Understanding completion rates of Indigenous higher education students from two regional universities: A cohort analysis

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Terminology

The term 'Indigenous' has been used to collectively refer to Aboriginal and Torres Strait Islander peoples of Australia. We recognise that this term is not universally accepted. Within this report it has generally been used for the purposes of brevity and is in no way intended to be disrespectful of the diversity of tribal groups, languages, cultures and connections to sea and lands that make up the population of First Australians.

The researchers pay their respect to Aboriginal and Torres Strait Islander peoples as the traditional owners of lands and seas across Australia.

List of main acronyms

ABS	Australian Bureau of Statistics
ACIKE	Australian Centre for Indigenous Knowledges and Education
ATAR	Australian Tertiary Admission Rank
BIITE	Batchelor Institute of Indigenous Tertiary Education
CDU	Charles Darwin University
CGS	Commonwealth Grant Scheme
CHESSN	Commonwealth Higher Education Student Support Number
CQUniversity	Central Queensland University
DET	(Commonwealth) Department of Education and Training
DHS	(Commonwealth) Department of Humans Services
DSS	(Commonwealth) Department of Social Services
HECS	Higher Education Contribution Scheme
HELP	Higher Education Loans Program
HEPPP	Higher Education Participation and Partnership Program
HESA	Higher Education Support Act
ILREN	Indigenous Leadership Research and Evaluation Network
ISSP	Indigenous Student Success Program
LLN	Language, Literacy and Numeracy
MCEETYA	Ministerial Council for Education, Employment, Training and Youth Affairs
NESB	Non-English Speaking Background
OLT	Office of Learning and Teaching
PM&C	(Commonwealth) Department of Prime Minister and Cabinet
SEIFA	Socio-Economic Index for Areas
SES	Socioeconomic status
STEM	Science, Technology, Engineering and Mathematics

| VET | Vocational Education and Training |
| WCE | Whole of Community Engagement |

Ethics

The project received ethics clearance from the CDU Human Research Ethics Committee on 22 November, 2017 (H17125).

Executive summary

Data shows that Indigenous higher education students have lower access, participation and completion rates compared with non-Indigenous students. Indigenous students from regional and remote areas face additional challenges and barriers in accessing and participating in higher education and are further under-represented in the national Indigenous higher education student population. They are likely to belong to multiple equity groups, attracting significant educational disadvantage when the appropriate systems are not in place to support them.

There have been numerous calls for an improved evidence base to inform better policy and practice to support increased Indigenous participation and success in higher education (e.g. Anderson et al. 2008; Behrendt et al. 2012; Frawley et al. 2015). This, coupled with statements from the Commonwealth Government asking for greater transparency and accountability around indicators of student success and student attrition[1], provides the impetus for more targeted research. This report investigates the higher education outcomes of Indigenous students enrolled in two regionally based universities—the Charles Darwin University (CDU) and the Central Queensland University (CQUniversity)—bringing together quantitative and qualitative analysis.

In comparison to the national domestic student population, the CDU/CQUniversity Indigenous student profile shows they are:

- generally from regional and remote Australia and from low socioeconomic status (SES) classified areas
- likely to be studying externally (including online and distance learning)
- likely to be female
- likely to be mature-aged (25 years and over)
- more likely to have an identified disability but less likely to identify a non-English speaking background
- likely to be admitted through pathways other than secondary school
- highly likely to be the first in their family to enrol in university
- likely to be enrolled in a limited number of study areas (society and culture, education or nursing) and unlikely to be enrolled in Science, Technology, Engineering and Maths (STEM) subjects if they are female.

Student enrolment data collected by universities are complicated, reflecting the often complex nature of student engagement with higher education. Students can discontinue and re-enter degree courses over time, exit with a different degree type, change their study discipline, change universities within their degree, and change their study intensity between full and part-time, and study modality between internal and external. These factors influence the length of time it may take to complete a degree and relative success and completion rates.

Cohort analysis provides a data methodology that can track students through their higher education pathway and identify relationships between characteristics of a population and that population's behaviours (Commonwealth Department of Education and Training [DET] has applied cohort analysis to the domestic all-student university population since 2014). Combined with qualitative student narratives, the cohort analyses in this report provide a richer understanding of how Indigenous students enrolled in CDU/CQUniversity progress through their university study.

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[1] In 2017 Senator Birmingham, Education Minister, asked the Higher Education Standards Panel to investigate factors influencing student completions.

The main findings show that when compared to the national Indigenous student population, Indigenous students from CDU/CQUniversity are less likely to complete a higher education award. However they have comparable levels of persistence and commitment, and around six per cent are still engaged with their study 10 years after enrolment. Student and study characteristics are associated with successful completion in similar as well as different ways to the national DET all-student cohort analyses, with many of the characteristics inter-related. Compared to men, more Indigenous women are participating, and they are successfully completing at much higher rates. Results also point to full-time study intensity and a multi-mode design (combining both internal and external elements of course work) being associated with higher award completion success. Remoteness is compounding issues around access and participation, with barriers related to communication, technology and financial support all identified as significant in student and staff interviews that investigated factors contributing to Indigenous student success.

The process of analysing the data highlighted weaknesses associated with the student enrolment data, as well as the design of information systems and current evaluation targets and methods when they are applied to Indigenous students from regional and remote areas. It also pointed to some specific research gaps and the continuing under-representation of Indigenous students who speak languages other than English (who are more likely to be living in regional and remote areas). Utilising student enrolment data on its own was found to have limited ability to predict success. Contextualising these results with student and staff narratives recognises the multifaceted dimensions associated with successful completion and identifies the need to consider the uniqueness of Indigenous student circumstances in regional and remote areas.

The report calls for further commitments to improved data, and quantitative methodologies for monitoring progress. When accompanied by targeted qualitative research (narratives and surveys) the analyses provide the depth of understanding required for targeted Indigenous higher education policy and practice appropriate to those students from regional and remote places.

Recommendations

Long term cohort tracking

1. **Expand DET's annual cohort analysis** of higher education students **to include separate analysis of the national Indigenous student population**. These results are important in their own right but also provide a benchmark for regional and remote Indigenous cohorts (p.42).

2. **Continue this cohort analysis of Indigenous students enrolled in CDU/CQUniversity and consider extension to include groups of universities that are servicing a majority of Indigenous students from regional and remote areas to increase the size of the analysis dataset.** (p.59, p.62).

Data and system changes

3. **Extend timeframe reporting of Indigenous student higher education award completion to a minimum of 10 years** which will better acknowledge and reflect the familial, cultural, social and employment obligations that Indigenous students face. Investigate the impact of this timeframe on maximum time limitations for higher education awards imposed by universities (p.42).

4. Reflecting the more complex and demanding nature of Indigenous student's engagement with higher education, **develop a more sophisticated evaluation process, including targets and measures, for reporting participation and completions of Indigenous higher education students** (p.57).

5. **Design better data and information systems** that are equipped to capture the multiple higher education entry and exit points, and any changed study intensity, that have been noted in this report. This should be accompanied by a number of data initiatives including:
   - **university-led campaigns for collecting higher quality enrolment data** on the personal characteristics of: Indigenous status; first-in-family status; place of usual residence on enrolment application; non-English speaking background; and disability status
   - **a single unique student identifier which can link study across the university and Vocational Education and Training (VET) sectors** that can assist in tracking transitions (across courses, universities and sectors) and identify success at various exit points
   - **ongoing survey collection and qualitative study focused on disengage/re-engage behaviours** to understand why Indigenous students leave higher education study and what prompts them to return (p.62).

Specific research gaps

6. **Investigate the relative success of course design and flexible delivery of higher education study units**, particularly on understanding how multi-mode delivery assists completion in regional and remote contexts (p.53).

7. **Increase both quantitative and qualitative research focus on enabling courses.** Who is accessing them? What is working? Where are the gaps in translating participation into enrolment and then to success? (p.56)

8. **Increase research attention on the low participation of Indigenous men in higher education**, particularly in regional and remote areas (p.48).

Indigenous students from non-English speaking backgrounds

9. **Acknowledge the additional English Language, Literacy and Numeracy (LLN) needs of some Indigenous students** and provide equivalent support structures as those extended to migrant and international students (p.50).

10. **Continue engagement work with Indigenous communities who speak languages other than English to increase aspiration and participation in higher education generally** (p.51).

Background

Increasing access, participation and success in higher education of Aboriginal and Torres Strait Islander students (referred to as Indigenous[2] students from here on) is a major education priority in Australia (Behrendt et al. 2012; Frawley et al. 2015; Smith et al. 2017a; Frawley et al. 2017a; Gore et al. 2017; Street et al. 2018). Indigenous students from regional and remote/very remote areas continue to be under-represented within the wider Indigenous higher education student population (Smith et al. 2018a; Pollard 2018). Indeed, we know that the cumulative impact of belonging to multiple equity groups—as is the case for all regional and remote Indigenous students—creates significant educational disadvantage when appropriate systems are not in place to accommodate the diversity of their needs (Smith et al. 2018a; 2018b). Recent research examining the evolution of Indigenous higher education policy in the Northern Territory has identified a complex array of factors that influence Indigenous student higher education participation (Street et al. 2017b; 2018). While there have been some promising initiatives about understanding and building aspirations for higher education among regional and remote Indigenous communities in the Northern Territory and elsewhere across Australia (Fredericks et al. 2015; Irwin et al. 2015; Street et al. 2017a; Moore et al. 2018), it is too early to assess the longer-term impact of such programs.

Charles Darwin University (CDU) and Central Queensland University (CQUniversity)—the two partner universities on this project—have significant Indigenous student cohorts and had high access[3] and participation rates[4] at the time of this study — 9.5 and 7.8; 4.5 and 3.9 respectively (DET, Selected Higher Education Statistics — 2017a). Both universities also have a student catchment from regional and remote areas and share common challenges in nurturing and supporting their Indigenous students to higher education success and graduate completion.

The Commonwealth Government has called for more information on factors contributing to student attrition and evidence of strategies that can improve higher education completions (DET 2017). It is interested in enhancing performance transparency and institutional accountability around indicators of successful completions (student achievement of higher education degrees) and lower student drop-out rates (student retention and student attrition measures). The enrolment, participation and completion indicators that have now been embedded into the guidelines and subsequent reporting of the Indigenous Student Success Program (ISSP) which is administered by the Commonwealth Government Department of Prime Minister and Cabinet (PM&C), are indicative of this interest (Smith et al. 2017b; 2018b). Importantly, Indigenous student completion rates now have clear ISSP funding implications for Australian universities (Smith et al. 2017b).

However, student progress through higher education is complex — students can become inactive, discontinue and re-enter degree courses over time, exit with a different degree type, change their study discipline, change universities within their degree, and change their study intensity between full and part-time, and study modality between internal and external. These factors influence the length of time it may take to complete a degree and relative success and completion rates. This may also differentially impact the Indigenous student population as a whole, and the regional/remote Indigenous student population in more specific ways. Success can also be defined in a number of ways including partial completion of award courses and other qualitative measures (Smith et al. 2018b; Street et al. 2018).

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[2] 'Indigenous' refers to Aboriginal and/or Torres Strait Islander people, and Australian First Nation's people. We use the term 'Indigenous' for brevity and with no intended disrespect to their diversity.

[3] Access rate = commencing Indigenous students/all commencing (domestic students)
[4] Participation rate = Indigenous students/all (domestic) students

Cohort analysis provides a methodology that allows identification of relationships between characteristics of a population and that population's behaviours. A Commonwealth Department of Education and Training (DET) student cohort tracking project has provided a better understanding of general domestic student progress through the higher education system and is in its fourth iteration. Results for the 2005 cohort showed that, overall, considerably less Indigenous students had completed their degree award by 2012 (45.5 per cent compared to 72.6 per cent of non-Indigenous domestic students), however more Indigenous students were still enrolled (9.3 per cent compared to 5.3 per cent of non-Indigenous domestic students) (DET 2014). Results are provided for the national Indigenous student population only (defined using the self-reported student Indigenous identifier question on enrolment) with 'Indigeneity' treated as one of the characteristics of the total student population.

This research was interested in using the same student and study characteristics of the Indigenous student population that the DET analysis applied to the total domestic student population (e.g. home address being regional/remote, study intensity, admission basis, mode of study etc.). They were applied to data about Indigenous students enrolled at CDU and CQUniversity with cohorts established for groups of students who were enrolled in the years 2005 through to 2012. Differences *within* this Indigenous student group (particularly with regards to equity group characteristics) can then be better understood.

Findings from recent qualitative studies (Smith et al., 2018c, Wood et al., 2018) about Indigenous student participation undertaken by both CDU and CQUniversity, were used as an explanatory framework to complement the findings from the cohort analysis. The adoption of this approach assisted identification of the relevance and importance of particular student characteristics to the likelihood of completion, and pointed to where study design, student assistance, and student support programs could have the greatest impact. Where appropriate, comparisons were made with the national Indigenous domestic student population (total), and the non-Indigenous domestic student population enrolled at CDU and CQUniversity.

Introduction

Access to education has been associated with positive social, health and wellbeing outcomes (see Junankar & Lui 1995 on the high social return from access to education for Indigenous Australians; Marmot 2004; Laming et al. 2016). Furthermore, access to higher education has been linked to declines in poverty (Swail 2003). Indeed, the 2016 Graduate Outcomes Survey (QILT 2016) showed that the 'gap' in employment rates comparing Indigenous and non-Indigenous peoples closes when they have a Bachelor level qualification. However significant disparities exist between these populations for both participation in higher education and success in award completion. The *Review of Australian Higher Education* (Bradley et al. 2008) argued that improved higher education outcomes for all Australians positively impacts the whole nation's wellbeing and recommended sector-specific targets for all underrepresented groups in higher education, including Indigenous students. It also recommended that the Commonwealth Government regularly review the effectiveness of Indigenous higher education access and outcomes measures.

Successive Commonwealth Governments have reacted to the range of evidence linking increased education with social and economic benefit by providing a number of funding and resource initiatives to encourage equitable access to higher education for students disadvantaged by their socioeconomic circumstances. In addition they have targeted funding for Indigenous students through scholarships and social payments, as well as programs that support increased aspiration for university education for individuals, their families and their communities, such as the Higher Education Participation and Partnership Program (HEPPP).

The *Review of Higher Education Access and Outcomes for Aboriginal and Torres Strait Islander People* (Behrendt et al. 2012) stated that to support success, "Aboriginal and Torres Strait Islander students needed access to a range of social, financial and academic support" and they tasked this to be a "whole-of-university effort" (page 12). The Review Panel proposed a number of recommendations including: creating an improved evidence base to monitor progress; building higher education aspirations and active mentoring; improving access to enabling courses; increasing scholarship support and other support programs; embracing Indigenous knowledges, expertise and skills within curriculum and teaching practices; and increased numbers of Aboriginal and Torres Strait Islander staff (both general and academic) particularly in senior governance positions. The panel also argued this should be a shared agenda for universities, governments, business and the professions, schools, and Aboriginal and Torres Strait Islander people and communities.

"Achieving parity in enrolments, retention and completions across a broader spread of disciplines will tell us not only that the choice to participate in higher education is the norm for Aboriginal and Torres Strait Islander people but also that the higher education system is supporting their success." (part iii, page 12).

The Behrendt Review termed "parity" to include retention and completion rates matched with non-Indigenous students and recommended this be based on the proportion of the total Indigenous population aged between 15 and 64 (Behrendt et al. 2012, page 10).

