

Robert Little
The Secretary
Standing Committee on Education and Employment
House of Representatives
PO Box 6021
Parliament House
CANBERRA ACT 2600

Dear Mr Little

Re: Inquiry into Innovation and Creativity: Workforce for the New Economy

Thank you for your invitation to Charles Darwin University to provide a submission to the Standing Committee on Education and Employment Inquiry into innovation and creativity – workforce for the new economy.

I am pleased to enclose our submission and would be happy to discuss any of the matters raised with you or the Committee if required.

Yours sincerely

Professor Simon Maddocks
Vice-Chancellor

3 March 2016



Standing Committee on Education and Employment

CDU Submission

Inquiry into Innovation and Creativity:
Workforce for the New Economy

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1. SUMMARY

Charles Darwin University makes the following recommendations for consideration by the Standing Committee on Education and Employment in its *Inquiry into Innovation and Creativity: Workforce for the New Economy*:

1. The AQF be expanded to allow a greater range of qualifications with different volumes of learning (e.g. undergraduate Certificates at AQF Level 5, equivalent to 0.5 EFTSL).
2. Government funding be uncapped for all undergraduate courses, recognising that qualifications of a lesser volume of learning than a 3 EFTSL bachelor degree can still add value to the population and can be more attainable for many people particularly those from LSES backgrounds.
3. Universities be permitted to enrol domestic students into individual credit-bearing units, on a full fee basis, without having to be enrolled into a course.
4. Where professional accrediting bodies are established in legislation or regulation, their accreditation remit is considered in the light of universities' (and TEQSA's) academic accreditation remit.
5. VET Fee Help caps are reconsidered for higher level qualifications such as Diplomas.
6. Government further invests in facilitating collaboration between universities and industry on innovation.

2. INTRODUCTION

Charles Darwin University (CDU) is pleased to provide this submission to the inquiry into matters that ensure Australia's tertiary system can meet the needs of a future labour force focused on innovation and creativity.

This introduction provides a brief overview of the context within which this submission is framed – drawing on CDU's development and experience, which has necessitated its own innovation and creativity to meet the challenges of the University's location in a relatively remote and sparsely populated region of Australia.

CDU was the nation's first dual sector university, established just over 25 years ago and originally named the Northern Territory University. CDU is the only university based in the NT and has, in the relatively short space of time since its establishment, achieved remarkable results in teaching, learning and research, being now internationally recognised in the top 2% of world universities and in the top 50 world universities under 50 years old.

CDU has always seen its mandate of providing the human capital that underpins the public good and future prosperity of Northern Australia as its primary role, but has increasingly sought to engage with the broader national and international communities and to realise the opportunities associated with being the Australian university closest to Asia.

More than 10% of Territory residents over 15 years of age enrol annually in either Higher Education or Vocational Education and Training (VET) programs at CDU. However the mix of students and the way they study at CDU differs from other universities. Around 12,000 VET students are enrolled at CDU each year. CDU has, over the years, invested in and developed proven and innovative ways of delivering VET to the Territory community through its ten urban and regional campuses and learning centres, and to around 170 other remote locations in the NT using Mobile Adult Learning Units, that take training to the communities where it is needed.

CDU has established strong links with the NT Government and NT industry in order to provide training that meets the needs of employers, as well as the aspirations of students. CDU prides itself on providing training to the widest possible demographic and to enabling access to students from disadvantaged backgrounds and supporting them to succeed. A demonstration of CDU's success in this area is that the proportion of ATSI students studying VET at CDU is at parity with the NT population (around 30%).

Of the nearly 12,000 Higher Education students enrolled at CDU, a relatively small proportion are school leavers, and a relatively high proportion are mature age, study part time and study online from interstate locations. In order to cater to this unusual student demographic, CDU has been at the forefront of developing innovative, online and flexible learning opportunities for Higher Education students, many of whom never reside in the NT, but whose choice of CDU for study has enabled the University to operate as a comprehensive tertiary education provider in a location without a sufficiently large population to sustain it.

CDU is in the process of finalising a new ten year Strategic Plan, *Connect Discover Grow*, that will ensure that the University remains a sustainable tertiary education provider, operating out of the NT and serving the Territory community, while growing its student base (particularly international students) its revenue streams and its engagement outside the NT.

