The industrial model of innovation has the notion of smart ideas leading to products, which then are taken to market through commercialisation or some process of technology transfer.

A friend of mine here in Canberra, a bureaucrat given to the habit of aphorism, expressed it very much like this. He said research turns money into ideas, and innovation turns ideas back into money. And he warned that in the equation of a Canberra bureaucracy and politicians, if you didn't have enough of the money coming back, you couldn't be expecting more and more money to be going into the research.

Now I would argue, and there's a big literature that would argue, that we've been moving to expand those notions of innovation with the concept of Knowledge Economies - economies that take smart ideas, and as well as turning them into smart products, also turns them into smart ways of doing things. The result is new processes, new operational processes, and new management processes.

But then we get to this issue. Is it the ideas and technology that transfer, or is it people who are the best agents for that transfer? What we've been seeing, with notions of creative class and creative economies, is that it is the transfer of people that gives the most efficient transfer of ideas and helps them to move down that train, eventually to generate value. There are exceptions, a couple of areas, where the transfer of ideas works, pharmaceuticals perhaps being one.

The Talent Economy – a new idea - is one that focuses on those people. It's designed to see how we can make people be as inventive as possible in contributing to their economy. And through that, to sustain and to grow innovation.

We could say that talent is the new gold. And when I think of talent, I think of talented sports people who go on to do great things in the Olympics. I think of talented people in science, who even at the ages of sixteen or seventeen are winning at the Physics Olympiads, the Chemistry Olympiads, or the Mathematics Olympiads.

But then I also think of other people, practising away, who hope to win a place in the Sydney International Piano Competition, or in the Australian Youth Orchestra, our elite Orchestra for young musicians.

And I think of the people taking part in debating competitions and how after participating in these national or international competitions they go on to become our leading lawyers and politicians. We need to be considering all of those talents and recognising a tremendously fundamental thing: that the ones who may be doing best in the Physics Olympiad are also playing in the viola section of the Youth Orchestra; and the ones winning in the debating competitions are the ones who are also doing extremely well in sport.

Why is it that now, at a time when we're talking about skills shortages, Amanda Vanstone is talking about the fact we need 20,000 skilled people, particularly engineers and doctors, and how her Department is looking at the way in which we can find them quickly?

Why at a time when we find the Chief Scientist of Queensland, Peter Andrews, stating that we need 80,000 more scientists than we're likely to produce, by the year 2010?

And why is it when we have such skilled shortages, that we have such skills wastage?

And by that I'm referring to many of the talents of the people here in this room.

I'm talking about that half of researchers in Australian universities who are in the areas of

humanities, arts and social sciences, maybe studying English, maybe involved in investigations into psychology, perhaps involved in archeology and anthropology.

How is it that we don't take advantage of the skills of these people?

Is it perhaps that the people in humanities, arts and social sciences are not good enough?

I'd suggest to you that there are many studies that show that's not true at all. If we look at the quality of these people, if we look at the impact they have upon our society, if we look at their capacity to contribute to research and its future in this country, the argument that half of our university sector lacks quality, that Australia has this massive ghetto, is not sustainable.

Maybe the argument could be made that these areas are not relevant. But if we look at the big questions - and many of you have been exploring those questions today with our Parliamentarians - you will know they want to see an innovative Australia addressing questions of the environment, and questions of what we are doing to empower our indigenous people and questions that relate to education and what the next generation of Australians are going to be doing.

So I'd suggest to you as it's quite evident that these areas have a huge humanities and social science component. So however you choose to look at the big questions, that there can't be an argument of irrelevance.

Perhaps we don't take advantage of the skills of people in these areas because these people don't want to contribute, they want to be objectors and to sit on the sideline?

But again I don't think that's true. Sure, many areas need to engage in pure research. If you commercialise that research it would be a travesty of the process and leave the results contaminated. But many other areas are not. And many of those pure results can nonetheless still be used in very valid ways, to improve our economy and to make money.

So the idea that our people don't want to contribute is, I think, probably seen to be incorrect - it's seen to be a lie.

Perhaps then the humanities and social sciences and arts are not being sufficiently embraced? That our national settings are such that we in Australia don't consider them to be as relevant and therefore they need to gain support? Here I think we are getting to the nub of the problem: that we are looking at a vast section of Australia's most talented staff in universities, practitioners in the community,

students in our schools and tertiary institutions who are not being embraced.

I think that needs to change.

How can Australia effect change so that we embrace one hundred percent of our talented people and start to marshall their resources towards innovation?