Overview of higher education funding arrangements from 2005

Funding to institutions

In Australia, the funding of higher education is predominantly a Commonwealth Government responsibility. Since 2005, higher education policy and practice has changed regularly in response to numerous reviews and the ideology of the government in power. The programs and support arrangements in place for Indigenous higher education have changed over time

and have often been spread across a number of separate Commonwealth Government Departments.

The Higher Education Contribution Scheme (HECS) was introduced into the funding arrangements of tertiary education in 1989 requiring Australian undergraduates to make a contribution to the costs of their degree. Since this introduction, the majority of funding to universities for tertiary education is administered under the *Higher Education Support Act (HESA) 2003*, with the main responsibility lying with the DET. Regional loading was incorporated into the Commonwealth Grants Scheme from 2004 — i.e. students attending regional campuses attracted additional payments for the institution depending upon the location and size of the campus.

In 2005, universities were allowed to determine their own student contribution level (HECS) for each course offering within pre-determined ranges, which allowed for some domestic students to be full-fee paying. Scholarships were made available to assist students from low SES backgrounds and Indigenous students through the Commonwealth Education Costs Scholarships, and the Commonwealth Accommodation Scholarship assisted students from rural and isolated areas who had to move in order to study.

In 2012, one of the major higher education reforms was to 'uncap' the allocation of university places funded by Commonwealth Government legislation through a demand-driven system for domestic students. It was preceded by a transition period whereby the previous five per cent over-enrolment cap for Commonwealth Support Places for domestic bachelor degree students at public universities was increased to 10 per cent in the years 2010 and 2011. These changes resulted in a large increase in domestic student numbers which eventually caused government reaction because of expected future cost increases to the federal budget (Dow, 2013). The Commonwealth Government looked to initiatives that could slow demand including the full deregulation of fees. However measures remained that were aimed at improving the participation of low SES students and increasing their eligibility to student income support.

In December 2017, the Commonwealth Government announced that it would effectively end the demand-driven system. The state of play in 2018 is that the Commonwealth Grant Scheme (CGS) covers direct funding to universities to subsidise students' tuition costs, and the Higher Education Loan Program (HELP) provides income-contingent loans to help students meet their study costs (DET, 2018). Other grants are made available including:

- the Disability Support Program to improve access for students with disabilities
- the ISSP to assist Indigenous students
- the Structural Adjustment Fund which assists universities to operate more competitively in the demand-driven funding environment
- the HEPPP which supports university efforts to increase higher education participation of people belonging to equity groups
- other specialised programs to support excellence in learning and teaching, superannuation, and maths and science partnerships.

This complex policy and resourcing environment around funding higher education has played out against a background where Australian universities have actively increased their focus on the international student market. There have been significant increases in full fee paying overseas students, with the provision of tertiary education recognised as a significant export industry for Australia — "Australia is the world's third most significant destination for international tertiary students, behind the United States and the United Kingdom." (UA Policy Statement 2013-2016).

Funding to Indigenous students

ABSTUDY was originally introduced in 1969 to assist Indigenous students to access tertiary education through financial support, but was broadened to cover some school-based education assistance which acknowledged the need for Indigenous students to first complete high school before transitioning into post school education (Street et al. 2018). To be eligible for ABSTUDY social payment support for tertiary study, a student must:

- be of Aboriginal or Torres Strait Islander Australian descent
- identify as an Aboriginal or Torres Strait Islander Australian
- be accepted as such by the community in which they live or have lived
- be an Australian citizen and normally live in Australia
- be covered under one of the seven ABSTUDY Awards
- be studying an approved course or doing an Australian Apprenticeship.

These payments are not made through application to the DET, rather separate components are administered through the Department of Humans Services (DHS) or Department of Social Services (DSS) under the *Student Assistance Act 1973*. They include a tertiary award for full-time (or concessional study load) tertiary students as well as a part-time award for students who are part-time, (of any age) undertaking tertiary study. Testing and Assessment Awards are available for students who need to travel for tests, assessments or interviews before starting their studies. Remote Area allowance is an extra payment for students living in a remote area and who are already in receipt of an income support payment from DHS. The range of social payments made available to Indigenous students is assessed according to their particular circumstances (see Table 1). ABSTUDY living allowance payment rates are aligned with other mainstream allowances and are means tested (although some supplementary components are not). It can be a complex and time-consuming process for students to navigate.

'Away from base' assistance is part of the ABSTUDY award, however it is administered by the Commonwealth Department of PM&C as part of their Indigenous Affairs portfolio. The assistance is provided as specific funding for activities that require ABSTUDY-eligible students to travel away from their home or school for a short period of time or for lecturers to travel to the home community of the student group. The application form is completed by the institution organising the activity to be funded. Activities can include testing and assessment programs, residential schools, field trips and placements.

Table 1: Matrix of ABSTUDY award payments

Payments you can get under ABSTUDY Awards

Payment	What it helps with	Schooling A Award	Schooling B Award	Tertiary Award	Part time Award	Testing and Assessment Award	Masters and Doctorate Award	Lawful Custody Award
ABSTUDY Living Allowance	Living expenses	✘	✔	✔	✘	✘	✔	✘
Additional Assistance	Costs in exceptional circumstances	✘	✔	✔	✘	✘	✔	✘
Additional Incidentals Allowance	Essential courses costs	✘	✘	✔	✘	✘	✔	✘
Assistance to pay student contributions (formerly HECS) or tuition fees	Tuition fees for Masters or Doctorate students	✘	✘	✘	✘	✘	✔	✘
Away from Base assistance	Approved travel for study at a different location	✔	✔	✔	✔	✔	✔	✔
Fares Allowance	Approved travel between home and place of study	✔	✔	✔	✔	✔	✔	✔
Incidentals Allowance	Study costs	✘	✔	✔	✔	✘	✔	✘
Lawful Custody Allowance	Essential study costs if in lawful custody for more than 2 weeks	✘	✘	✘	✘	✘	✘	✔
Relocation Allowance	Moving to another place to study	✘	✘	✘	✘	✘	✔	✘

Source: DHS website — https://www.humanservices.gov.au/individuals/forms/sy034

Funding through scholarships

Scholarships supporting tertiary study are offered to Indigenous students by universities, governments, non-government organisations (including Indigenous Land Councils), philanthropic groups and industry sources. Each set their own eligibility requirements and compliance conditions, and these can restrict access to other social payments. Scholarships can cover a range of disciplines at the undergraduate and postgraduate levels and may cover all student expenses or only very specific items.

Since 2010, the Commonwealth Scholarship Program has been open to commencing students who identify as being Aboriginal or Torres Strait Islander. Additional scholarships within the program include an Indigenous Access Scholarship that provides eligible students with a one-off payment to study a higher education undergraduate or eligible enabling course; an Indigenous Enabling Commonwealth Education Costs Scholarship; and Indigenous Commonwealth Accommodation Scholarships (Wilks & Wilson 2012). These scholarships are administered and awarded by individual universities on behalf of the Commonwealth Government. There are also specific scholarships associated with a number of study fields such as teaching, nursing and midwifery, commerce/business, and mining.

All scholarships are based on student application processes.

Introducing the two regional universities

Charles Darwin University (CDU) is regionally located in the Northern Territory, with main campus locations in Darwin (at Casuarina and the Waterfront) and Palmerston (these sites are classified by the Ministerial Council for Education, Employment, Training and Youth Affairs [MCEETYA] as provincial however are termed 'regional' throughout the report because this terminology is more widely understood)[5] and Katherine, Alice Springs, Tennant Creek and Nhulunbuy (classified by MCEETYA as remote). There are smaller study hubs in other areas of the Northern Territory, and additional campuses in Sydney and Melbourne. CDU has been a dual sector university since its historical beginnings as a merged institution between the Darwin Institute of Technology and the University College of the Northern Territory in 1989 (Webb 2014). It has had multi-mode study options from the mid-1990s. The University attracts about 24,000 student enrolments, with around 70 per cent of its higher education students located across Australia and undertaking their studies online.

CDU has a long history of Indigenous education with senior Indigenous leadership positions in place such as the first Pro Vice-Chancellor for Indigenous Leadership appointment in Australia (2008), and an Indigenous Advisory Council which reports directly to the Vice Chancellor (2010). Other commitments have included the establishment of an Office of the Pro Vice-Chancellor — Indigenous Leadership in 2009, and the subsequent establishment of the Australian Centre for Indigenous Knowledges and Education as a partnership between CDU and Batchelor Institute of Indigenous Tertiary Education (with negotiations starting from 2010). This included a contemporary purpose-built facility on the CDU Casuarina campus.

CDU has also made an explicit and long-term commitment to Indigenous studies through the creation of schools and/or faculties over past decades, with the most recent School of Indigenous Knowledges and Public Policy (SIKPP) having been transitioned into the College of Indigenous Futures, Arts and Society (CIFAS) at the beginning of 2018. The most recent CDU Strategic Plan has an explicit pillar dedicated to Indigenous Leadership (2015), with an accompanying Indigenous Leadership Strategy completed in late 2018.

The main campus (Casuarina) has on-site Indigenous-specific accommodation options and an Office of Indigenous Support Services (OISS). Alice Springs also has a recently refurbished OISS office. OISS provides a range of student service activities including the co-ordination of academic orientation activities and Indigenous tutorial support. In addition, all CDU staff are mandated to attend cultural awareness training, and a *Larrakia Academic Elder-in-Residence* position was established at the CDU Casuarina Campus in 2016. CDU was also identified in the top ten universities in Australia for supporting governance and Aboriginal and Torres Strait Islander participation in higher education (Moreton-Robinson et al. 2011).

The University has a strong focus on enhancing Indigenous research, education and engagement. With the establishment of the Indigenous Leadership Research and Evaluation Network (ILREN) in 2016, it aims to undertake high quality research and evaluation activities relevant to contemporary practice and policy issues impacting the livelihoods and wellbeing of Indigenous people. ILREN was recently awarded an Australian Rural Education Award by the Society for the Provision of Education in Rural Australia for its significant contribution in this regard, with over ten nationally significant Indigenous higher education related projects undertaken between the years 2014–2018. A significant proportion of research undertaken

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[5] MCEETYA Classification of Geographical Location: the classification incorporates the Australian Bureau of Statistics' Accessibility/Remoteness Index of Australia (ARIA) and maintains comparability with the Rural, Remote and Metropolitan areas. The definition of geographic location divides Australia into three broad zones: Metropolitan (mainland state capital city regions and major urban Statistical Districts with populations of 100,000 plus), Provincial (includes provincial cities and Statistical Divisions with less than 99,999, Darwin is included in this zone) and Remote (consistent with the areas described as Remote and Very Remote in the ARIA).
http://scseec.edu.au/site/DefaultSite/filesystem/documents/Reports%20and%20publications/Archive%20Publications/National%20Report/ANR%202005.pdf

at CDU is focussed on Indigenous Australia, particularly Northern Australia. This crosses the Institutes and Centres for health research, environment and livelihoods, renewable energy, graduate education and the oil and gas industry.

Central Queensland University (CQUniversity) was originally founded in Rockhampton in 1967, as the Queensland Institute of Technology (QIT) Capricornia and was granted full university status in 1992. The newly established University was named the University of Central Queensland, but rebranded to CQUniversity as a national university in 2009. CQUniversity has more than 30,000 students, approximately 50 per cent of whom study online by distance. CQUniversity is one of the largest regional universities with campuses in Bundaberg, Cairns, Emerald, Gladstone, Mackay, Noosa, Rockhampton and Townsville as well as campuses in metropolitan areas including Adelaide, Brisbane, Melbourne, Perth and Sydney. Along with these campuses, the University also operates study centres in Biloela, Broome, Busselton, Charters Towers, Karratha and Yeppoon, and delivers programs in Cooma and Geraldton, thanks to partnerships with the respective University Centres in those communities.

In 2014, CQUniversity merged with CQ TAFE, establishing Queensland's first comprehensive, dual sector university. As a result, CQUniversity now delivers more than 300 education and training offerings, from short courses and certificates, through to undergraduate, postgraduate and research degrees.

CQUniversity established their Indigenous Learning, Spirituality and Research Centre in 1985, named Nulloo Yumbah, and the Office of Indigenous Engagement in 2012, including the leadership role of Pro Vice-Chancellor Indigenous Engagement. The University has a number of targeted engagement programs aimed at building Indigenous community capacity in education, employment and equality of opportunities. The University's Centre for Regional Advancement of Learning, Equity, Access and Participation contributes to the national research agenda by undertaking high impact applied research that leads to sustainable benefits for people from diverse backgrounds by: implementing policies and practices that reflect a commitment to inclusion; improving access to and the participation of people from diverse backgrounds; identifying and applying effective learning and teaching approaches that lead to positive educational and employment outcomes; empowering people from diverse backgrounds to be agents of change in their communities; and being responsive to the changing political, social and economic environment, and the needs of our communities. The 2016 Indigenous Education Statement emphasises the CQUniversity's aim to make Indigenous engagement core business through a whole of university approach for students across both higher education and vocational education. There are a number of Indigenous people involved in a range of decision making committees — of the 12 Regional Engagement Committees, at least one representative on each committee identifies as Aboriginal or Torres Strait Islander. Indigenous representation is included on a number of panels, committees and Centres through the University.

Both Universities have worked to optimise their education offerings in ways that enable students to study by distance (or externally) while also having access to a local study centre for support.

Research aims

This project utilised the DET cohort methodology[6] and applied it to CDU and CQUniversity Indigenous student enrolment data. Student cohorts were created using their higher education commencement year and then tracked over time to observe the number who completed, the number still studying and those who opted out before completing an award. The national all-student domestic student cohorts have been tracked through these analyses since 2005 by DET, with an ongoing monitoring program in place to understand differential completion rates based on student and study characteristics, and between individual institutions.

For comparison purposes, the cohort analysis was also applied to the total population of Indigenous higher education students (studying at any Australian university) and for the domestic non-Indigenous student population enrolled at CDU and CQUniversity. Regression analysis was performed to assess the relative influence of different student and study characteristics on the likelihood of completing a degree for two of the student cohorts (those in the 2005 and 2006 cohorts only).

Extant qualitative research on Indigenous student access and success was used as an explanatory framework to understand cohort analysis results, specifically in relation to other factors that influence student success over and above characteristics collected from student enrolment information.

Objectives

- Review the assumptions made in the DET cohort methodology as they apply to the CDU and CQUniversity Indigenous student populations.
- Develop enduring methodology and analysis guidelines to assist understanding of the success and completion rates of Indigenous students from multiple equity groups to allow investigation of change over time.
- Identify key student characteristics that could inform support programs that increase the likelihood of student success and degree completion.
- Build a strong evidence base around Indigenous success and completion in regional university contexts.

Research questions

Question 1 — How do Indigenous students enrolled in two regional universities compare with national Indigenous student results with respect to graduate completion, length of time to complete an award, and relative attrition across time?

Question 2 — How do other equity group characteristics interact with Indigenous student attrition and/or completion rates?

Question 3 — Is the DET methodology appropriate for, and relevant to, Indigenous student populations across the two universities?

Question 4 — Do results from the cohort analysis align with the qualitative knowledge gained in previous local studies and can they be used to better target further qualitative investigation of good practice Indigenous student support programs?

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[6] See Higher Education Statistics – Student Data – Completion Rates – Cohort Analyses
https://www.education.gov.au/completion-rates-cohort-analyses

Data and methods

Who was included?