Through growing its base and financial security, CDU will be in a stronger position to be able to invest in new programs and services and to meet future demand for skills and education in areas that are not even imagined yet.

The Australian and Northern Territory Government agendas for developing Northern Australia place CDU in a relatively unique position as the only University based in the NT, on the doorstep of Asia, and a major contributor to developing a labour force capable of bringing the aspirations of the White Paper on Developing Northern Australia to life. The five industry pillars that play to Australia's strengths and have the most potential for growth in northern Australia: food and agribusiness, resources and energy, tourism and hospitality, international education, health care, medical research and aged care, are areas where this University can have a big part to play in ensuring that the right workforce is available in the north, and that the right information through targeted and applied research is available to ensure development is sustainable and social and economic prosperity and wellbeing is achieved.

3. GRADUATE SKILLS

The extent to which students are graduating with the skills needed for the jobs of today and of the future

The 2015 Committee for Economic Development (CEDA) of Australia Report on Australia's Future Workforce predicts that within ten to fifteen years 40% of Australia's workforce will be replaced by automation, with a further 18.4% being at medium risk of a similar fate. According to CEDA, "jobs that involve low levels of social interaction, low levels of creativity, or low levels of mobility and dexterity are more likely to be replaced by automation" (CEDA, "Australia's Future Workforce" (June 2015), p8).

This prediction has reinforced CDU's awareness of the need to be adaptable and nimble in responding to changing workforce needs, and to produce graduates who are able to meet the challenges of the future, not just the demands of the present. Australian higher education is increasingly focused on work preparation in a narrow sense, in preparing people to operate effectively within the current job market rather than enabling them to respond effectively to jobs not yet conceived. This is evidenced through the dominant measures of higher education academic success, as follows:

- Course completion rates. This assumes that a whole tertiary course provides the optimal preparation for work in the jobs market. The Australian Qualifications Framework (AQF) specifies a range of qualifications according to level and volume of learning in a manner that is largely arbitrary and historically-based. Many students and sponsors of students are able to acquire much of the skills and knowledge that they seek without having to complete an entire qualification (this is particularly true for VET), which suggests greater flexibility in awarding qualifications may be desirable.
- Funding linked to the AQF qualifications. The AQF is an imperfect framework that prioritises the international recognition and transferability of qualifications at the expense of recognising tailored packages of learning that may not align with the AQF course prescription. CDU recognises that whole qualifications have an important place, in that they are comprised of carefully designed, cohesive programmes with inter-related learning outcomes. However, mature age students have shown that they are often quite capable of tailoring their own packages of learning to gain the skills they require.
- Funding for graduate coursework courses linked to entry into the professions. The preferential treatment of courses that provide entry into professions is a clear indicator that the Government preferences higher education for employment purposes. In most cases, arts and humanities and social sciences are disciplinary areas that aren't professionally accredited, however it is those disciplines that may provide the critical thinking necessary for a creative and innovative society.
- Graduate destinations (particularly graduate employment rates). The reliance on this indicator suggests that the purpose of higher education is to prepare people for the world of work, rather than to prepare them to be effective thinkers and innovative and creative in whatever endeavours they may then embark upon. A more relevant indicator might be "graduate achievements" within, say, two years and five years of graduating.

This would be difficult to objectively measure, which may account for employment rates and starting salaries as a crude proxy.

- Employer satisfaction. This is not yet activated in Quality Indicators for Learning and Teaching (QILT), but is pending. This indicator assumes that what the employers want is a proxy for measuring innovation and creativity. This is improbable for many employers, and high employer satisfaction is not necessarily related to graduates either being innovative and creative, or having the opportunity to exercise these capabilities.
- Work Integrated Learning (WIL). The importance of WIL has become a dogma as higher education is increasingly promoted as a means to a job. While WIL can no doubt contribute to students' ability to integrate theory and practice, in an AQF model with largely fixed volumes of learning, increasing the volume of WIL activity necessarily decreases the volume of theoretical or other activity-based learning. CDU does not object to the increased importance of WIL, but does note it as an indicator of an increased focus on employment readiness.
- Report Timing. Universities must submit to the Department of Education "Campus File" and the "Course File" for the following year, by 1 August. This is 7 months prior to the commencement of Semester 1, which is a long lead time in which the course offerings are essentially fixed. The ability for universities to rapidly respond to the market would be improved with shorter government lead times. CDU notes that the 1 August date is also 11 months before the commencement of Semester 2, and 16 months before the commencement of Summer Semester. While it is possible to resubmit changes to the Department, it may be appropriate to have multiple submission points during the year.