We could reset the incentives. We could try to engage business which has a very poor record of engagement with R&D, and we also need to engage these art sectors. We need to re-think education to unlock talent. In particular I want to talk about unlocking talent across the arts and the sciences, not regarding them as separate camps.

And we need to look at restrictive practices and research. We have various schemes of co-operation, various national programs of excellence. Now, how can we find the way to co-operate and use that excellence across the whole of the sector in a way that's more meaningful? In a way that contributes more, that draws on the full range of Australia's abilities, not just ability in science and in technology, which was the basis of the 'Backing Australia's Ability' plan.

Let's talk about incentives. Well, in the humanities and arts and social sciences, we have nearly 65% of Australia's university students and 50% of its staff,

but these areas are gaining less than 10% of our national spend on research and development.

The rules of the innovation game crop up as the first area to examine. How is it that we have these restrictive rules at national and state levels, rules dealing with innovation, with commercialisation, with taxation, with intellectual property, and so on?

Why are we restricting through those very rules the ability of people in the humanities and arts and social sciences to contribute fully to innovation? Maybe we're still stuck in that mindset of technology transfer.

Let's look at taxation, the research and development tax concession. This an area which explicitly excludes people in the humanities, arts and social sciences, and I want to probe why.

The tax concession for R&D was brought in to encourage industry to move away from having such low levels of investment in research and therefore in the stocks of innovation.

When you probe why the contribution of people in this room here today are excluded, you find some answers which are curious.

CHASS, the Council for the Humanities, Arts and Social Sciences has been pushing the Government on this issue. We've gained some replies that have

suggested that as the research in this field is not patentable, it is therefore unusable in the market. Interesting proposition.

But then we gained a response which I think is of that sort that would have given Sir Humphrey his knighthood, and I read it to you.

'While the Government is aware that some work undertaken in the humanities, arts and social science fields can be vibrant, the Government feels that the current restrictions on what activities qualify for R&D tax concession provide the appropriate focus on providing support for circumstances where businesses undertake risks that they would not otherwise take in the normal course of their business.'

[Laughter]

Now, for those of you out there able to run that again on your video machine, I invite you to do so, but after the end of my talk please. If you picked up from that response that possibly the answer to our question was: no, this concession is not for you, then I think you'd be near to the mark. But the letter did go on with one of those thin-end-of-the-wedge arguments: it could be a little bit difficult, because if we let you in, there would be a whole lot of other people who would be have to let in and as a result, we would have serious cost implications.

Their argument seemed to be that, if we let you have access to this concession, then a whole lot of industries might actually then want to invest in what you're doing and that might then cost the Government some money!

I suggest that we do need to look at the issue of why we don't use the talents of our HASS people and also why business is sitting on the sidelines.

At the moment, businesses R&D spend in Australia is about .8% of our GDP. This is only a little over half that of the average of OECD nations.

In percentage terms we level peg with the Czech Republic in business R&D spend. Australia ranks nineteenth out of the thirty OECD countries.

I think we do have to rethink whether our tax concessions are working for the science and technology sector, but also whether they're working for the humanities, arts and social sciences. There would be good evidence to suggest that perhaps they're not really working well for either.

Let's now look at education, the second of these three areas where we might have some change.

I believe education is the very incubator of innovation. I think of Singapore, which in the last five or six years has been trying to change its education system from kindergarten up, so that

instead of having a compliance mindset of conformity, Singapore is trying to have an “empowerment of talent” model, by taking Singaporeans, young Singaporeans, and exploring what is different in them and developing that difference, because that difference probably gives them the greatest competitive advantage.

Some Australian states are trying to think also of how to be smarter. I notice the State of Queensland has 'Smart State' written on its number plates. Well, on about 20% of its number plates, because the Queensland Government allows you to choose whether you're going to have 'Sunshine State' or 'Smart State', and 20% of the population opted for the 'Smart State' story.

But Queenslanders have come up with two new 'smart' academies in the last few months. An academy which is going to look at science and technology areas and have three or four hundred students from Years 10, 11, and 12, and another smart academy in the creative arts. That really needs to be applauded. But, I immediately ask, why would you have two separate smart academies? Why not have a smart academy that might bring those science and arts people together?

That gets to the broader question. Why is it at a time when huge skills shortages are emerging in areas of maths and science and engineering, that we still perpetuate this apartheid model in our universities with separate faculties of arts, separate

faculties of science, with different funding models and often rigid walls between them? To the university deans in the audience, and there are about thirty of you in the room, I just mention that word “EFTSU” - you will know what I'm talking about, trying to make sure that the students are studying in your camp.