Indigenous students were identified through their enrolment record where they self-identified to the question — Are you of Aboriginal or Torres Strait Islander origin? No; Yes Aboriginal; Yes Torres Strait Islander; Yes both Aboriginal and Torres Strait Islander. This report acknowledges that some students will not identify their Indigenous status for a range of reasons and some students will incorrectly identify as Indigenous. Variations in the rates of self-identification in data relating to Indigenous people's education participation have been noted in previous reports/studies (COAG Reform Council 2013; Kinnane et al. 2014; Wijesekere 2008) and it is expected that there has been a net *under*-identification reflecting evidence in population data and research looking at the propensity to identify (e.g. ABS 2018; Department of Education, Employment and Workplace Relations 2011; NSW Aboriginal Affairs 2015).

The analysis was restricted to Indigenous students enrolled in Bachelor award degrees and we made no distinction between Bachelor Graduate Entry, Bachelor Honours and Bachelor Pass degrees.

Students were included in the CDU/CQUniversity analysis if they were enrolled with either institution at any point in their enrolment period regardless of whether they completed at or separated from another university.

Where students changed their field of study, they may have been counted in the student data system again as a re-enrolment depending on the level of overlap in study units. In these cases there may be an element of student double counting in the analysis, however because of small numbers it is likely to have had minimal impact on the general results.

International students (i.e. overseas students in Australia on a student visa) were excluded from all analyses.

What is counted?

Award completion is counted where a student completes requisite course units that when combined satisfy the course requirements of a higher education degree award, however this may not be the same level award for which they initially enrolled. For example, a student may have enrolled in a Bachelor degree but exited with a Diploma award. This example would be treated as a successful completion.

Re-enrolment occurs when a student enrols in higher education course units at the beginning of each semester. They will be counted as enrolled if they are enrolled at one of the formal university student census dates in the cohort year.

In the context of this cohort completion analysis, *attrition* occurs when students opt out of their study without completing the required course work, or when they do not re-enrol. In this report this is also referred to as *disengagement* from study.

Student and study characteristics are those recorded at initial enrolment. These characteristics are (generally) not updated when students re-enrol, therefore some variables that may change through the period of cohort tracking will not be updated to reflect that change. For example, a student may enrol in full-time study however change to part-time as their course progresses. These changes may occur multiple times.

Defining student cohorts

Similar to the DET methodology, the cohort analyses within this report group students together according to their commencement year. This enables the tracking of student outcomes over time through their unique Commonwealth Higher Education Student Support Number (CHESSN) which captures events such as students changing their university of enrolment. The student cohorts included students commencing their study in each of the years 2005 through to 2012.

Point-in-time observation of student progress was taken at the end of **year four** (where three to four years is regarded as the standard time required for Bachelor degree completion when students study full-time); **year six** (a standard time applied to part-time students who study at half a course workload of a three year degree); and **year 10** (longer than the standard time for Bachelor degree completion for part-time students). One cohort—2005—could be tracked through to 11 years allowing some understanding of the proportion of students still enrolled at this point. As Figure 1 illustrates, all eight cohorts can be observed at the end of the four year point, six cohorts can be observed at the end of six years; and two cohorts can be observed at the end of the 10 year point. Therefore there are limitations given all cohorts do not contribute to the understanding of student outcomes at all observation points. However, the analysis does set up the beginning of future longitudinal analysis of student outcomes, which has been deemed important in recent Indigenous higher education scholarship (Gore et al. 2017; Smith et al. 2018b).

Data was collected on: total students in cohort; total completed; total still enrolled at time point; total re-enrolled but opted out before time point; total that never came back after first year.

There are differences between cohorts in terms of student numbers and student characteristics that may have been affected by changes to Commonwealth Government legislation, policy and practice. Cohorts from 2010 were influenced by the introduction of the demand-driven system. Other changes over the observation period also have the potential to impact access and attrition. For example, CDU partnered with the only other tertiary education provider in the Northern Territory—Batchelor Institute of Indigenous Tertiary Education (BIITE)—to establish the Australian Centre for Indigenous Knowledges and Education (ACIKE[7]) which provided Bachelor level awards to new Indigenous students. This change impacted Indigenous student enrolments from 2012 by increasing student numbers at CDU.

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[7] The Australian Centre for Indigenous Knowledges and Education (ACIKE) is a joint initiative between BIITE and CDU to provide a shared facility for the delivery of a specific range of higher education and postgraduate study options. Acceptance of student enrolments under this arrangement commenced in 2012.
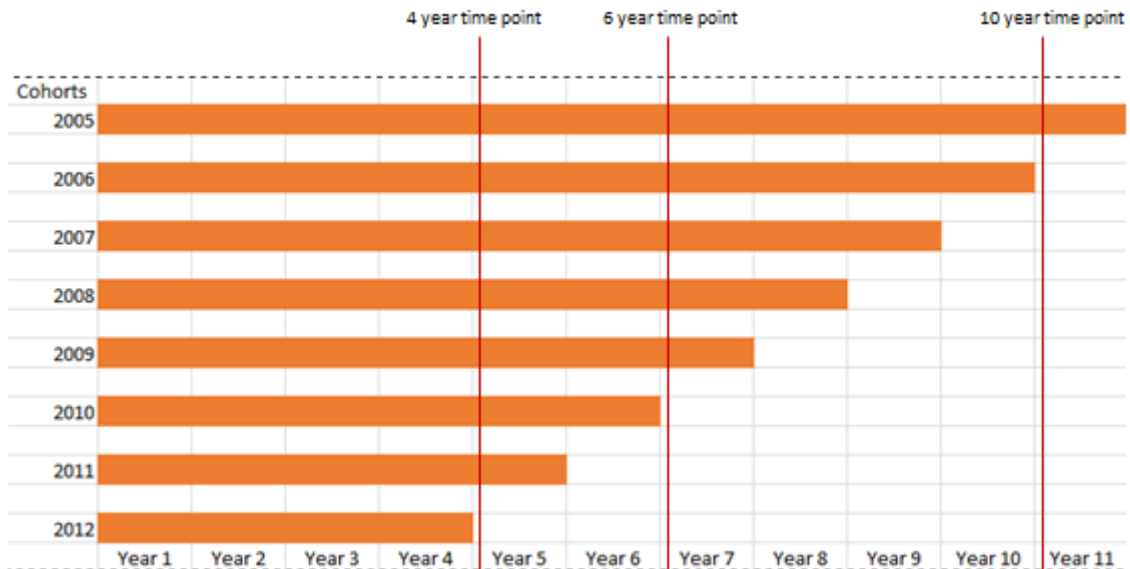
Figure 1: Cohorts 2005 to 2012 and observation time points

Student and study characteristics

DET analysis of the national higher education domestic student cohorts (DET 2014) has shown that lower completion rates are associated with a number of student and study characteristics. These include:

- students who study externally (study mode)
- students who study part-time (study intensity)
- students who are older (student age group)
- students who are admitted to higher education on a basis other than secondary education (basis of admission)
- students who have a lower Australian Tertiary Admission Rank (ATAR) score (basis of admission)
- students who are Indigenous
- students from lower SES areas
- students from regional areas of Australia (MCEETYA Regional classification — refer to previous footnote 1).

Completion rates also differ across fields of study.

Where possible, these student and study characteristics are included in the analyses, however because of small numbers, some aggregation of data has been undertaken for the CDU/CQUniversity analyses to build sample and allow more robust conclusions from the findings. Some of these analyses use data averaged across cohorts — this is generally at the end of six years, allowing for six of the eight cohorts to be included. This report makes an assumption that the Indigenous student bodies of both universities are generally homogenous[8] and it is valid to group them together. Although this is the case for most of the characteristics included, it may not be for all.

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[8] The diversity of the Aboriginal and Torres Strait Islander community is acknowledged and this statement refers to the broader demographic and socioeconomic characteristics only.

Comparative analysis

The focus of this study is to understand outcomes of Indigenous students enrolled at two regional universities — CDU and CQUniversity. Context to this analysis has been anchored by an overview of the cohort results for the national Indigenous higher education student population enrolled at all universities in Australia which has also been completed for the first time in this report.

Where relevant, comparison with the non-Indigenous student cohorts enrolled at CDU/CQUniversity has been briefly referenced because of similarities in the profile of student demographics and study characteristics in both populations, and because of the broader higher education policy aims to achieve parity between Indigenous and non-Indigenous access, participation and success. However, the Reference Group recommended that the report focus remain on the Indigenous student population, therefore, details of these comparisons are provided as an appendix (see Appendix C).

Multivariate analysis

All multivariate analysis was limited to CDU/CQUniversity student record data for the 2005 and 2006 cohorts to optimise the opportunity for course completion for those students studying part-time across 10 years.

Framework analysis drawing on locally-based qualitative studies

Results of these cohort analyses were used as pre-arranged themes to examine qualitative research findings from studies about Indigenous student participation in higher education that have been conducted over the past four years at both CDU and CQUniversity. This methodology is known as framework analysis. It has been used as a pragmatic approach to investigating the intersection of quantitative and qualitative data in social policy contexts (Ritchie & Spencer 1994; Smith & Firth 2011; Ward et al. 2013). Framework analysis involves using prearranged themes in a deductive way. Extant results from research projects listed in Table 2 were used as the qualitative basis to give the statistics 'voice' and provide additional contextualisation, as has been advocated through recent Indigenous higher education research and national consultation processes (Smith et al. 2018b; Zacharis & Brett 2018). Although mostly used in health research (Srivastava & Thomson 2009; Ward et al. 2013), we consider framework analysis to be both useful and relevant to studies of the higher education experience of Indigenous students (see for example Smith et al. 2018a).

The case studies prepared by both universities for an Office of Learning and Teaching (OLT) report entitled '*Addressing the gap between policy and implementation: strategies for improving educational outcomes of Indigenous students*' (ID15-4939) have been used as a primary source of evidence to undertake the framework analysis and to inform the cohort results. However, other smaller studies have also been used. Most of the studies collected information about the experiences of undergraduate and postgraduate Indigenous students through semi-structured interviews. They included students who had graduated; those who were still studying; and those who had withdrawn but planned to return to study (Wood et al. 2019 *in review*). Interviews were also conducted with experienced university staff, both Indigenous and non-Indigenous, to collect their views about what factors were considered to influence Indigenous student success the most.

Table 2: A selection of qualitative Indigenous higher education Studies at CDU and CQUniversity from 2014–2018

Title of Study	Chief Investigators	University (a)	Study Period	Funder	Publications
Whole of Community Engagement initiative	James Smith & Steven Larkin	CDU	2014–2017	Commonwealth Department of Education and Training (HEPPP)	Street, C., Smith, J. & Stewart, A. (2017a). *Whole of Community Engagement initiative: Final Evaluation Report*. Prepared for the Australian Government Department of Education and Training. Darwin, Charles Darwin University. (https://remotengagetoedu.com.au/uploads/assets/uploads/54545_WCE_evaluation_report_fin_LR.pdf) Smith, J., Yibarbuk, D., Larkin, S. & Guenther, J. (2017). What do we know about community engagement in Indigenous education contexts and how might this impact on pathways into higher education? In J. Frawley, S. Larkin and J. Smith (Eds), *Indigenous pathways, transitions and participation in higher education: From policy to practice*. Singapore, Springer Nature. (https://www.tandfonline.com/doi/full/10.1080/10371656.2018.1477533) Shalley, F. & Stewart, A. (2017). Aboriginal adult English language literacy and numeracy in the Northern Territory: A statistical overview. Darwin, Charles Darwin University. LLN Action Network (2017) Action statement on Aboriginal adult English LLN in the Northern Territory. Darwin, Charles Darwin University. Smith, J., Bullot, M., Kerr, V., Yibarbuk, D., Olcay, M., & Shalley, F. (2018a) Maintaining connection to family, culture and community: Implications for remote Aboriginal and Torres Strait Islander pathways into higher education. *Rural Society*. (doi.org/10.1080/10371656.2018.1477533) Moore, T., Smith, J. & Robertson, K. (2018). *Whole of Community Engagement initiative: Evidence based actions to support remote Indigenous participation in higher education*. Prepared for the Australian Government Department of Education and Training. Darwin, Charles Darwin University.
Building evidence about Indigenous pathways and transitions into higher education	James Smith & Steven Larkin	CDU	2015	Department of Education (HEPPP) — National Priority Pool Grant	Frawley, J., Smith, J. & Larkin, S. (2015). Beyond Bradley and Behrendt: Building a stronger evidence-base about Indigenous pathways and transitions into higher education. *Learning Communities: International Journal of Learning in Social Contexts*. Number 17, 8-11. (https://www.cdu.edu.au/sites/default/files/the-northern-institute/10.18793-lcj215.17.01.pdf) Smith, J., Trinidad, S. & Larkin, S. (2015). Participation in higher education in Australia among under-represented groups: What can we learn from the Higher Education Participation Programme to better support Indigenous learners.

Title of Study	Chief Investigators	University (a)	Study Period	Funder	Publications
					Learning Communities: International Journal of Learning in Social Contexts. Number 17, 12-29. (https://www.cdu.edu.au/sites/default/files/the-northern-institute/10.18793-lcj215.17.02.pdf) Smith, J., Trinidad, S. & Larkin, S. (2017). Understanding the nexus between equity and Aboriginal and Torres Strait Islander higher education policy agendas in Australia. In J. Frawley, S. Larkin and J. Smith (Eds), *Indigenous pathways, transitions and participation in higher education: From policy to practice*. Singapore, Springer Nature. (https://link.springer.com/content/pdf/10.1007%2F978-981-10-4062-7_2.pdf) Frawley, J., Smith, J. & Larkin, S. (2017a). Indigenous pathways and transitions into higher education: An introduction. In J. Frawley, S. Larkin and J. Smith (Eds), *Indigenous pathways, transitions and participation in higher education: From policy to practice*. Singapore, Springer Nature. (https://link.springer.com/content/pdf/10.1007%2F978-981-10-4062-7_1.pdf) Frawley, J., Smith, J. & Larkin, S. (2017b). From policy to practice in higher education: Cross-cutting issues in Indigenous pathways, transition and participation. In J. Frawley, S. Larkin and J. Smith (Eds), *Indigenous pathways, transitions and participation in higher education: From policy to practice*. Singapore, Springer Nature. (https://link.springer.com/content/pdf/10.1007%2F978-981-10-4062-7_16.pdf)
Accelerating the Indigenous academic workforce	Steven Larkin, Sarah Ireland & Kim Robertson	CDU & UoN	2016–2017	National Aboriginal & Torres Strait Islander Higher Education Consortium	Larkin, S., Ireland, S., Robertson, K., MacGibbon, L., Butler, K., Small, T. & Chatfield, T. (2017). *Accelerating Indigenous higher education: Report on increasing the Indigenous academic workforce*. Darwin, Charles Darwin University and the University of Newcastle.
Indigenous achievement in higher education and the role of self-efficacy: Rippling stories of success	Jack Frawley, Robyn Ober, Millie Olcay and James Smith	CDU & BIITE	2016	National Centre for Student Equity in Higher Education	Frawley, J., Ober, R., Olcay, M. & Smith, J. (2017c). *Indigenous achievement in higher education and the role of self-efficacy: Rippling stories of success*. Prepared for National Centre for Student Equity in Higher Education, Perth: Curtin University. (https://www.ncsehe.edu.au/wp-content/uploads/2017/05/Frawley_Rippling-Stories.pdf) Frawley, J., Ober, R., Olcay, M. & Smith, J. (2017d) Indigenous student achievement in higher education: The influence of cultural factors on self-efficacy. *Journal of Australian Indigenous Issues*. 20 (2), 17-31.