In relation to VET, the impact of VET fee capping has impacted CDU's ability to attract students to higher level Diploma studies and this has implications for the future workforce in terms of students being able to upgrade their skills. The workers of the future will increasingly need higher level qualifications such as Diplomas and Advanced Diplomas to prepare them for paraprofessional jobs. VET Fee Help capping has this year meant that only a limited number of students wanting to study Diplomas at CDU will have access to an income contingent loan. This stifles CDU's ability to innovate and shift our program/qualification mix in VET to respond to industry needs and student aspirations for higher level VET qualifications.

CDU's overall education programs are designed to foster and enable an orientation in students to life-long learning. CDU's graduate attributes have a focus on skills and capability that enable students to adapt to new work challenges and environments creatively. Of particular relevance to this Inquiry, successful CDU graduates should have personal practical knowledge core attributes that enable them to:

- Conceive of imaginative and innovative responses to future challenges
- Have initiative and enterprise skills that contribute to innovative outcomes
- Identify, retrieve, evaluate and use relevant information and current technologies to advance learning and work performance
- Be efficient and innovative project planners and problem solvers capable of applying logical and critical thinking to problems across a range of disciplinary settings

- Have an understanding of the broad theoretical and technical concepts related to their discipline, with relevant connections to industry, professional, and regional and Indigenous knowledges.

However, at CDU, and at other Australian universities, higher education graduates have learning experiences that have been structured by the university in close collaboration with professional bodies, many of which accredit the courses offered. Professional accrediting bodies are increasingly prescriptive in regards to curriculum (including entrance and exit standards, content matter and methods of assessment). This has weakened universities' ability to innovate in the curriculum. One obvious example is the insistence by some professional accrediting bodies on having invigilated final exams, when decades of androgogical research has revealed that methods of authentic assessment support superior learning outcomes. Another example is that the increasing demands for content related to professional practice have meant that the space for general elective units in courses has decreased, resulting in diminishing opportunity for breadth of learning, particularly in terms of exposure to multidisciplinary perspectives. So while this system is designed to produce graduates that meet the professional bodies' workforce requirements it may also work against the development of graduates who are broad and critical thinkers, who can go on to choose and excel at a range of different careers and jobs.

Given that most graduates will have around ten career or job changes during the course of their working lives, there is an argument that streaming school leavers, in particular, into specific discipline areas so early on in their tertiary education experience does not best equip them for the range of potential careers they may have during their working lives and that the system is raising false expectations of employment in core disciplines and producing graduates with fairly narrow attributes that actually reduce their broader employment prospects.

A broader set of skills, such as the CDU graduate attributes outlined above, which empower graduates to think critically and creatively, and more specialist on the job training as graduates' careers evolve, might better serve the workforce of the future. This type of system operates in America, whose liberal arts college system produces more broadly educated graduates who largely then go on to engage more strategically in their university studies, than the more discipline defined undergraduate programs prevalent in the Australian university system. The University of Melbourne model has sought to address this very issue.

Providing students with an education, not just a qualification, is more likely to produce a workforce that is creative and innovative for the future. Innovation is most likely to occur at the interface of disciplines, where knowledge and ideas from different areas result in synergies and collaborations that enable new inventions and new ways of doing things to flourish.

4. LAWS AND REGULATIONS

Matters relating to laws and regulations that may act as a barrier to education providers being able to offer qualifications that meet the needs of the new economy and fastest growing sectors

As a general comment, post-school education in Australia tends to be excessively regulated and once an activity is overly regulated it becomes inflexible. While regulation is intended to assure quality and integrity in the sector, this also acts to stifle creativity and innovation in relation to how teaching is delivered, how learning is achieved and how quickly the sector can respond to the changing needs of the workforce and society.

Comments outlined in section 2 are also relevant to this section.