We need to break down that idea of the two worlds, the C.P. Snow notion of two worlds of mutual incomprehensibility. We need to find ways of allowing students to explore where they're at in the spectrum of generalisation and specialisation; and where they're at in terms of developing their scientific and their more humanistic knowledge.

I'd suggest that we will then get more students who find, particularly at university level, that the maths and science they didn't enjoy at secondary school is not in fact so bad. There were maybe some other factors at high school - maybe hormones had something to do with it. They can have another chance to recover what could have been a huge passion and talent.

But also, we will end up with humanists and social scientists, people like us, but hopefully not like us, because we often put the chemistry and physics books aside at the age of seventeen and have never looked at them since. We want humanists and social scientists who are more aware of science, more aware of mathematical issues, people who are broader citizens of our country.

We could go further. Why not merge these faculties? Why not have in our Australian universities, or some of them, a faculty of arts and sciences? It sounds heretical even to mention it and you can see the hackles going up in the corridors where deans walk. But that's what Harvard has. That's what Yale has. And the University of California at Los Angeles, and Toronto. It is an almost standard model in the best of the North American universities.

I think Australia should be probing the arts and science connection, because the arts and science non-connection is stopping us doing great and creative things. I think of a submission made to a digital content study last year. It quoted someone who ran an Adelaide animation firm. The submission said the skills we're looking for in animation today, are skills in the arts, in psychology, in IT and in design. And if you look at many of our courses in many of our universities, it's very hard to study those elements together.

We need to see how we can develop the talents of our students in education, whether in arts or science by so-called inclination, or business or law or engineering. We need to find ways, creative ways in structural terms, and also curricula redesign, of opening up what our universities already offer, and allow students to choose how they wish to develop their talents.

Paul Salteri, the CEO of Tenix, a large defence contractor, has this to say: we need to take innovation out of the mindset of science and technology, and find champions for it in all knowledge sectors.

That leads to the third, the research part of the agenda for change.

We need to engage the humanities, arts and social sciences more in our larger research endeavours. If you look at our centres of excellence, you will find we've got twenty-five or thirty of them now in Australia, but you won't find ones that are solidly in the heartlands of the humanities and social sciences. If you look at our co-operative research centres, you'll find a similar thing. Some seventy of them around the country. And sure, humanists and social scientists are contributing, particularly to those centres in the areas of the environment and to some in the areas of information and communications technology. But we're still waiting to see how these larger research endeavours, with hundreds of millions of dollars invested by the Government each year, can embrace the humanities, arts and social sciences.

The centres of excellence are a vital plank of 'Backing Australia's Ability', and they do talk about the economic and the social and the cultural benefits to come to Australia. So I think this is a complete entree for us to be pushing very strongly

to make sure that the excellence in our sector is also seen to be represented in this great scheme.

So there's an agenda. One that says, we have to change some of the incentives because the incentives aren't working well and they're not involving all available Australian talent.

We need to re-think education, to make sure that we are allowing our students to explore their talents as they present to those students in real time. And in research, our schemes must be all embracing, and include all disciplines, because not to do so again denies talent, the ability of expression.

I think that there is now time to re-visit the equation of science and innovation. It's not the right message. If Peter Andrews is right in Queensland, and we are heading for a shortage of 80,000 scientists by 2010, well, as Peter himself points out, business won't be doubling its investment because there won't be the people there to invest in.

We need the equation of talent and innovation, as part of the thinking about a Talent Economy. And the talent needs to be taken where it's found. Talent isn't able, completely, to reinvent itself. It needs to be incubated.

I think of Leon Mann, the former President of the Academy of Social Sciences and I feel guilty because Leon raised the prospect that talent could

be one of our national research priorities. I must say I thought that Leon was on pretty shaky ground at the time and said no - I was still caught up in a disciplinary mindset at the time - no, how could that be a national research priority? But I do see it now, and Leon, if you're out there listening, I apologise, because it was one of the planks that we need if we are going to have a research and innovation plan moving forward.

We have, and as a member of this Council, the InnovationXchange which is trying (and succeeding, I think) to change the landscape of innovation. The InnovationXchange is all about people who are connecting, growing and leading innovation. It's concerned that we build the talents of entrepreneurs for a more innovative Australia and on its website you'll find a wonderful number of projects in engineering and nanotechnology, in traffic management and pollution, in finance and in design. There's even a page which talks about developing a new slide for the guitar.

What the InnovationXchange is trying to do is to link up and to educate Government and business, the arts and the sciences and create a new generation of people, with an entrepreneurial mindset. If you were from the arts, you would call it a creative mindset; if you're from the sciences, you'd call it an innovative mindset. But it's the same thinking.