Title of Study	Chief Investigators	University (a)	Study Period	Funder	Publications
Identifying strategies for promoting VET to higher education transitions for Indigenous learners.	James Smith, Jack Frawley, Steven Larkin, Andrew Gunstone, Ekaterna Pechenkina, Christine Robertson & Wendy Ludwig	CDU & SUT	2016	National Centre for Student Equity in Higher Education	Smith, J., Frawley, J., Pechenkina, E., Ludwig, W., Robertson, C., Gunstone, A., & Larkin, S. (2017). *Identifying strategies for promoting VET to higher education transitions for Indigenous learners*. Prepared for National Centre for Student Equity in Higher Education. Perth: Curtin University. (https://www.ncsehe.edu.au/wp-content/uploads/2017/09/08Smith_Report_FINAL.pdf) Frawley, J., Smith, J., Gunstone, A., Pechenkina, E., Ludwig, W. & Stewart, A. (2017e). Indigenous VET to higher education pathways and transitions: An integrative literature review. *International Studies in Widening Participation*. 4 (1), 34-54. (https://www.ncsehe.edu.au/publications/indigenous-vet-higher-education-pathways-transitions-literature-review/)
Review of NT Indigenous Higher Education Policy	James Smith, Catherine Street, Wendy Ludwig, Kim Robertson & John Guenther	CDU & BIITE	2016–2017	Commonwealth Department of Education and Training (HEPPP) – National Priority Pool grant	Street, C., Guenther, J., Smith, J., Robertson, K., Motlap, S., Ludwig, W., Gillan, K., Woodroffe, T. & Ober, R. (2017b). The evolution of Indigenous higher education in the Northern Territory: A narrative review of policy influence and impact. *International Studies in Widening Participation*. 4 (2), 32-51. (https://novaojs.newcastle.edu.au/ceehe/index.php/iswp/article/viewFile/80/99) Street, C., Smith, J., Robertson, K., Ludwig, W., Motlap, S. & Guenther, J. (2017c). *Northern Territory Indigenous Higher Education Policy Review: Final Report*. Prepared for Australian Government Department of Education and Training. Darwin, Charles Darwin University. (https://www.cdu.edu.au/sites/default/files/opvcil/northern-territory-indigenous-higher-education-policy-review_final.pdf) Street, C., Guenther, J., Smith, J., Robertson, K., Motlap, S., Ludwig, W. & Gillan, K. (2018). A historical overview of responses to Indigenous higher education policy in the Northern Territory: Progress or procrastination? *Australian Universities' Review*. 60 (2), 38-48. (http://www.aur.org.au/current/ebook)
Strengthening evaluation in Indigenous higher education contexts in Australia	James Smith, Kellie Pollard, Lim Robertson & Fiona Shalley	CDU	2017–2018	National Centre for Student Equity in Higher Education	Smith, J., Pollard, K., Robertson, K. & Shalley, F. (2018b). *Strengthening evaluation in Indigenous higher education in Australia*. Final Equity Fellowship Report. Perth, National Centre for Student Equity in Higher Education. (https://www.ncsehe.edu.au/wp-content/uploads/2018/06/JamesSmith_FellowshipReport_FINAL_ACCESSIBLE.pdf) Smith, J., Pollard, K., Robertson, K. & Trinidad, S. (2017b). What do we know about evaluation in Indigenous higher education contexts in Australia? *International Studies in Widening Participation*. 4 (2), 18-31.

Title of Study	Chief Investigators	University (a)	Study Period	Funder	Publications
					(https://novaojs.newcastle.edu.au/ceehe/index.php/iswp/article/viewFile/86/104)
Addressing the gap: Indigenous student success		CQU, CDU, JCU, UniSA, UoN	2016–2018	Commonwealth Department of Education and Training, Office of Learning & Teaching	Smith, J., Robertson, K. & Pollard, K. (2018c). *Case Study 1 – Charles Darwin University.* Prepared for an OLT report about strategies for improving educational outcomes for Indigenous students in higher education. Darwin, Charles Darwin University.
Addressing the gap: Indigenous student success	Denise Wood, Bronwyn Fredericks, James Smith, Felicia Watkin-Lui, Steve Larkin, Maree Gruppetta, Josephine May Lester-Irabinna Rigney	CQU, CDU, JCU, BIITE, UoN, UniSA,	2016–2018	Commonwealth Department of Education and Training, Office of Learning & Teaching	Wood, D., Fredericks, B., Bond, C., Rigney, L.-I., Neill, B., Smith, J., Robertson, K., Pollard, K., Grupetta, M., May, J., Heath, T., Wallace, K., Small, T., Watkin-Lui, F., Ah Mat, L., White, P., Larkin, S. (under review). *Addressing the gap between policy and implementation: Strategies for improving educational outcomes of Indigenous students. Final Report 2018.* Department of Education and Training, Office for Learning and Teaching.

(a)   University acronyms: BIITE (Batchelor Institute of Tertiary Education), CDU (Charles Darwin University), CQU (Central Queensland University), JCU (James Cook University), SUT (Swinburne University of Technology),UniSA (University of South Australia), UoN (University of Newcastle)

CDU and CQUniversity — Indigenous student profile (cohorts 2005 to 2012)

Growing numbers

There were 340 Indigenous students enrolled at CDU and CQUniversity in 2012. Figure 2 shows that combined Indigenous student numbers at the two universities have generally been trending upwards since 2006. Across all cohorts, the lowest number of Indigenous students enrolled was 115 in 2008 and the highest number (340) was in 2012, coinciding with the first year of the demand-driven system. This is an increase of nearly 200 per cent (196 per cent) over eight years, much higher than growth at the national level (which shows a 71 per cent increase in Indigenous student participation in higher education).
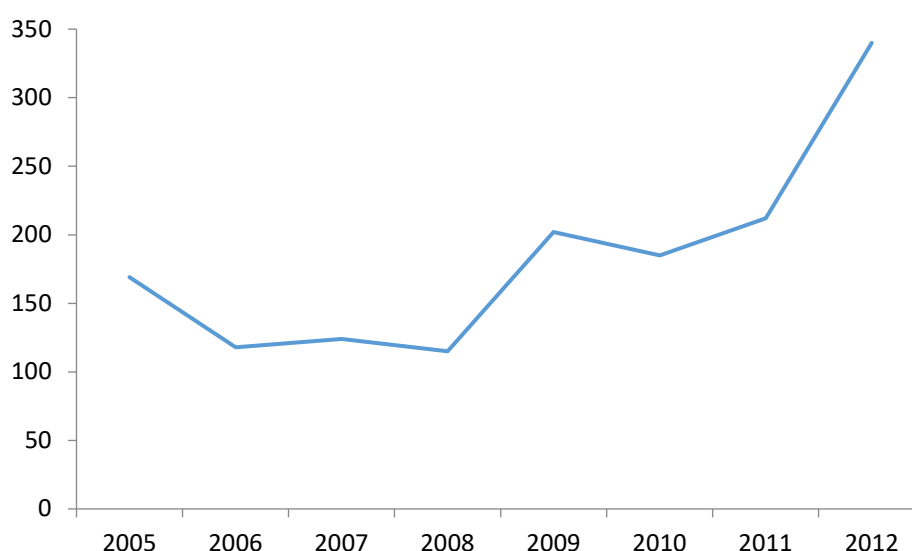
Figure 2: Combined CDU and CQUniversity Indigenous student enrolments for cohort 2005 to 2012

Regional and remote backgrounds

Of those Indigenous students whose usual home address was recorded in enrolment records, almost two thirds (64 per cent) had an address that was classified as regional while 19 per cent were from remote areas — therefore over 80 per cent of students were from regional or remote Australia. The remaining 17 per cent came from metropolitan areas (with three per cent unclassified). Nearly four in 10 were classified as coming from low SES areas (39 per cent), and 61 per cent were from either medium or high SES areas. Ten percent of Indigenous students identified as being from non-English speaking backgrounds.

Demographics and study characteristics

Across cohorts, almost half of all Indigenous students studied externally (49 per cent), followed by those who studied internally (30 per cent) and those who studied through a multi-mode approach (21 per cent). Around two thirds were full-time (63 per cent) and three quarters were female (75 Per cent). A third of students were aged 35 years and over (33 per cent), with 27 per cent aged 25 to 34 years, 19 per cent aged 20–24 years, and the remainder aged less than 20 (21 per cent). Around eight per cent of students identified a disability.

Pathways to university

Excluding students transferring from other higher education courses, one third were admitted to their current Bachelor degree on the basis of successfully completing at least some previous higher education (33 per cent). A fifth were admitted on the basis of secondary study (either with or without ATAR) (20 per cent), 16 per cent were admitted through a VET pathway, and the remaining third (31 per cent) were admitted through other pathways (including professional qualifications, or mature age). Slightly more than one in 10 students had participated in a prior enabling course in the last five years (11 per cent), although this does not mean the course was completed. Seventeen per cent of students were Commonwealth scholarship holders.

Narrow study disciplines

The largest proportion of the Indigenous student body was studying in the areas of society and culture—28 per cent. This was followed by education (inclusive of teacher training)—24 per cent; and nursing — 16 per cent (with another four per cent studying in other health areas). Just five per cent of women were enrolled in STEM subjects.

First higher education experience in family

Students' parental education experience was collected from student enrolment records from 2010 onwards. These data can be used as a proxy indicator for the student being the first in their family to undertake university study. Enrolment data show that five per cent of Indigenous students at CDU or CQUniversity had at least one parent with either postgraduate or Bachelor level qualifications. An additional two per cent had at least one parent with another type of post-secondary school qualification and 12 per cent had at least one parent with either complete or incomplete secondary school education. The remaining students had parents classified as 'other' - this includes those whose parents had primary school level, no formal schooling or where their parental education experience was unknown. Therefore, more than nine in 10 students (95 per cent) had parents who did not participate in university education (although the students may have been influenced and supported through other familial networks such as uncles, aunties, siblings or cousins).

Listening to the voices of Indigenous students and staff

Both participation in higher education, and successful completion, have been found to be positively influenced by having family members who either attended or graduated from university (Cassells et al. 2011). Moreover, family and community support has been identified as a significant enabler in Indigenous higher education contexts (Frawley et al. 2017b; Smith et al. 2018b). The following statements from students interviewed in the OLT case studies show how university can be isolating and overwhelming when students are first to study at the higher education level in their family:

"So, **it was just this unknown** because nobody in my family had ever even considered going to university. My parents hadn't even finished primary school, let alone high school. It was, like, this big step forward, I think, for the whole family — that I'd gotten accepted into uni. But it was a complete unknown." (Student — Smith et al. 2018c)

"… **I didn't really have a view** of how it [University] would be." (Student — Smith et al. 2018c)

Parallel research conducted by CDU researchers has indicated that the vicarious experiences of observing significant others successfully complete university, such as

parents, relatives, teachers and work colleagues, had a big impact on aspiring to get a university degree (Frawley et al. 2017b). For example, two students commented:

> "**The person who inspired me to come to uni was my uncle, my mum's cousin.** He was 60 when he went and did his anthropology through Queensland University and he took about six, seven years to complete that. As you know from before, our parents were only able to go to a certain level at school and he finished his education in year seven, but he pursued his study in his older age and it was sad because he never lived long enough after he graduated to really enjoy the benefits. He was able to speak to me as a child about going to university and he took the time and this was, I'm talking about in the 80s where he'd answer my questions about university and he gave me those options. Otherwise, I wouldn't have known that these opportunities existed outside our doorsteps." (Student — Frawley et al. 2017b)
>
> "I woke up one day and thought, I need to do this, I need to go to university. **I had this idea because I was lucky I had people in my family who had this idea."** (Student — Frawley et al. 2017b)

Given that a third of Indigenous students were admitted to CDU/CQUniversity based on previous higher education experience, it is important to understand the reasons for Indigenous higher education attrition, but also the respective motivation to return to university. The recent OLT work undertaken by CDU and CQUniversity provides some useful insights into these issues. However, it is worth noting that recruitment of students to this research who had left university was very difficult. Therefore, the perspectives of current students and staff were often used as an alternative measure to describe this phenomenon. The most frequently raised barriers impacting completion of undergraduate qualifications related to being first-in-family; access to English language programs (akin to those provided for migrant populations and international students); and financial support.

> "… non-Indigenous students they may have some role model or example in their family or someone they know who has actually achieved it … whereas for **people from an Indigenous background they may be the first person (in their family) to ever finish high school**." (Staff — Smith et al. 2018c)
>
> "… Indigenous students in Australia … **don't have any access to any English as a second language programs**, because we are Australian citizens." (Staff — Smith et al. 2018c)
>
> "… I think what we could do is provide a little **more financial support for students**." (Staff — Smith et al. 2018c)

As mentioned above, understanding the points of leverage that support Indigenous students to either complete and/or return to university is equally important. Participants in the OLT study often focused on tangible academic and pastoral oriented supports provided by the university, particularly those that offered a safe cultural space, in addition to basic infrastructure. There was a sense among some students that regional universities were better equipped to provide more intensive and personalised support due to smaller enrolment numbers.

> "… **there was a lot more support that I received than I thought I would**, especially from lecturers and other students." (Student — Smith et al. 2018c)
>
> "… the lecturers from what I understand, you can get it **more one-on-one** with them and the major universities you can't really, there's so many (students), it's very hard." (Student — Smith et al. 2018c)
>
> "… It just feels that sometimes people just don't know how to handle me, they don't want to deal with me, but here [Indigenous Student Services] is a very, very, very, **very safe space for me**." (Student — Smith et al. 2018c)
>
> "… with these identified (at-risk) students, where we could be **wrapping more support, especially tutorial support** trying to increase hours for them … and definitely working with the academic support officers, and hopefully there's some liaison with the lecturers." (Staff — Smith et al. 2018c)
>
> "… **It was great having access** to the Indigenous computer lab, access to the computer, printer, and internet on campus." (Student — Smith et al. 2018c)

Another study conducted recently through CDU highlighted the potential opportunities VET to higher education pathways can provide as a point of access for Indigenous students (Frawley et al. 2017e Smith et al. 2017c). While only 16 per cent of regional students at CDU and CQUniversity are currently using this entrance pathway, there is significant potential for dual sector universities to better utilise this option (Smith et al. 2017c). Indeed, there was a high level of optimism in this regard, particularly if pathways could be communicated better to Indigenous students and the higher education experience made less daunting.

> "The pathway should be clearer with VET being communicated as part of the process to commencing in higher education. At the moment they [VET and higher education] are two separate entities and that is how they are perceived. They need to be **communicated as one pathway** with two separate exit points depending on your goal and what you hope to achieve." (Staff — Smith et al. 2017c)
>
> "As a dual sector education institution, **we may be uniquely able to overcome some of the inhibitors for Indigenous students** [completing higher education], where vocational education (VET) or Technical and Further Education (TAFE) programs, which have distinctly different and much less unfriendly, 'intimidatory', judgmental and sanctimonious approaches and protocols, entry requirements, codes of teaching and assessment [in comparison to higher education]." (Staff — Smith et al. 2017c)
>
> "Not only are **the pathways unclear**, and the curricula, learning approaches and assessment measures seemingly viewed as inappropriate by would-be Indigenous students, the language, rigidity and purposes of academia are viewed as irrelevant to their way of life." (Staff — Smith et al. 2017c)

Staff who participated in this OLT study also expressed their feeling that insufficient policies and systems were available to support Indigenous students to make successful VET to higher education transitions. For example:

> "I see the transition from VET to higher education for the great many of the students we have as **totally unattainable given the current policies** of both the NT and Federal governments. Too many bureaucrats have no idea what is actually happening on the ground in many of the remote communities we visit." (Staff — Smith et al. 2017c)
>
> "So I mean it's obviously a much bigger issue than any of us can address in our positions but **some of that barriers for the students** in general going between VET and Higher Ed, let alone Indigenous students **is really the system**. They're systemic issues that relate to the whole VET system in general … both the Higher Ed and VET system." (Staff — Smith et al. 2017c)
>
> "This is not to say that universities need to compromise their standards, but **the university does need to** rethink the ways in which these standards are achieved, and undo some of the **pointless and prohibitive protocols**, language, etiquette and archaic ritual which have in the past been used to maintain academia access uniquely for the privileged." (Staff — Smith et al. 2017c)

Summary student profile

The student profile identifies the relative vulnerability of the CDU/CQUniversity Indigenous student population. When compared to both the non-Indigenous domestic student population enrolled at CDU/CQUniversity and the total domestic student population nationally, Indigenous students at CDU/CQUniversity are generally much more likely to belong to more than one of the equity groups[9] as shown in Table 3.