5. INDUSTRY PARTNERSHIPS

Factors that discourage closer partnerships between industry; in particular small and medium enterprises, the research sector and education providers; including but not limited to: intellectual property; technology transfer; and rapid commercialisation.

Rather than focus on factors that discourage closer partnership between industry, the research sector and education providers, it would be better to focus on factors that encourage these relationships. Higher levels of public investment in facilitating collaboration between public and private sectors in innovation are probably needed to bridge the gap and get these partnerships working effectively. Universities can lead by making the establishment of industry partnerships a priority and bringing in more academics who have worked in industry, but support and incentives to encourage the development of these relationships is clearly needed within the Australian university sector.

CDU operates in a very remote jurisdiction with a relatively small population (around 244,000). There are around 14,000 active businesses in the Northern Territory, and the vast majority are classed as small and medium enterprises with fewer than 150 employees. The biggest business sectors are mining, agriculture, tourism, construction and public administration.

CDU has world class research strengths in the public good disciplines of environmental science and Indigenous and tropical health, as well as social policy, and is developing research capability in engineering and technology focused on sustainable and renewable use of natural resources and primary industry. These areas of focus have meant that to date CDU has developed strong links with government and with government agencies and industries involved in environmental management and resource development, health and development of public policy.

CDU's experience shows that partnerships between universities and external agencies including industry are really only effective if they are developed as long term strategic relationships that both parties are committed to, that have a shared vision and that involve individuals on both sides who have built trust and an understanding, or a willingness to understand, the others' world, be it industry, government or academia.

Given CDU's current research strengths, technology transfer and rapid commercialisation are not areas where CDU is likely to be a significant player in the short term, but with the Australian and NT Government agendas for developing northern Australia, there will be important areas where CDU's expertise and experience operating in a remote part of the country for over a quarter of a century will be able to make a significant contribution to government and industry efforts to develop the north. CDU is also located in Darwin, the Australian city that is truly the gateway to Asia, with rail and transport links that make Darwin a potentially major base for Asian related industry and trade.

CDU will play a dual role in providing expert knowledge to develop the north sustainably, while educating and training the workforce needed to underpin that development locally and will therefore continue to foster and maintain close links with industry to determine their knowledge and workforce needs.

Three case studies of CDU collaborations with industry are outlined below to demonstrate current activity that highlights the benefits of university and industry partnerships and the role these kinds of relationships can play in enabling CDU to be both innovative and creative in its teaching and research activities and how these will flow on to developing the workforce of the future.

Industry Collaboration Case Study 1: Supporting the NT Energy and Resources Sector

Primary Partners or End Users

- Charles Darwin University (CDU);
- Northern Territory (NT) Government;
- Ichthys LNG Pty Ltd: a Joint venture between INPEX group companies (the Operator), major partner Total, CPC Corporation Taiwan, and the Australian subsidiaries of Tokyo Gas, Osaka Gas, Kansai Electric Power, Chubu Electric Power and Toho Gas;
- Energy and Resource Sector operating in Northern Australia.

Sector

- Government and private industry

Sources of Support

- In 2012, the Ichthys LNG Project Joint Venture participants committed \$3 million to the construction of the \$5.24 million North Australian Centre for Oil & Gas (NACOG) facility based at the CDU campus in Darwin, NT.
- The NT Government also contributed to the cost of the facility with CDU providing the land.

Purpose of the Program

- CDU's North Australian Centre for Oil and Gas (NACOG) undertakes research to support the resource and energy sector in Australia's north. For example, NACOG has a particular focus on corrosion-related issues relevant to the oil and gas industry that are unique to tropical environments. Corrosion is an issue for any industry, but especially for petroleum production and processing operations located off-shore or near the coast. Northern Australia's extreme wet tropical climate makes for a particularly challenging environment.
- Darwin is, therefore, an ideal location to investigate corrosion prevention and control in the wet tropics, with the aim of helping industry reduce its maintenance costs and extend the effective life of plant and equipment. Many corrosion issues can be prevented or mitigated through appropriate design, monitoring and control systems.
- The overarching purpose of CDU's Corrosion Research Program is to determine how the marine environment in tropical waters affects equipment, and then assist with improving the integrity of the materials so they are better suited to northern conditions

Summary of Collaborative Approach

- CDU established NACOG in 2012 in collaboration with industry and government as a training and research centre to respond to and support growth opportunities in the resource and energy sector.
- NACOG's focus and investment aligns with the priorities outlined in the White Paper on Developing Northern Australia, and the emphasis on meeting the energy needs of Australia's region. LNG, in particular, has rapidly become an important export for Australia and is now Australia's third largest export after iron ore and coal.