It's an ability to take a good idea and make something of it which is valuable.

Now it is a global world, and talent will go where talent will go. If we are going to be a magnet for talent, rather than pushing our talent out - and there's a great history of expatriation of talent in Australia - then we do need to re-think our innovation so that it does not seem to be only that hard innovation from the experimental mindset of science and technology R&D. That in itself is hugely valuable, but we also need to recognise the soft innovation.

Paul Salteri, again, would talk about that as being the way in which your smart ideas lead to you doing things in a more innovative, a better way. A way that might actually make money or save money. It could be getting in bed with the right venture partner. It could be having a recruitment policy that brings in the best possible staff.

We need to have technological innovation certainly, but we need non technological innovation.

And we need social innovation, a growing field in Britain and the United States. Innovation that is not concerned with one bottom line, but concerned with three or four. What are the environmental consequences? What are the consequences for people? And what is the ethical bottom line?

Social innovation is something that we surely can't ignore.

And then there's creative innovation. A wonderful area in which technology can assist us to create the content which most of us enjoy when we go to a film, when we play a computer game, when we listen to recorded music, when we plug in the headphones of our iPod. The technology is wonderful but I must say personally, I don't sit there wowing at the technology. I sit there thinking: isn't this a wonderful artistic product, a wonderful film, an enjoyable experience.

Things are changing and there is light at the end of the innovation tunnel. With 7% growth being predicted for the creative industries, a \$20 billion industry but making a net damage to our balance of payments of about \$1.5 billion each year, we do have a chance to capture the minds of politicians. With growth of nearly 15% being expected for the next five years in various forms of interactive games and over 12% in various forms of subscription television, I think that we're in a position of making sure that the creative industries ride high.

Indeed only a couple of months ago, the first Centre of Excellence in Cultural and Media Industries was announced, based at the Queensland University of Technology.

The Prime Minister's Science, Engineering and Innovation Council now has on it Professor Iain McCalman, one of our leading humanists and social scientists. Here is again an opportunity to talk about the way creativity and innovation might relate.

Some of you may have been here for Iain's talk last year or may have watched it on television. Iain talked about Ireland. Again, it seemed a somewhat unlikely model to take, given the nature of our historic relationship with Ireland. But he talked about the way in which Ireland was backing both its culture and its technology. His talk was entitled 'Making Culture Bloom'. And culture has bloomed in Ireland. The latest results on OECD real income per head show Ireland is now in the top four countries, along with the United States, Luxembourg and Norway. Now something has worked there. But it was not at the expense of Irish culture. Irish culture itself has become a major contributor to Irish innovation.

We're not quite there yet with our co-operative research centres, but again in Brisbane, we have the Australasian CRC for Interaction Design, pointing a way to a possible future in design. I personally think the twenty-first century will be the century of design. It's going to be the time in which form matters more than function. The cars all work reasonably okay. The issue is now, which car do you want? And that's gets down to its design, its brand and the way it resonates with you.

We're seeing a huge exploration now of the potential of design. A field that ties up arts, ties up engineering and ties up technology and business in an integral way.

A recent study in New Zealand called 'Success by Design' pointed out that 67% of New Zealand exporters believed that design was one of the key factors in their success.

I'm suggesting to you then that a whole-of-country approach, bringing together arts and sciences, Government and industry, is needed if we are to be a truly innovative Australia. If we are going to find a place higher up in the OECD ladder of innovation.

I believe it can be done.

Talent is the gold.

We have skilled people that need now to be grown. Skilled people who need to be exploited a hundred percent of their talent. We need to make sure that we are thinking of creative people first. Not necessarily thinking of the subjects and thinking of the disciplines that hide behind them.

In education I believe we must be making sure that we are educating and nurturing that talent as it presents. We need to think of an Australia which people will clamor to enter, not one which they'll be keen to leave.

And lastly, we must go beyond being a lucky country and beyond being a clever country. Think of John Kenneth Galbraith, the adviser to so many American Presidents. He observed that beyond economics, even beyond knowledge, it is human ingenuity and the products of individual human minds that drive societies forward.

I look forward to a more innovative Australia in the years to come.

[Applause]

CHAIR:

Thank you Professor Gillies. Time now for questions. We'll have our usual round of media questions and there may be a second round, but I would like to offer the opportunity to - for some questions from the floor today. I think there'll be time for that, hopefully. So if anyone does have a question, I know there's a large number here, we may have more than we can cope with. We may not have too many. But if you do have a question, you just catch the eye of our floor manager, Abbey, and perhaps put your hand up and catch her eye, and once we've got through our first round of media questions, we may be able to come to you. Our first question today is from Simon Grose.