Many of these student and study characteristics were also associated with lower completion rates in the national student cohort analysis by the DET.

In summary, Indigenous students at CDU/CQUniversity were:

- generally from regional and remote Australia and low SES classified areas
- likely to be studying externally
- likely to be female
- likely to be mature aged (25 years and over)
- more likely to have an identified disability but less likely to identify a non-English speaking background
- likely to be admitted through pathways other than secondary school
- highly likely to be the first in their family to enrol in university
- likely to be enrolled in a limited number of study areas (society and culture, education or nursing) and unlikely to be enrolled in STEM subjects if they are female.

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[9] Those students identified by higher education policies as requiring increased support and encouragement to participate at equivalent rates to the total higher education student body (i.e. students from regional and remote areas; students from low SES areas; students from non-English speaking backgrounds; students with a disability; and female students studying STEM disciplines.

Table 3: Percentage[a] of student and study characteristics: comparing student populations across CDU/CQUniversity and total national domestic student population

Student/study characteristic	Indigenous students CDU/CQUniversity	Non-Indigenous domestic students CDU/CQUniversity	All domestic students, Australian universities
Regional/Remote addressed	85%	69%	20%
Low SES	37%	35%	17%
Female	73%	68%	59%
Studying full-time	64%	60%	84%
Studying internally	33%	26%	85%
Over 25 years	58%	50%	19%
Identified with a disability	8%	5%	4%
Identified a NESB[b]	5%	5%	14%
Admitted via secondary school	23%	33%	49%
Participated in enabling course	13%	7%	4%

[a] Percentages based on total students in cohorts 2005 to 2010 taken at the end of the six year observation point.

[b] Non-English Speaking Background

Results (Part A) — Indigenous student completion and attrition

The regional picture — CDU/CQUniversity cohort outcomes over time

At the end of 11 years, 395 Indigenous students from cohorts 2005 through to 2012 enrolled at CDU/CQUniversity had successfully completed a university level award. As would be expected, the number of student completions increased as the observation time point increased, reflecting both the number of part-time students, but also student progress through their study (Table 4). This is the process of gathering award requirements across time as study units are successfully completed. It also acknowledges that: students who were not successful in their first attempt may repeat units; students may change their study intensity; and students may decide to change their field of study and enrol in additional units at the same level.

Table 4: Number of Indigenous CDU/CQUniversity student award completions in each cohort for observation points

Cohort	End of 4 years	End of 6 years	End of 10 years	End of 11 years	Total award completions	Percentage of cohort (a)
2005	35	42	58	61	61	36.1
2006	20	37	51		51	43.2
2007	26	39			39	31.5
2008	20	32			32	27.8
2009	42	58			58	28.7
2010	24	44			44	23.8
2011	29				29	13.7
2012	81				81	23.8

(a) Length of observation period changes across cohorts for percentage calculation

Figure 6 (see page 40) illustrates differences in completion rates between cohorts and total student enrolments. Despite the upward trend in student enrolments (and particularly so when full deregulation of university places commenced in 2012), the data show completion rates are holding. Acknowledging the year on year fluctuations, at the end of the four year point for the 2012 cohort there is a noticeable increase in completions (both number and percentage) — it would be interesting to observe whether this trend is maintained after the demand-driven system ceased.

Point in time comparison with national Indigenous student results

At the end of the four year point in their study, the highest completion rate for students enrolled at CDU/CQUniversity was achieved by the 2012 cohort at 24 per cent, with this cohort also having the largest number of commencing students (Figure 3). This equates to one in every four students successfully completing a higher education award. Within the 2012 cohort, 30 per cent of students were still enrolled and the remaining had disengaged from study (25 per cent opting out after the first year and another 21 per cent opting out before the four year point). The lowest completion rate was for the 2010 cohort at 13 per cent — a difference of 11 percentage points in the cohort range of successful completion. The 2010 cohort also had the highest overall disengagement levels across all cohorts (57 per cent).
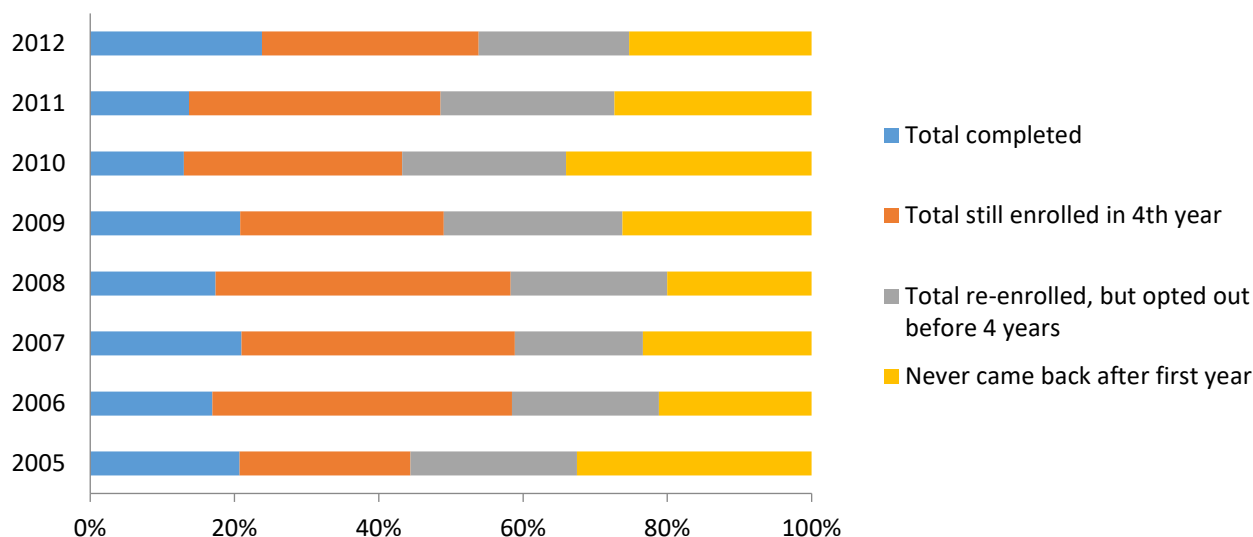
Figure 3: Indigenous students at CDU/CQUniversity; completion and enrolment status at end of four years by cohort

Indigenous students studying at CDU/CQUniversity generally had lower completion rates when compared to Indigenous students enrolled at all Australian Universities - a difference of between six and 11 percentage points across cohorts (see Appendix A for results of the national Indigenous student cohort analysis). Between 24 per cent and 42 per cent of CDU/CQUniversity students remained enrolled, mainly higher compared to the national results (28 per cent and 33 per cent). First year attrition was also higher but for some cohorts only, ranging from 20 per cent to 34 per cent at CDU/CQUniversity compared with 20 per cent to 26 per cent nationally. The proportion of students who re-enrolled but opted out prior to the observation point was more similar (18–25 per cent compared with 18–20 per cent nationally).

At the end of six years, both the 2006 and 2007 cohort completion rates at CDU/CQUniversity had climbed to 31 per cent (from 17 per cent and 21 per cent respectively) while half of the students had disengaged from their study (51 per cent and 52 per cent) — see Figure 7. The completion rates of the other cohorts ranged between 24 per cent and 29 per cent. Again, the 2010 cohort had the highest levels of student disengagement from study (increasing from 57 per cent to 65 per cent) and the lowest proportion of students still enrolled (11 per cent).

Compared with national Indigenous student results, CDU/CQUniversity students are completing at lower rates when observing six years out from commencement (a difference of between nine and 16 percentage points). Between 11 per cent and 25 per cent of CDU/CQUniversity students remained enrolled while this was between 13 per cent and 15 per cent nationally.

Figure 4: Indigenous students at CDU/CQUniversity; completion and enrolment status at end of six years by cohort

At the end of 10 years, 43 per cent of the 2006 CDU/CQUniversity cohort had successfully completed a higher education award, another eight per cent were still enrolled while 49 per cent had disengaged. A third of the 2005 cohort had successfully completed (34 per cent), five per cent were still enrolled while 60 per cent had disengaged (Figure 5).

Completion rates at CDU/CQUniversity remain lower when compared to national Indigenous student results, however the difference was much larger for the 2005 cohort (14 percentage points) than for the 2006 cohort (eight percentage points). Disengagement levels were equivalent for the 2006 cohort but much greater for the 2005 cohort. The proportion of students still enrolled at CDU/CQUniversity was higher for the 2006 cohort (at eight per cent) and lower for the 2005 cohort (at five per cent) — this compares with six per cent for both cohorts nationally.
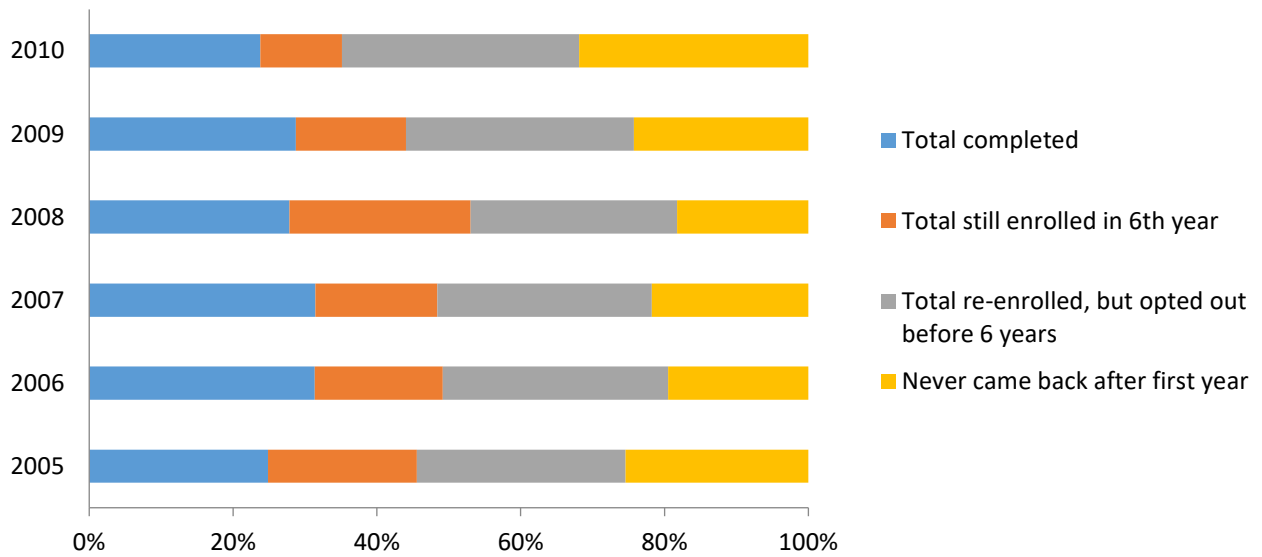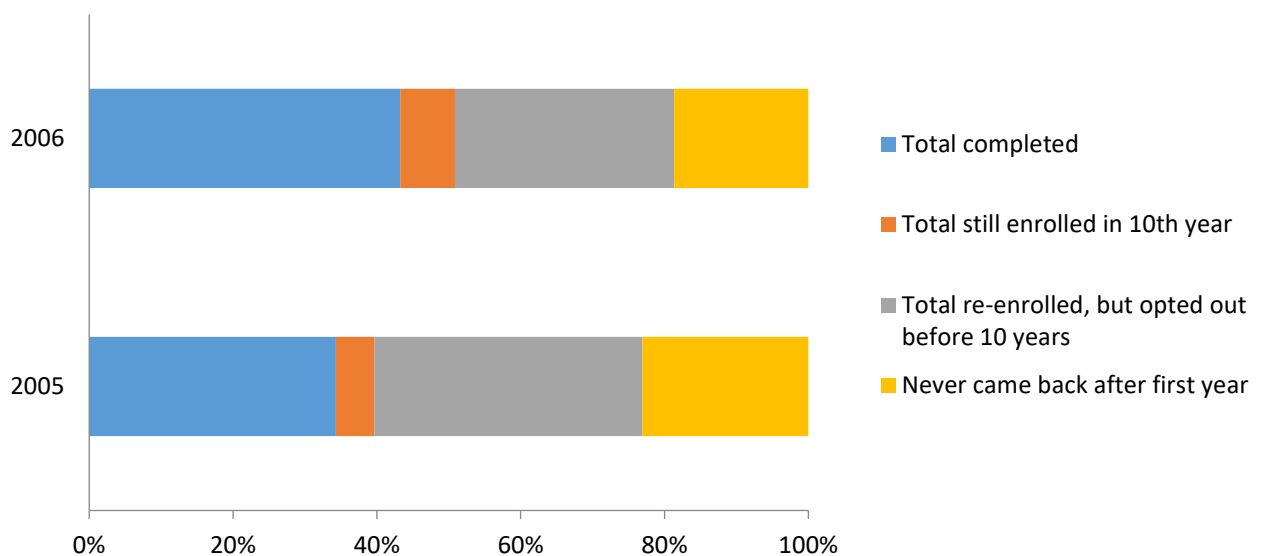