Details and Analysis of Impact

- A social return on investment (SROI) evaluation was undertaken on NACOG by INPEX to understand the value created by the investment. SROI uses established economic valuation techniques to express the social, environmental and economic impacts of a program or organisation in monetary terms.
- The value created by NACOG found that for every \$1 invested \$4.50 of social and economic value was created over the fifty-year life of the building. Investment in NACOG has attracted staff with particular expertise and enabled the university to develop a new capability in the NT to serve the needs of this growing and important industry.
- Following the oil and gas industry boom in Northern Territory, there has been a demand for upskilling in a number of areas including engineering. Two areas of engineering NACOG concentrates on are corrosion and materials engineering. Corrosion is a significant issue in the oil and gas industry due to the variety of chemicals used and, more so, in the tropical weather conditions of Northern Territory.
- NACOG has been providing engineering conception, design, implementation and maintenance support to the industry in problems involving selection, repair, and maintenance advice and through failure analysis to inform the system engineering process. The close interaction with industry has resulted in industry having confidence in NACOG and drawing upon its expertise. This in turn has resulted in local industry development with local skills.
- A number of CDU research students have undertaken thesis projects to develop skills in areas that are relevant to the local industry.

Industry Collaboration Case Study 2: Malaria Research Indonesia

Primary Partners or End Users

- Menzies School of Health Research at CDU
- Indonesian Ministry of Health (MOH)

Sector

Government; private industry; civil society

Sources of Support

PT Freeport Indonesia

- In-kind support: IT, transportation, health workers salaries (+AUD1m)

Rumah Sakit Mitra Masyarakat (RSMM) Hospital

- Clinical laboratory space provided in-kind

Mimika District Government

- Funding for promotion of Artemisinin-based Combination Therapy (ACT) in Timika

Indonesia Ministry of Health

- Salary support for MOH researchers

DFAT [Australian Aid Program]

- +\$1.2m through the Strengthening the Timika Translational Research Facility
- Australian Leadership Award funding, including for Dr Rini Poespoprodjo, an Indonesian paediatrician. Dr Rini completed her PhD on “Maternal and Child Health in Papua Indonesia – the epidemiology of malaria and strategies for its treatment and prevention”.

LPI [local Papuan NGO]

- Use of buildings and purchase of anti-malarial drugs

Purpose of Program

- Malaria is a major cause of death in the Asia-Pacific, infecting around 500 million people each year and killing up to 600,000. Almost half of Indonesia's population of 250 million live in malaria endemic areas with 15 million people seeking treatment for clinical malaria each year. Papua province not only has the highest prevalence of malaria in Indonesia but also the highest prevalence of multidrug resistance to both *P. vivax* and *P. falciparum*.
- The Malaria Research Program in Indonesia aims to undertake clinical and field work to investigate the occurrences of drug resistance and advance understanding of how Plasmodium parasites, that cause human malaria resulting in severe diseases and death, and use this information to identify better ways to prevent and treat malaria in different environments, facilitating policy change and monitoring the impact of such change on the health of communities.

Summary of Collaborative Approach

Menzies work in Papua Indonesia is a collaborative partnership with the Indonesian Ministry of Health, local government and civil society. The partnership has also worked closely with industry partners, including PT Freeport Indonesia for in-kind support. The purpose of our work is to undertake translational research to inform national policy and practice, and to assist the Papua region develop local expertise, in research, education and training, health policy and service delivery.