QUESTION:

Simon Grose, *Science Media*. As a spokesperson for people working in the humanities, arts and social sciences, a great bit of your, a great part of your speech was a kind of a [indistinct] and a plea

for attention. You said, we are not being sufficiently embraced. Poor [indistinct] and you asked how can we unlock the talent of the people in this sector. Surely if you're not being sufficiently embraced, you should flaunt yourself? Surely if you're - it's up to the people to unlock their own talent? There's a kind of passive line coming from what you were saying. Surely there should be an active approach?

PROFESSOR GILLIES: Simon, I think that's a very good observation and I take our newspapers as an example. Most of what's in the newspapers is in fact humanities and social science content. And so often people from this sector are playing roles in those newspapers. They may be critics, they may be commentators. We're tending not to make that point obviously enough. We have, you have, a science and technology page. Why? Because the rest of the paper isn't about science and technology. It's mainly about what's happening in political and economic areas. Areas of the social sciences. It's what's happening in areas of the arts. It's what's happening in a lot of areas of current affairs. And so I think that you make a very good point which our sector needs to hear, and that is that we must make sure that our contribution is known and fully appreciated. That's the way not to be assumed, or maybe I could say, not to be embraced. I'm suggesting that we have a sector which is being taken for granted, partly because it's where the majority of students are studying and a huge number of staff are working.

CHAIR:

The next question's from Mark Kenny.

QUESTION:

Mark Kenny from *Radio National Breakfast*, Professor Gillies. You mentioned the current Government policy of bringing in 20,000 skilled migrants and you questioned why it is that our universities, for example, have not trained - have not met that demand. But isn't that in a sense the problem that universities have to some extent over recent years, particularly since, I guess, the Dawkins reforms of the 1980s or late '80s, that they've become somewhat instrumentalist and that we've become in a sense obsessed with the product rather than the process of education?

PROFESSOR GILLIES: I think we may, to go back one step even earlier, we may have become over-regulated and as a result we haven't put the incentives in the right place to produce those engineers and doctors that we now need. It could also be that we haven't had the demand and that that's something which has been completely beyond the control of universities. This may go back to primary school. The emerging doctor or engineer might have been turned off at the age of eight or ten, or the age of twelve or fourteen. So I think there are a series of earlier issues which are very much to do with why we now have this so called skills shortage in a range of area. It's not just the ones that are mentioned by Amanda Vanstone as being looked for, it's areas of mathematics - we're in a huge crisis. We need statisticians and mathematicians hugely but the difficulty is it's a twelve or fifteen year training period, and if you

opted out at Year 7 or 9 or 11 and decided to play football or the violin, then you probably are not going to opt back in unless there are some really good incentives to do that.

CHAIR:

David Denham.

QUESTION:

David Denham from *Preview*. Just first of all a little bit about the Irish analogy. I wouldn't push that too far because a recent - the last book that written by Pete McCarthy, who was an Irish Liverpoolian and he went round the round looking for McCarthys and when he visited Ireland he said, since Ireland has joined the EU the Guinness has got worse and English beer has got a damn sight better. So, Irish culture I think has been diluted a little. Now, what I'd like to tease out of you now is something more about the outcomes that you see from the process of integrating the arts and the Sciences. 'Cause I think it's very important that the two sectors do work together and I think it's very good - there should be no division at all on that. But you see we've got our national research priorities and there's no, so far as I know, and Graeme Cook would question me on this, there's no arts and science division on that. Those are national research priorities and the arts and science and everybody talented has the opportunity to come in on that and the goals are well defined. Shouldn't we be focusing more on the national goals and the national outcomes? I mean when man went to the moon and Kennedy and the Apollo thing, he didn't say, identify how to leverage creativity in the

innovation process for competitive advantage in the Australian context? I know that's Sir Humphrey. He said we're going to get people on the moon. So shouldn't - what I'd like to tease out of you is, what are the outcomes? And then, because we don't all want to be cricketers? Do we? No. So. Could I have some outcomes then I think focus where the arts come in? It's sort of back to front as far as I can see.

PROFESSOR GILLIES: Yes. I would suggest to you that the national priorities exercise in research was not a good process. Although it's come up with four priorities, they don't give a large degree of access for this sector. You need to go from the priorities themselves down to the goals and look at what's actually being specified there. Each one of them does have some ability, obviously studies of people are rather relevant to studies of making us have a better environment. But in total I would say it isn't a good representation of the total interests of Australia.