Figure 5: Indigenous students at CDU/CQUniversity; completion and enrolment status at end of 10 years by cohort
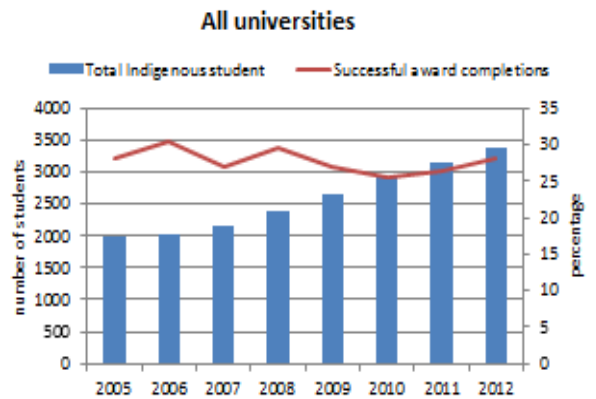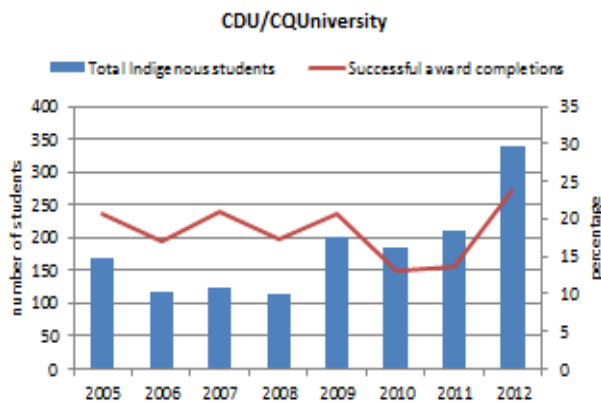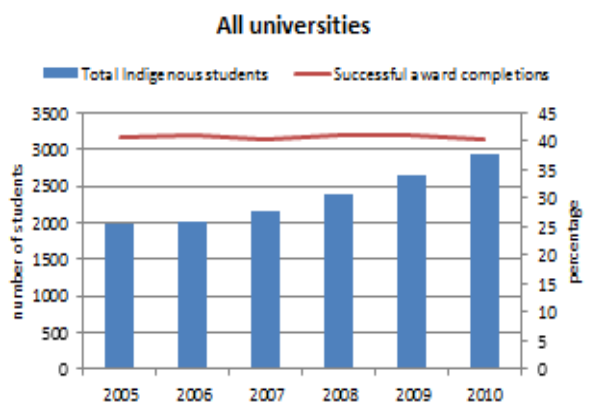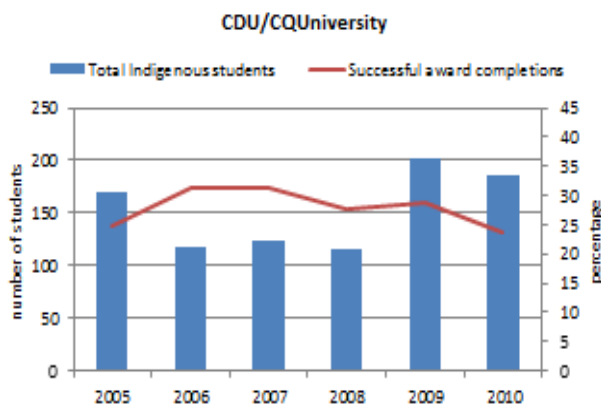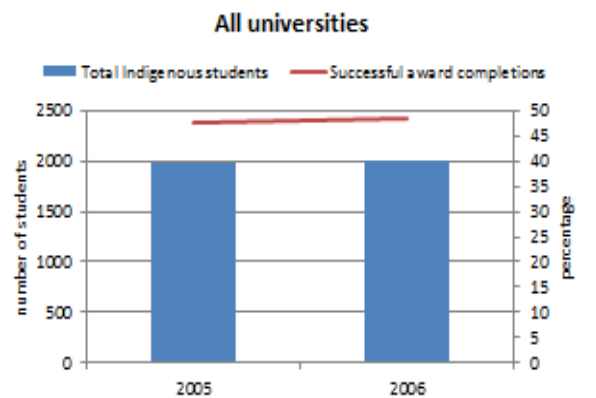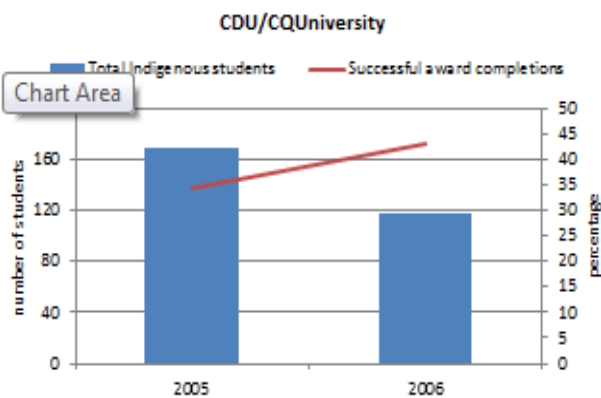
Figure 6: Indigenous students enrolled in CDU/CQUniversity compared with all universities Indigenous student enrolments, percentage of completion success by cohort at each observation point

Cohort averages and differences

For Indigenous students enrolled in CDU and CQUniversity, when completion rates are averaged across all cohorts, there was an improvement of 21 percentage points in successful completions as the enrolment time period was extended from four years to 10 years (18 per cent to 39 per cent). Almost the same increase in successful completions was observed in the national Indigenous student data (from 28 per cent to 48 per cent) although the base completion rate was 10 percentage points higher. However, readers should be mindful that there are fewer cohorts contributing to the average at the 10 year point compared to the four year point.

The cohort average for Indigenous students who enrolled in CDU/CQUniversity courses but who did not return to study after their first year was 27 per cent, five percentage points higher than the national Indigenous student average. Figure 7 illustrates the greater variation in this measure for students at CDU/CQUniversity which was generally higher than the national measure across all cohorts with the exception of 2006 and 2008. Disengagement after the first year of study but prior to the observation point at four years was consistently higher than disengagement at later points in student progress for all but one cohort, suggesting this is a major period of student disengagement — the largest difference was 11 percentage points for the 2008 cohort. This underlines the importance of Indigenous students feeling supported for success in their first year of study.
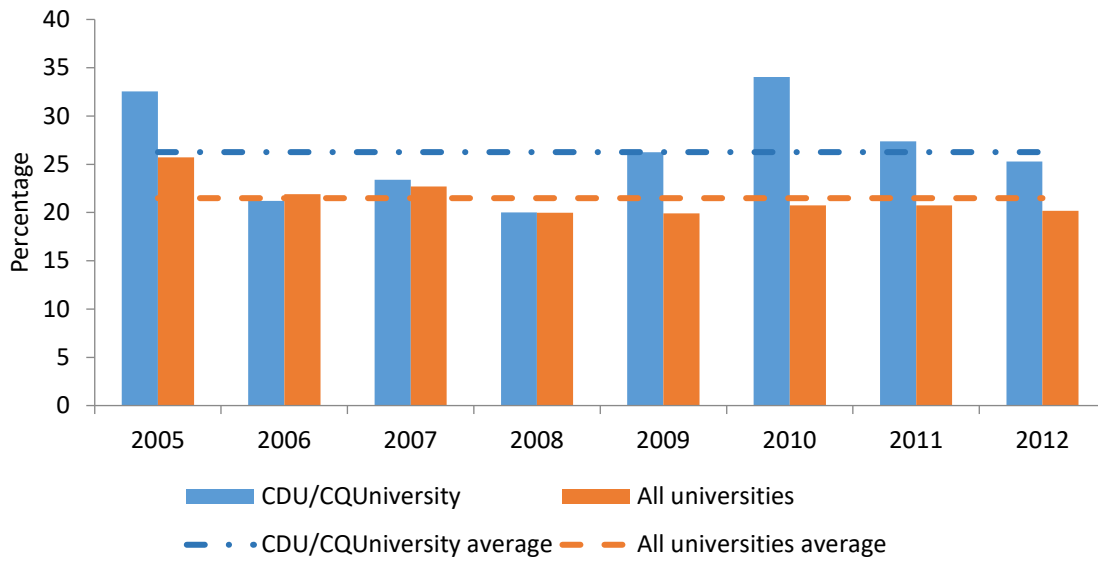
Figure 7: Never returned to study after first year, cohort differences

In terms of average student engagement levels, Indigenous students at CDU/CQUniversity showed similar levels of persistence and commitment to successful completion when compared to Indigenous students enrolled at all universities, with the average percentage enrolled at the 10 year point almost the same (6.5 per cent and 6.2 Per cent). Despite this commitment, the maximum time allowed by universities for students to complete a degree may penalise those who are still engaged with study as they may not be eligible for their award because of the elapsed time. This requires both structural attention by the university administration, and active communication with students to ensure they understand maximum time limitations, and that all study benefits to students are actually realised.

The average disengagement rates (associated with re-enrolment but opting out prior to the observation point or before first year of study) remained higher for students at CDU/CQUniversity at each observation point (Figure 8).

CDU/CQUniversity

All universities

Legend (both charts):
- Completed award
- Disengaged from study
- Still enrolled
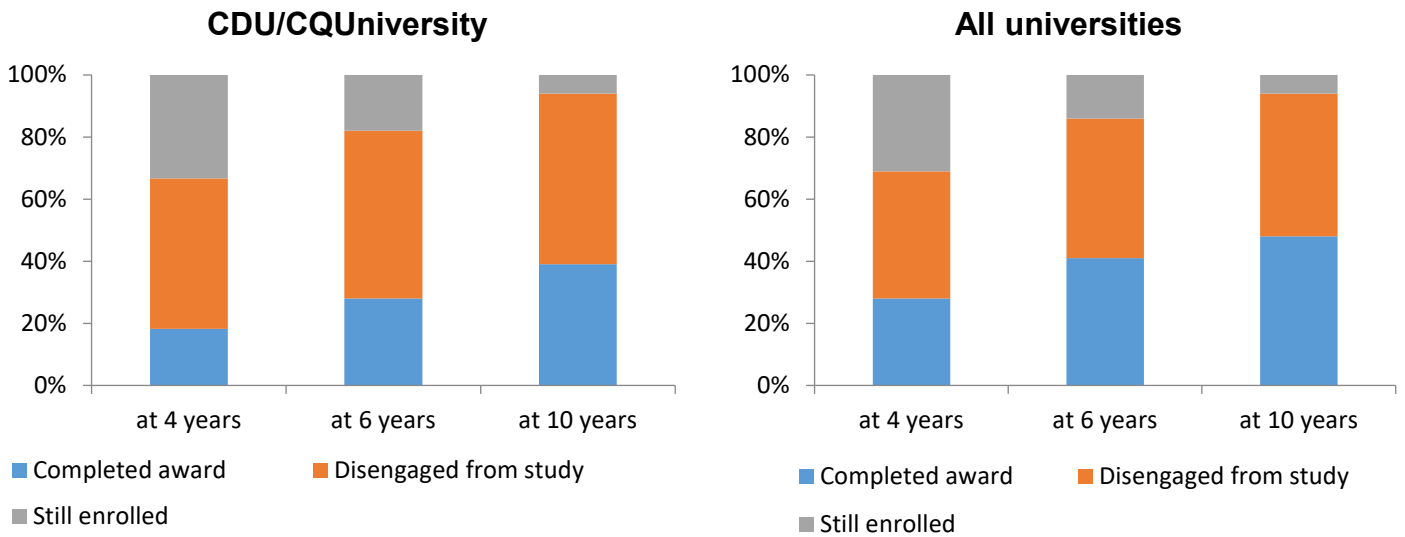
Figure 8: Observation point averages across all cohorts: student success measures

RECOMMENDATION: Expand DET's annual cohort analysis of higher education students to include separate analysis of the national Indigenous student population. These results are important in their own right but also provide an important benchmark for regional and remote cohorts.

RECOMMENDATION: Extend timeframe reporting of Indigenous student higher education award completion to a minimum of 10 years which will better acknowledge and reflect the familial, cultural, social and employment obligations that Indigenous students face. Investigate the impact of this timeframe on maximum time limitations for higher education awards imposed by universities.

Results (Part B) — Indigenous student and study characteristics

The national picture — summary

As discussed earlier the focus of this report is on the higher education outcomes of Indigenous students enrolled at two regional universities at the Bachelor level. Although cohort analysis was also undertaken on the national Indigenous student population this is provided for comparative purposes only. Cohort results for Indigenous students enrolled in all Australian universities at the 10 year observation point showed:

- Students from metropolitan and regional areas have higher completion rates than those from remote areas.
- Students studying internally completed at higher rates than those studying through multi-mode, who in turn completed at higher rates than those studying externally.
- Students studying full-time also completed at higher rates compared with those studying part-time.
- Females consistently completed at higher rates than males (by about two to three percentage points).
- Generally, younger students completed at higher rates than older students, however those aged 35 years and over were often completing at higher rates than those aged 25–34.
- Students admitted via an ATAR completed at higher rates than those admitted through other pathways, however secondary education even without an ATAR appears important to completion success.
- Commonwealth Scholarship holders completed at marginally better rates.
- Coming from a non-English speaking background appears to be associated with lower completions rates, however student numbers are small and the size of the association is variable in each cohort.
- For most students, the higher the SES of the area of their residential address on enrolment, the higher the completion rate. But there is a more marked negative association with student success related to greater remoteness when comparing students from medium SES and low SES areas.
- Students who participated in a prior enabling course (within five years of commencing study) completed their award at rates below those who did not.

These results suggest demographic and study characteristics of Indigenous students are associated with completion success in similar ways to those found in the DET analysis of the domestic all-student population. The exceptions include the effects of age, and coming from a non-English speaking background which both appear to interact differently with completion rates.

Are these relationships similar or different for Indigenous students enrolled at CDU/CQUniversity?

A regional picture — CDU/CQUniversity student and study characteristics

Data and methods

When we drill down into the data by student and study characteristics, issues associated with small numbers[10] can become problematic. Therefore, in the following analyses these data have been aggregated and other data excluded to ensure the issue of small numbers is not leading to erroneous conclusions. Adjustments to Indigenous student data from CDU/CQUniversity included:

Data aggregated

- *basis of admission* — any higher education course; secondary education (with or without ATAR); VET award (any certificate level award); other (including mature age special entry, professional qualification and other basis)
- *socioeconomic status* (SES) — Low SES vs other (both medium and high)
- *field of study* — students studying teaching and nursing vs other fields of study.

Data excluded

- *ATAR* — very small numbers of students provided or required an ATAR on entry
- *parents' prior educational attainment* — data was only collected from 2010 onwards
- *students with disability* — very small numbers of students identified a disability on enrolment
- *women in STEM* — very small numbers of female students were enrolled in STEM subjects.

How student and study characteristics are inter-related

Initially it was of interest to understand whether there was a relationship between the student and study characteristics included in the cohort analysis — i.e. whether they were inter-related. Simple pair-wise chi-square correlation tests were performed on the 2005 and 2006 cohorts to test whether there was a statistical relationship, and if so, its strength. Only these two cohorts were included so that the time period for award completion was maximised. Full results of these tests are provided as Appendix B.

The analyses showed many of the relationships between student and study characteristics were indeed highly significant. This is not surprising but the relationships should be kept in mind when understanding the differential outcomes based on student and study characteristics identified in the cohort analysis. They also point to the potential for a cumulative impact on successful completion of a higher education award.