Details and Analysis of Impact

Over the last 20 years, this collaboration has had an immense impact on the health of the Timika population, especially in vulnerable pregnant women and infants. In the key areas of Menzies research the following impacts can be traced:

Malaria

- A Deloitte's report (2012) valued Menzies' economic contribution in the region through research on malaria at \$297m, with a return on investment factor of 72.
- In Mimika district, these studies and resulting policy and treatment changes resulted in: a 49% reduction in malaria, fivefold reduction in hospital admissions, and threefold reduction in perinatal mortality.
- Investment has resulted in antimalarial clinical trials and peer-reviewed articles that have directly impacted on national and regional policy, as well as World Health Organisation guidelines.
- Based on Menzies' research, Indonesia became the first country to adopt DHA-piperazine as first line malaria treatment of uncomplicated malaria from all species, including pregnant women and young children. A large multicentred study of severe malaria demonstrated the superiority of intravenous artesunate over intravenous quinine, resulting in Indonesian and global policy change.

Maternal and Child Health

- Menzies and its partners have helped to change policy for the treatment of malaria in pregnancy and babies. This resulted in significant reductions in low birth weight babies and perinatal mortality. On the basis of this evidence, Indonesia changed national policy to DHA-piperazine for pregnant women. The WHO is currently reviewing the implication of these findings with regard to international policy.

Menzies' research impact comes from a unique translational approach, from an appreciation of the local healthcare providers and priorities, and the relationships that have been built with key stakeholders. Menzies staff and partners include key policy makers, healthcare providers and community leaders and Menzies has established an innovative public private partnership with the local commercial sector, resulting in private funds being leveraged to support the research facility and hospital in Indonesia.

Industry Collaboration Case Study 3: Vocational Education and Training

An example of enterprise based training delivery through CDU VET in collaboration with industry illustrates the future potential of industry partnerships to enhance training outcomes. CDU's successful collaboration with Neptune Asset Integrity (NAI) was established by a cooperative partnership focussed on developing technical linkages between CDU, NAI and industry in the NT. This collaboration enables CDU to maintain industry currency and deliver customised training to satisfy the current and future labour market requirements of the oil and gas industry. Having NAI located on campus and working closely with CDU's School of Trades (VET), provides an opportunity for real-time collaboration between NAI and CDU. NAI also promotes CDU's training, consulting and applied research services to their industry partners.

Applied research, particularly in the VET sector, is an obvious enabler to help predict future training market trends and ensure training products remain contemporary and relevant. Applied research focussed on future labour market patterns can help shape vocational training. For example; the next major phase of economic activity in the NT and other resource rich jurisdictions will most likely be in the maintenance services sector. Large processing plants (oil and gas) and completed, or soon to be completed, infrastructure developments to support the oil and gas industry will require a large workforce to maintain them. Working in partnership with industry, research projects will provide an opportunity for CDU to analyse course needs, new training programs and training methodologies to position VET for the next phase of economic development and remain abreast of advances in the industry.

These case studies demonstrate CDU's connection to issues in the region and are models of engagement with industry and government that CDU will continue to build on in fostering mutually beneficial relationships with external partners and developing innovative solutions to the challenges of northern Australia and the near Asian region.

6. ENTREPRENEURSHIP

Relationships between tertiary education entrepreneurship programs and private incubator and accelerators.

CDU's location in the Northern Territory, in a remote region with a relatively small population, presents particular challenges in initiating relationships between education entrepreneurship programs and private incubators and accelerators compared to other jurisdictions. This may change in future as northern development gains pace and new industries are attracted to the north, but at present there is limited capacity for CDU in this area. The CRC for Developing Northern Australia (or another funding program such as a new round of Collaborative Research Networks) could provide the necessary support to provide momentum to the Northern Territory community in this regard.

7. CONCLUSION

In concluding, CDU makes the following recommendations for consideration by the Standing Committee on Education and Employment:

7. The AQF be expanded to allow a greater range of qualifications with different volumes of learning (e.g. undergraduate Certificates at AQF Level 5, equivalent to 0.5 EFTSL).
8. Government funding be uncapped for all undergraduate courses, recognising that qualifications of a lesser volume of learning than a 3 EFTSL bachelor degree can still add value to the population and can be more attainable for many people particularly those from LSES backgrounds.
9. Universities be permitted to enrol domestic students into individual credit-bearing units, on a full fee basis, without having to be enrolled into a course.
10. Where professional accrediting bodies are established in legislation or regulation, their accreditation remit is considered in the light of universities' (and TEQSA's) academic accreditation remit.
11. VET Fee Help caps are reconsidered for higher level qualifications such as Diplomas.
12. Government further invests in facilitating collaboration between universities and industry on innovation.