I've in the press a number of times pointed out that the word "Asia" does not appear in them, though there is mention to our region and our world in one of the sub goals as safeguarding Australia, itself an unfortunate way to be approaching Asia. So, if we are going to be embracing this sector we probably need to have a couple of other priorities such as Asia Pacific engagement and, well, why not have Australian culture and heritage? Because no one else is going to do it and it's just not our priority,

well, maybe it doesn't matter. Given where the talents are lying you'd have to say, if you matched where the students are studying up against the priorities, you would come up with quite a misfit.

But we have to line them up because these are the workers who go on in years to come to be the bright talents who hopefully help us to achieve those priorities. So, while I don't think there's anything wrong with the four that we've got, in health and in environment and the technology one and safeguarding Australia, I think we needed a couple of others which were primarily focused upon people and regions and languages and culture. And if we don't think that Asia even needs a mention, at a time when we now just have a statement coming from the Minister for Education, Brendan Nelson, that we do have languages of national priority - he hasn't said what they are but he has said they would include Indonesian and Arabic - I think that's starting to become a serious issue of misfit between student demand, education and then what we're trying to achieve in research.

So if we're looking at the final outcomes, we need to go again right back and look at the process through and ask ourselves do we have all of those settings in the right place? Otherwise whatever outcomes we want, we won't achieve them. As the Chief Scientist of Queensland says, we will simply not have the people there to implement what we may have the money and the wish to achieve.

CHAIR: A question now from Liz Bellamy.

QUESTION: Hi, I'm Liz Bellamy from the *Canberra Times*. You mentioned in your speech before the need for sort of greater integration between science and the humanities and that the issues that creates a bit further down the track's when you've got sort of I guess people specialising in subjects where perhaps their talents would lie elsewhere. What solutions could you propose to sort of deal with that within the education system? Do you think it's something that can be tackled at a university level or do you think you need to go further back, say right back to primary schools as you mentioned before?

PROFESSOR GILLIES: Could I just tease out from there - you're talking about the backgrounds of students as they go into tertiary education, or...?

QUESTION CON'TD: Yeah. I mean I guess you were talking about sort of integrating science and humanities. I mean, would, for example, one solution be to ensure that students when they enter university do a year of general studies where they're not specialising? Would that be one solution or do we need to go further back, or...?

PROFESSOR GILLIES: The notion of diversity, I think that's a good field that the Minister Brendan Nelson has opened up in recent months. That we need to have real choice for students so some can go and get a good solid education in arts and sciences at university. Others

can go into more specialist institutions. I know as a former professor of music that it's no good to wait until students have had all their generalist education at the age of twenty to say, well, do you want to play the cello or play the flute? Because they needed to start that fifteen years before. So I don't think there's one answer to how we should construct our university education. That's been the problem. We have had one answer and one model and look where we are. We've rather, much run to the end of that course and we feel everyone's talent's been rather much pushed into the same shoe.

I like the idea in many of our comprehensive universities of a first year that is a little bit like a diet. You need to have some fats, but not too many. You need to have some carbohydrates and you need to be having some of those other things that I remember learning about in science many years ago. Now if we said in the first year, you need to study one humanities style subject. Maybe you do French. You need to study one social science subject. Maybe economics. You do need to do some quantitative mathematical subject, it may be pure maths, and also let's not forget about technology.

I think then we're starting to get real about what the twenty-first century requires of most graduates. To put it round the other way: how could you negotiate yourself as an eighteen year old in 2005 through the next century - and you'll probably live to be a hundred and twenty or something - how could you

possibly negotiate that with having no tertiary level study of technology whatsoever? And I turn it round the other way. How could you do it without any knowledge of a humanities subject, without any knowledge at all of any social science methodology? So, if you look at it in that regard, we need to make sure that there is an availability for a lot of our students to study. In fact, maybe a compulsion to study. You don't just come and do whatever you like. No. If you come to university 'x' there's a particular style of learning and in that institution you will have a broad first and second year. Why is it a good idea? Because American studies suggest that 60% of undergraduates currently in the United States don't really have a clue why they're there. I don't mean in the United States.

[Laughter]

A few of them might have a worry about that. But actually why they are in the university. If we then consider what that means two years later, they do actually find that they were challenged by something they didn't know about. They'd cashed out of maths because of the bad maths teacher. They thought economics was yuk and they suddenly discover that in fact it's not the dismal science but the subject that's going to lead the world. That's the kind of challenge I would like to see and I think that would help to address this issues of skills shortages and the mutual incomprehensibility which still

remains a big problem I think, among our universities and staff.