Student and study characteristics (average after six years)

The cohort analysis of student completion success associated with each student and study characteristic was undertaken at the six year point. Data was pooled and averaged across cohorts commencing 2005 through to 2010 to provide a more robust source of results that smoothed observed differences between cohorts. It is acknowledged however that students studying part-time may not have had time to complete their award at the end of the six year

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[10] Robust data conclusions are impacted by small numbers — for example when only five students have a particular characteristic a difference in outcome for one student impacts the result by 20 per cent. However a difference in outcome for one student would only impact results by one per cent where 100 students had that characteristic.

point, but some do. **At the end of six years, on average, 28 per cent of all Indigenous students at CDU/CQUniversity had successfully completed their degree.**

Region and geographic Socio-Economic Index for Areas (SEIFA)

Students who were classified as living in regional areas achieved higher completion rates than those living in either metropolitan or remote areas at the end of six years — see Figure 9. Almost one in three students from regional areas (30 per cent) had successfully completed their award, compared with 24 per cent successfully completing from remote areas. Case study interviews identified feelings of isolation and disengagement which are relevant to students from regional and remote areas and the work by Pollard (2018) further identifies that remote students are at even greater risk.
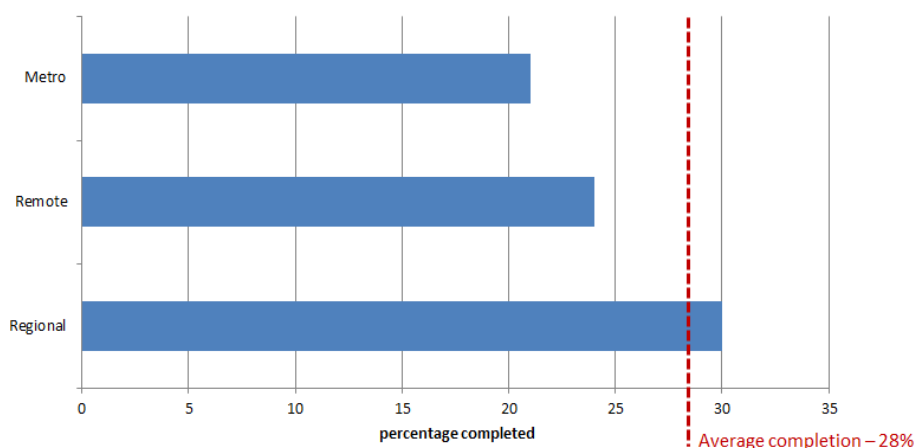
Figure 9: Average Indigenous student higher education completion, by remoteness (cohorts 2005 to 2010)

> "[I] was a bit disengaged from the uni. I wasn't really aware of the services and so didn't use them. **I just felt isolated**. I used the library but getting books out to where I live is hard and I couldn't always get the textbook due to availability." (Student — Smith et al. 2018c)
>
> "For distance ed. - it's a bit different for distance ed. We had to do a discussion and to try and get all your teammates together, because everyone works, everyone has got families — **it's really hard to get a team together and all collaborate** at the same time and the same night." (Student — unpublished quote from the 2018 OLT Case Study research)

Perhaps surprisingly students from metropolitan areas had the lowest completion rates at 21 per cent, however as these students are likely to be studying externally (given all metropolitan addresses are off campus), study modality is also likely to be interacting with completion rates.

Interestingly, students living in areas regarded as low SES were more likely to have successfully completed (30 per cent) compared to those living in areas classified as medium or high SES (26 per cent) — see Figure 10.
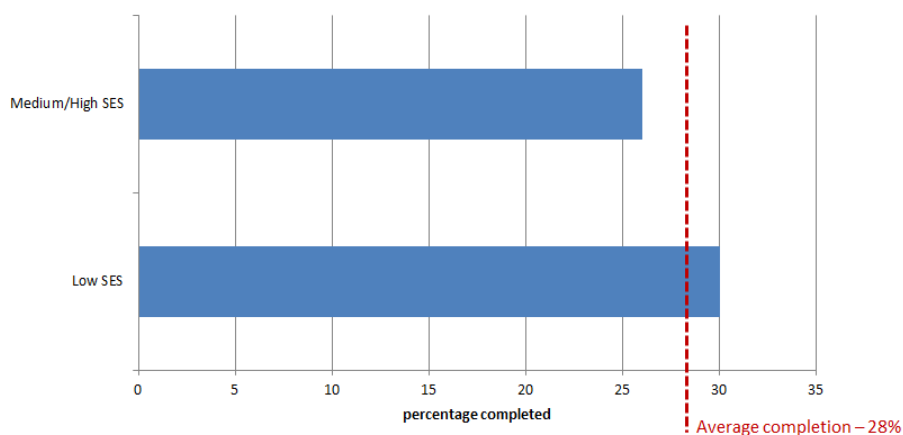
Figure 10: Average Indigenous student higher education completion, by SES (cohorts 2005 to 2010)

These results reflect the catchment areas of both universities, with higher numbers of regional and remote students attached to lower SEIFA scores. However, as an index of socioeconomic advantage or disadvantage, SEIFA has some significant limitations - because it is a measure associated with an area it may not adequately reflect the status of an individual or an individual within a household. This limitation is particularly relevant to the geography of the Northern Territory and to parts of Queensland where very large regional and remote areas are defined as low SES and thus the measure loses some of its power to differentiate the SES of an individual student. Regardless of the indicator used, relative SES remains relevant to whether a student can afford to attend university, and this has been raised as a significant barrier to higher education completion as the OLT case studies attest.

"I could have pulled out many times **because of money problems**. It's just that I have a lot of family support and we just make do on what we've got. Well, we don't have a social life." (Student — Wood et al. 2018)

"For me to return to study, **I would have to be financially better placed** before considering to return to study." (Student — unpublished quote from the 2018 OLT Case Study research: main reason for withdrawing from study and not returning)

"One of the **biggest challenges for me was financial**. The little bit of ABSTUDY I got, didn't really help. I was working so couldn't get the full amount." (Student — unpublished quote from the 2018 OLT Case Study research)

Holding a Commonwealth Scholarship is positively associated with the likelihood of completion. At the end of six years, 32 per cent of Commonwealth Scholarship holders had completed their award, compared with 27 per cent of students who did not hold one of these scholarships — Figure 11. This aligns with recent research that again has emphasised the importance of scholarships and financial support for regional and remote Indigenous students (Kinnane et al. 2014; Pollard 2018). One student in the OLT case studies spoke explicitly about the importance of scholarship support but noted it may be insufficient in the context of the many other financial commitments of many Indigenous students:

"The other thing that has been important for me, it's both something that tides you over, but it also reinforces the notion of obligation, and that's about getting an **Indigenous scholarship**. Because it's enough - I'm at the stage where I don't have any - I don't have a mortgage, and I don't have loans. If I did have any of that, or if I had children at home, the level of the Central Queensland University's scholarship would not be enough …" (Student – Wood et al. 2018)
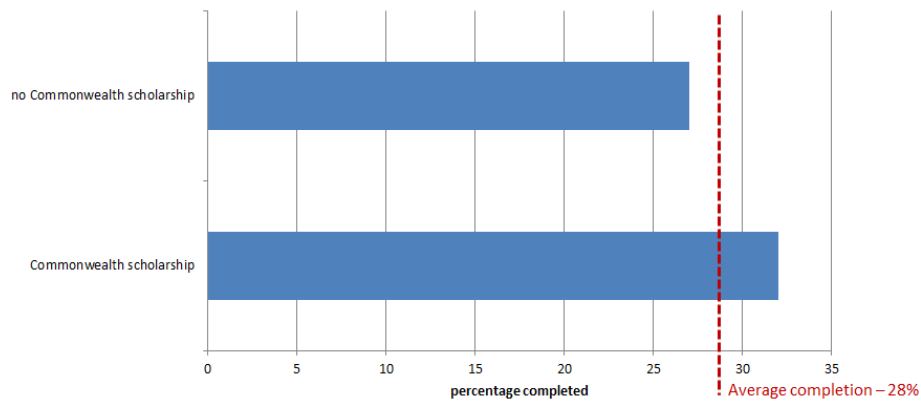
Figure 11: Average Indigenous student higher education completion, by Commonwealth scholarship status (cohorts 2005 to 2010)

Demographic characteristics

Women completed a higher education award at much higher rates than men, with a marked difference of 12 percentage points (31 per cent and 19 per cent respectively) — see Figure 12.
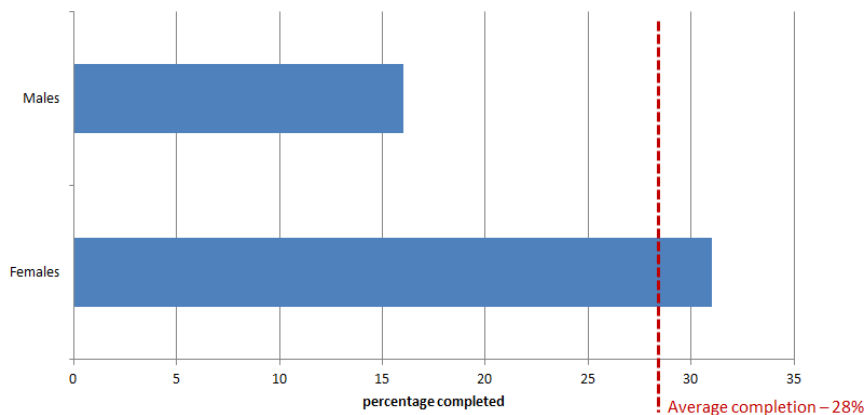
Figure 12: Average Indigenous student higher education completion, by gender (cohorts 2005 to 2010)

This higher level of completion may be influenced by the higher female participation rates (as noted earlier) as the significantly smaller numbers of male students will be impacted to a greater extent by those who did not complete. These results warrant particular attention in relation to Indigenous men accessing post-school education and training. Higher education and VET form the two parts of the tertiary education system and both have roles in readying people for participation in society. VET in particular has been important for building labour market skills, predominantly in mainstream jobs (Dockery & Milsom 2007). The ongoing trend of Indigenous men engaging in VET over higher education awards (Windley 2017; ABS 2017) suggests that dual sector universities should be mapping whether men are transferring from higher education to VET (as they do with pathways in the other direction) in order to provide a more comprehensive picture of how students complete any post compulsory education award.

RECOMMENDATION: Increase research attention on the low participation of Indigenous men in higher education, particularly in regional and remote areas.

Although 28 per cent of students aged less than 20 years (i.e. those more likely to have come to university straight from school) successfully completed a higher education award, those aged 35 years and over were the most likely age group to have completed (31 per cent). Both these age groups completed at higher rates than those aged 20–24 and 25–34

(26 per cent) — see Figure 13. It could be hypothesised that Indigenous people are moving through their life-course stages at different ages, attracting increased responsibilities at an earlier point. Those aged 35 years and over may indeed have more opportunity to balance their commitments and obligations with higher education study.
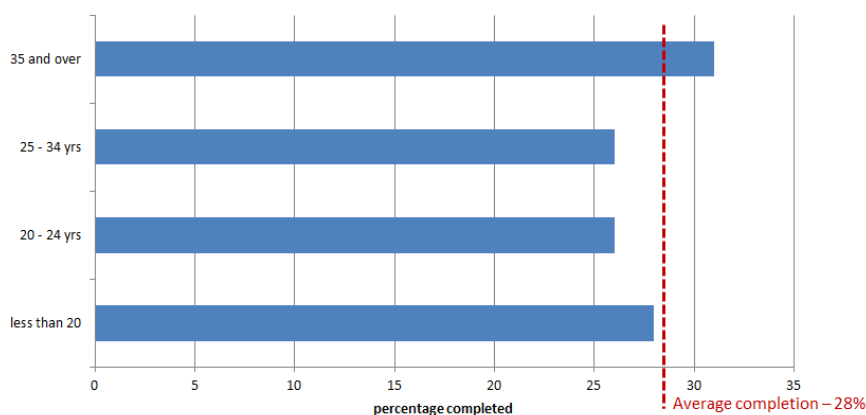
Figure 13: Average Indigenous student higher education completion, by age group (cohorts 2005 to 2010)

Students from non-English speaking backgrounds (NESB) were much less likely to complete a higher education award (17 per cent compared with 28 per cent from English speaking backgrounds) — see Figure 14.
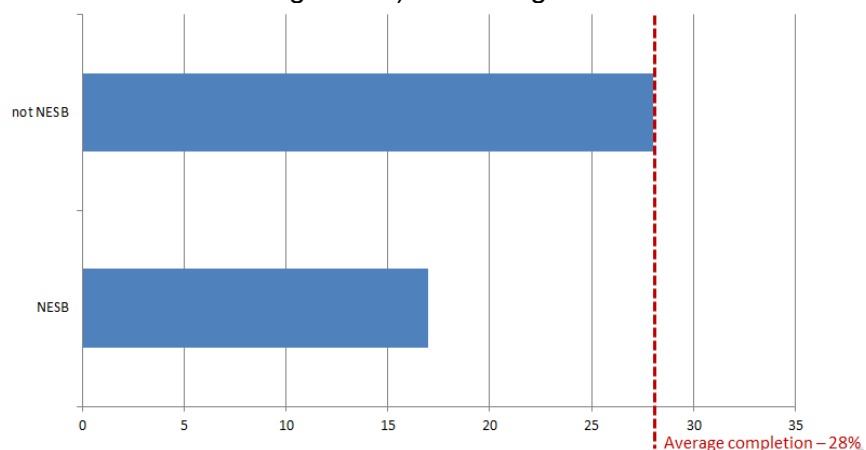
Figure 14: Average Indigenous student higher education completion, by NESB status (cohorts 2005 to 2010)

It should be noted however that the numbers of students identifying as NESB were small, and were very small in the early cohorts (see Figure 15). Therefore caution is advised when interpreting these results. For example, relatively high numbers of NESB students completed in the 2009 cohort (44 per cent), however there were only nine NESB students. The total numbers point to a persistent issue around low participation in higher education by Indigenous students from NESB.
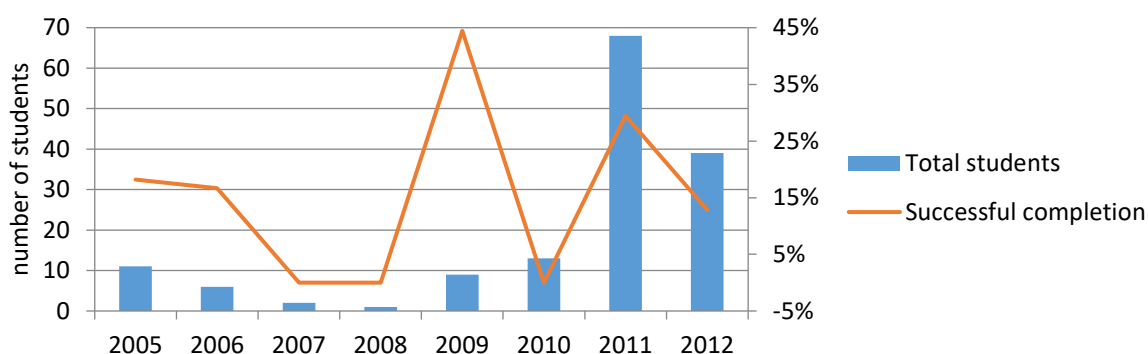
Figure 15: Indigenous students from non-English speaking backgrounds enrolled at CDU/CQUniversity, by cohort

Staff interviewed in the OLT Case Studies identified English literacy as a particularly significant barrier for their Indigenous students, although the issue was not overtly identified by the student participants.

> "… **academic English** … just about all the assessments are based on your fluency with that dialect and that's **generally a barrier**." (Staff – Smith et al. 2018c)
>
> "… Indigenous students in Australia … **don't have any access to any English as a second language programs**, because we are Australian citizens." (Staff – Smith et al. 2018c)

The Whole of Community Engagement (WCE) initiative at CDU also identified poor English language, literacy and numeracy proficiency as a genuine barrier preventing remote Indigenous students from accessing and participating in higher education (Street et al. 2017a; Shalley & Stewart 2017; Moore et al. 2018). This culminated in the development of an *Action Statement on Aboriginal adult English LLN in the NT*, including a policy recommendation for all tiers of government to acknowledge the extent and impact of low levels of English LLN in the Aboriginal adult population of the Northern Territory, and to prioritise coordinated and sustained, bi-partisan commitment that endures beyond changes in government (LLN Action Network, 2017). A subsequent evidence brief reiterated the need to invest in English LLN, particularly for the benefit of remote Indigenous learners (Moore et al. 2018). However a strategic policy commitment to invest in English LLN for adult Indigenous students by Australian governments remains elusive.

RECOMMENDATION: Acknowledge the additional English LLN needs of some Indigenous students and provide equivalent support structures as those extended to migrant and international students.

RECOMMENDATION: Continue engagement work with Indigenous communities who speak languages other than English to increase aspiration and participation in higher education generally.