CHAIR:

I think we do have some further media questions, but again I'd just like to mention at this stage if there's anyone around the room who'd like, who isn't working in the media, who'd like a question, then we'll come to you in a moment. But next, Simon Grose has another question.

QUESTION:

Simon Grose, *Science Media*. A part of your speech was a pitch for a share of the tax concessions for research and development. I think that given Treasury's resentment of tax concessions for R&D in general, it's a pretty hard road you're setting for yourself. I'd like to run another model by you. I was fortunate enough to visit Germany last year as a guest of the German Government, having won the German Journalism Award; and one of the things I discovered there was their research foundation system in which companies are encouraged or are - they're encouraged to set up research foundations which earn a tax concession. I visited the [indistinct] Thiessen Research Foundation which is coming off the steel industry of course, and one of the ways this system's designed is that they aren't allowed to do any research in the area of their own business and [indistinct] Thiessen's Research Foundation was spending all its money on the arts, social sciences and humanities. I wondered if you've looked into a model like that and if so, have you put it towards

Government and started lobbying that kind of idea forward?

PROFESSOR GILLIES: Thanks Simon. I'd like to look into that model further. I'm a little bit aware of it from the arts side and I know that there are those in the German Government who would say that this isn't something which is contributing as much as they would like to national development, but then on the other side, Germany is the arts. It's the country for music more than any other. So, just to have a proper quality of life and standard of living for so many Germans, you just have to have an arts component to it. So I think we're dealing with a different equation.

In Australia, it would be more probably sports than arts that we would be seen to be so important for a lot of the big companies, and that's unfortunate to me personally, but maybe that's just the way our country is different. But to address the very beginning of your question, you were saying about getting a share of - I was seeing rather much a pie being grown, now that's how naïve I am, having only been back here in Canberra for three or four years. I would like to think that this isn't at the expense of the science and technology people. I don't think there's anything I've said today which implies less than absolute respect and desire for those areas to go forward. But, it would need to be something which is adding value to this sector but not at the expense of science. Otherwise, I think that provides an awful equation and you jeopardise

the very effectiveness of the concession by whittling it down, making it smaller, so you can spread it more broadly. But there, we may as well try; and with some of the answers we've been getting back, I think there's certainly an avenue to seek greater clarification of meaning.

CHAIR: David Denham?

QUESTION: Just a quick one, follow up one really I suppose. How do we get people to focus on what they're going to study? Because there's a huge range of things to study to achieve national goals or whatever you want to describe them. Do you have any processes in mind for how we manage that process, do you see what I mean? I mean what the - whether you teach - whether you're studying music, violin or mathematics or whatever. How do you do that to manage and develop the best talents?

PROFESSOR GILLIES: An observation which comes out of a recent series of reports in the arts suggests that very often that choice is determined by parental income and class. Increasingly our performing arts are becoming the plaything of a middle class of sufficient affluence. That's worrying because it cuts out people like that wonderful British dancer Billy Elliott. Those people don't get there because no one takes them up, their parents don't have enough even to pay to get them in the door the first lesson. I worry about that because I think we may have moved away from a greater concept of egalitarianism in student choice and student support in recent years, especially as

students pay such a high percentage now and especially in later years of their education. And I don't think we can enforce this.

In the pluralistic democracy, a very liberal environment, we have to put out a whole series of incentives. We have to be there. Taking the point of Simon: we need to be making the case, not sitting back saying we've been hard done by. We have to be out there advocating, and all sectors need to be there. If there aren't enough students doing engineering, it's maybe because the engineers - and I know they've tried hard, but still need to try harder - need to make people realise the excitement, the primeval thrill of building a bridge. And I'd suggest in it not falling down. Things like that. Maybe we're not communicating enough for the real advantages of the professions, and hence it makes it very hard for students to start bonding with the desire to be one of those professions or to be one of those disciplinary experts.

CHAIR:

Next question Stuart Cunningham from QUT.

QUESTION:

Thank you Malcolm for a very challenging and stimulating address. It reminds me in the focus that you've placed on these three areas of the tax concessions, education and research. It's a little bit like an archeologist trying to reconstruct a dinosaur from a tiny fossil fragment, there are so many missing links for this sector in innovation and innovation systems approach to development of our sector. I wanted to ask you a question, I suppose

that one of the key missing links you didn't mention is the connection between education, R&D and the industry sectors which our sector is so influential in supporting in terms of personnel and I'm thinking of the sectors that you mentioned, film, television, animation, games, multi-media design.

All of these sectors which are growing rapidly. You quoted some figures on their growth potential in this country, but one of the key missing links in, for innovation, is the radical disconnect between education, R&D and these sectors. If you compare the connection between say medical schools and the medical profession or between almost any profession and the education that they receive before they go into that profession, you're struck by the lack of connect between say the film industry and educational enterprises that seek to serve it for instance.

So I'm wondering if you would make some comments about how we can better link the industry sectors and the education services which depend - that serve those industries?

PROFESSOR GILLIES: It's a hard ask especially in a field that's growing so rapidly. Maybe, Stuart, we have the disconnect because we're still looking at those supportive studies in film for instance, as being part of liberal education and not considering them yet enough as part of professional education. Why the medical tie-up is so close is because the medical industry, the medical profession has such a tight control over

what's taught in universities. The professional model is implemented across the universities so that the universities train exactly the skills that are necessary then to go out into the profession.

But we don't have that model yet in this brave new world of creative industries, as far as I can see. It's being built in a few places, but we don't have industry, from the cottages right through to the corporations involved in this area, having a consistent enough message as far as I can see to the tertiary institution saying this is the new professional model. I think it's developing. I see new courses being accredited every year which are moving towards that but I don't think we're there yet.

We have a series of isolated courses in many universities and many other forms in [indistinct] and in TAFE which aren't adding up to the full quid of professional training and making sure that people then have the entire skill set, including the research skill set they may need to work in those industries.

CHAIR:

Our next question comes from an audience member on the right.

QUESTION:

Bobby Cereni from *Questacon* the National Science and Technology Centre. It seems to me in listening to the talk today and also the comments we've had from Minister Nelson and from other speakers over the last two days, that, and as a recent returnee to

Australia, having been overseas for the last four or five years, that we've faced with tremendous challenges at the moment nationally, around the areas of science and technology and public engagement around these issues. We're facing issues of energy use, nuclear power. We're facing issues of water and resource use. We're facing issues around new technologies and it seems to me that this is the opportunity we have to bring together these two silo sectors if you like.

The skills of communication, humanitarianism that we've seen in the arts, the skills of problem solving, analytical and technology that we've seen in science and research. How do we actually break down these barriers in a practical sense? How do we bring together the Deans of Science and the Deans of Education and the Deans of the Arts? How do we actually start to implement some national dialogue and discussion, action in these areas?

PROFESSOR GILLIES: Thanks for the question. I'd just like to just get a sample from the Deans of Arts who are here. Have you met recently with the Deans of Science? Yes. Good. So I think that's where the collaborations are starting. It's within individual universities and its groups of universities and occasional plenary meetings talking about the issues that may be in common. I don't think that we're going to get those Faculties of Arts and Sciences in our universities, however, until we change the way in which we're funding students. Because as we fund them, let's take PhDs, as being either high cost or low cost, and

I won't tell you which equation goes with which side, but I think you can guess it. You create a system which has no desire for those on the high cost side to be having contact with the low cost side because they think it will simply be a drain of resources. We're back to incentives.

We have to move back and consider what is it that would drive the behaviour to be different and it could be that certain universities need to say fine, that's the way the money comes in the front gate but now this is the rule for the way it's going to be distributed within. All institutions do that to some degree, but perhaps not enough are doing it enough.

To answer the question that you were raising about whether this is really a pivotal time in Australia's history, I think it is. Because we have so many really pressing issues and to take water as one. We have proposals that we could have gigantic desalination processes going on, on the East Coast of Australia, a little bit like you find in the Persian Gulf. On the other hand, the way in which we might address the water problem might be to redesign toilets. It might be to have an effect upon the way people think about their use of water. The way they may water their gardens or even if they have gardens and lawns. Those kinds of issues are only really going to be talked about when people with the total parity of [indistinct] sit around the same table and talk the issues through. So you have to find the parity of this theme which gives the parity of argument before you end up with a really

productive solution to those kinds of problems I would suggest.

CHAIR:

Let's conclude on that note.

[Applause]

Professor Gillies thank you very much for your address today. Let's hope that the message you're delivering gets through 'the Hill'. As I was sitting here I was just reminded of the fact that one of the big events in this town is the regular exhibitions we hold at the National Gallery and it seems to me the current exhibition there is the Bill Viola Exhibition which is a fascinating fusion of technology and art. I wonder if politicians can begin to get their head around just what can be created if you do fuse those two things. It's interesting of course that that exhibition comes from the J Paul Getty Museum and an Australian renowned for his arts administration and innovation has just been appointed as head of that museum. But, nonetheless this is today about you and your Council and thank you again very much for your address and we have a small gift here for you. We'd like you to come back so we're giving you a membership to the Press Club.

PROFESSOR GILLIES: Thank you Laurie.

[Applause]

END * *