Study characteristics

Students studying through a multi-mode combination achieved much higher completion rates (37 per cent) than those studying internally (27 per cent) or externally (24 per cent) — see Figure 16.
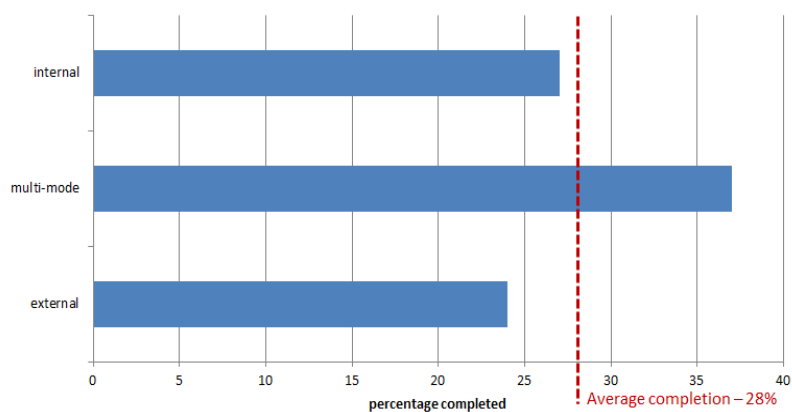
Figure 16: Average Indigenous student higher education completion, by study mode (cohorts 2005 to 2010)

Although technology has supported increased access and participation in higher education for students in regional and remote locations, as well as for students who need the flexibility of online study in order to balance their life commitments, it comes at a cost. Comments from externally enrolled students in the OLT case studies show that a range of factors are conflated with the experience of participating in university by distance. Issues relating to working collaboratively on team assignments, transport, other life and family responsibilities, organising job placements, communication with staff, and sitting exams, have all surfaced as significant concerns. This is highly congruent with staff commentary from the OLT case studies, as outlined below:

"The other thing that affects them [Indigenous students] are those **other commitments**. (Staff – Wood et al. 2018)

"Flexibility. Understanding the cultural obligations that students have that may be quite different to what I have and what other students have. **Negotiating group work effectively around those obligations.**" (Staff – unpublished quote from the 2018 OLT Cast Study research)

The rigidity of university policy and procedures for students based in remote locations can be overwhelming and can be perceived as unfair or lacking sufficient flexibility to support sustained engagement in higher education study — particularly for those students who face additional challenges in terms of remoteness and cultural and family obligations. Similar findings have been noted in recent research about remote student university success funded by the National Centre for Equity in Higher Education (NCSEHE) (Pollard 2018), and have been echoed in a national independent review of regional, rural and remote education in Australia (Halsey 2018). Such work has emphasised the importance of personal, and regular, communication between universities and regional and remote Indigenous students. As some staff from the OLT study commented:

"…. With Indigenous students specifically, we think it is more — quite possibly the embarrassment that they don't know and are too scared to ask a question, and they have no one around them that has studied previously to be able to ask that question. You know, **getting a follow-up call and just saying, "Hey, how are things going?**" they might be able to relay a little bit more of their concerns." (Staff — unpublished quote from the 2018 OLT Case Study research)

"Sometimes I think we can work in an online space too much, and **a lot of people cry out for—**a lot of leavers—**this face to face**, this interaction. So, I think there needs to be a healthy mix." (Staff — unpublished quote from the 2018 OLT Case Study research)

Research by Devlin and McKay (2015) found that flexibility has been viewed as critical by regional low SES students for balancing work and study, or dealing with study and having children and/or other family responsibilities. In other studies (Burke et al. 2017) students expressed a strong preference for face to face traditional lecture and tutorial styles — as it enables deeper understanding and greater connection. Students from the OLT study also commented on the significance of personal communication to keeping them engaged:

> "Everyone sends emails, but **it would be good to get personal contact**, as it works." (Student — unpublished quote from the 2018 OLT Case Study research)

A comparison across study areas shows that students enrolled in teacher education were the most likely to successfully complete compared to other study areas, with a third of all students achieving their award (33 per cent). This was followed closely by those enrolled in nursing (30 per cent) and those studying humanities and the social sciences (including creative arts) (both 29 per cent). Historically, there have been multiple programs targeting Indigenous pre-service teachers from regional and remote areas in the Northern Territory and Queensland that have provided additional supports and flexibility to aid the participation and completion of higher education (Van Gelderen 2017; Street et al. 2018).

The success of multi-mode course design over both internal and external modalities deserves attention in this space. *Growing Our Own* is an innovative program for Initial Teacher Education in remote Northern Territory designed as a partnership between CDU and Catholic Education NT (Van Gelderen 2017). It is aimed at pre-service teachers and the flexible design allows lecturers to travel to remote Indigenous communities to deliver course content face-to-face as well as supporting students to travel to the CDU campus. The program functions under a 'two way' pedagogy and 'on country teaching' where the lecturers, mentors and pre-service teachers actively engage in 'epistemological dialogue and exchange' (Van Gelderen 2017, page 14). There is also a significant amount of practical work experience with students undertaking at least three days of teaching practice each week. The program provides students pastoral support and embeds a high level of flexibility that allows students to enter and exit so they can deal with the many unique circumstances of living in a remote Aboriginal community. The program claims high retention rates (74 per cent) and has graduated 38 per cent of students enrolled through the period 2009 to 2016. Ninety per cent of successful students have gone onto employment.

Recent research by Stone and O'Shea (2019) found evidence that the design of online higher education requires a rethink of the role of lecturers and how teacher engagement and connection with online students 'had a demonstrable positive effect on retention figures' (Stone & O'Shea 2019, p. 62). It also pointed to the need to consider challenges associated with the technology and the learning platforms, including student IT experience and their understanding of how to use the interface, access the content and find relevant support and assistance.

Learnings from these studies could be useful to guide future strategy development in study areas where there is potential to increase completion rates. Within the context of education, there are parallel recommendations about maximising the contribution of local Indigenous teachers in remote areas, which increases the legitimacy of investing in this way (Street et al. 2017a; Moore et al. 2018).

RECOMMENDATION: Investigate the relative success of course design and flexible delivery of higher education units, particularly on understanding how multi-mode study assists completion in regional and remote contexts.

Unsurprisingly, more full-time students had completed their award compared with those studying part-time (34 per cent and 16 per cent respectively, Figure 17) because the observation point of this analysis was at the end of six years. However only slightly more

part-time students were still enrolled compared to full-time students (17 per cent and 19 per cent respectively). This may suggest that the full-time/part-time study intention of students when they enrolled at commencement had changed by the six year observation point. Alternatively it may suggest that students are repeating subjects where they did not succeed (thus taking longer) or changing their field of study which effectively increases the time and/or units required to complete an award.
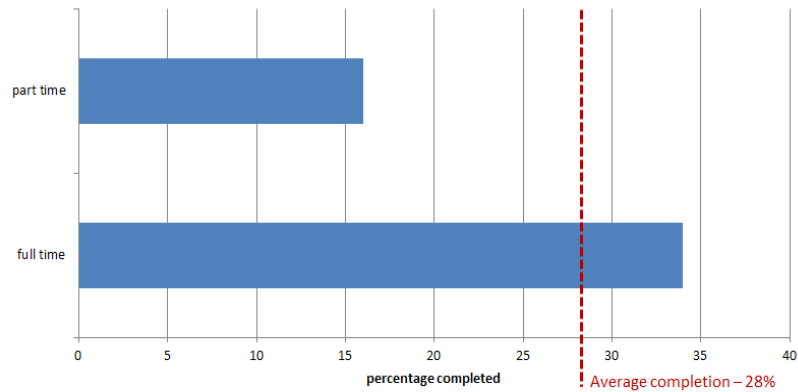
Figure 17: Average Indigenous student higher education completion, by study intensity (cohorts 2005 to 2010)

Admission and support

The basis of student admission to university was associated with completion rates – see Figure 18. Students who were admitted via previous higher education study (although completion or success cannot be assumed) were more likely to complete successfully (36 per cent), followed by those who were admitted through secondary education (either with or without an ATAR score) (29 per cent). In comparison, those admitted through VET pathways had the lowest completion rates (22 per cent) with completion rates for students admitted through other pathways (including professional qualifications and mature age) almost the same (23 per cent). As discussed earlier in the report, there is significant potential to maximise VET to higher education pathways as a means of increasing Indigenous student participation in higher education. However, ensuring an appropriate level of academic and pastoral support is available to students entering higher education from VET, professional qualifications and mature age entry pathways is clearly an important consideration if completion rates are to mirror enrolments and participation.
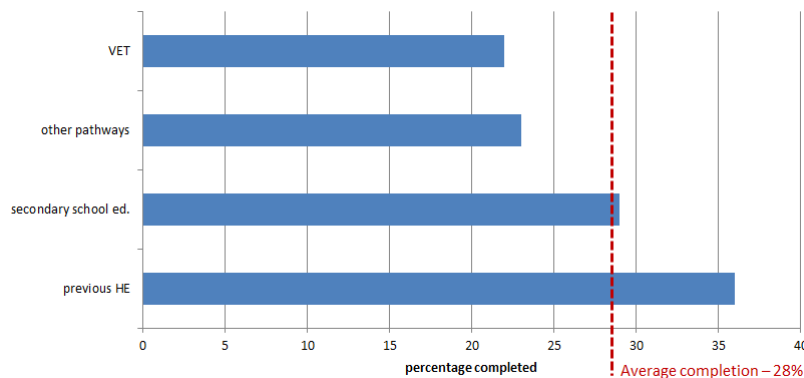
Figure 18: Average Indigenous student higher education completion, by admission basis (cohorts 2005 to 2010)

The high percentage of admission by previous higher education study could again indicate that students are opting in and out of study as they manage their personal circumstances

> "I'd like to see some **changes in policy around actually recognising different cultural sort of conceptualisations of time** and also allowing students more chance to adapt to the university system of time and deadlines and all the rest of it. I think that could be particularly useful." (Staff — unpublished quote from the 2018 OLT Case Study research)

An important observation here is that the persistence, perseverance, and high levels of self-efficacy and motivation displayed by Indigenous students could be used as a strategic lever to support these students to re-enter and complete their studies if they have previously chosen to withdraw (Frawley et al. 2017b). That is, Indigenous students who leave higher education study could be actively encouraged to return to university, with clear evidence that prior engagement in higher education has a positive association with the likelihood of completion.

Participation in a prior enabling course is associated with lower levels of completion success (22 per cent compared with 29 per cent who did not)—Figure 19—however there is evidence to suggest this group is also more likely to still be enrolled at the end of their sixth year (see Appendix D — Figure 8).
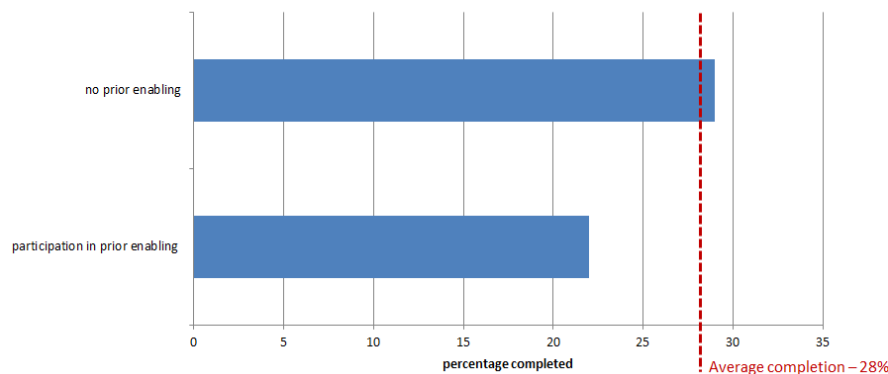
Figure 19: Average Indigenous student higher education completion, by participation in prior enabling courses (cohorts 2005 to 2010)

The negative association is somewhat at odds with current academic scholarship indicating that access to quality pre-tertiary enabling programs and preparatory courses are critical in preparing students from low SES backgrounds for university study (Devlin and McKay 2015; Pitman et al. 2017; Harvey 2017). This includes the perceived benefits of enabling programs for Indigenous students in relation to improved confidence and increased skills (Kinnane et al. 2014; Hall & Wilkes 2015). More targeted qualitative research examining the impacts and outcomes of enabling programs in supporting Indigenous students to enter, participate *and* successfully complete university, is warranted. Given that data has identified prior post-school education is important to success and that the Indigenous student cohort is likely to have significant life skills associated with mature age, the process of recognising prior learning should also be examined from the perspective of supporting greater access to higher education.

RECOMMENDATION: Increase both quantitative and qualitative research focus on enabling courses provided to Indigenous students. Who is accessing them? What is working? Where are the gaps in translating participation into enrolment and then to success?

Summary

To summarise, the cohort analysis found the following person and study characteristics of Indigenous students at CDU/CQUniversity to be associated with successful award completion:

- In contrast to national level Indigenous student results, Indigenous students based in regional areas were more likely to achieve award completion. This was followed by those from remote areas, and then those in metropolitan areas.
- Similar to national Indigenous student results, women were more likely to have completed than men. Although age is interacting in similar ways to the national population in the 20 to 34 year group, students aged 35 and over were more likely to complete compared with students coming more directly from school.
- Like the national Indigenous student results, Indigenous students who identified from NESB had lower rates of completion. Small numbers may be affecting the validity of this association but it is notable that it is consistent both at the CDU/CQUniversity and national levels.
- Students studying via multi-mode are completing at higher rates than those studying internally. This contrasts with national level results but may reflect the way the key study areas of education and nursing are structured at CDU/CQUniversity. These fields of study are also associated with higher levels of student completion.
- Similar patterns of award completions are observed by study intensity — with full-time students more likely to be successful than part-time students. However the proportion of full-time students still enrolled after the six year observation point may be significant.
- Previous education at the higher education level was more relevant to award completion than secondary education for students at CDU/CQUniversity when compared to those at the national level.
- Although participation in prior enabling courses is associated with lower levels of completion at both the national and CDU/CQUniversity level, there is evidence that many students coming through this pathway are still engaged with study after the six year point. The educational vulnerability of this group should be recognised.
- Scholarship support appears to assist students in successful completion however this analysis was limited to Commonwealth Scholarships only.

These cohort analyses identify student and study characteristics that are associated with higher education award completions in similar and different ways when compared to the national Indigenous student population. The significance of increasing student success to improved social and economic outcomes in regional and remote areas should attract continuing commitment to this type of analysis in the future.

RECOMMENDATION: Reflecting the more complex and demanding nature of Indigenous students' engagement with higher education, develop a more sophisticated evaluation process, including targets and measures, for reporting participation and completions of Indigenous higher education students.

Can student and study characteristics predict success? — A regression analysis

Cohort analysis shows that a range of student and study characteristics collected at student enrolment are associated with award completion, and many in similar ways to those found in the DET analysis of the all-student population. But can we use student enrolment data to predict the likelihood of successful completion from these characteristics?

Regression analysis is a statistical modelling technique that is helpful for zeroing in on the most important predictors of observed outcomes, which for this analysis was the likelihood of

award completion. Multivariate logistic regression was applied to enrolment data for students in the 2005 and 2006 cohorts at the end of the 10 years (again, to optimise the opportunity for successful completion), and the full analysis provided as Appendix C.

The regression analysis show that just two variables can predict completion success with any level of confidence — participation in a prior enabling course and study intensity (Table 5). The resulting model also suggests that gender could play a small role in predicting the outcome.

Table 5: Summary results, Multivariate Logistic Regression predicting completion success

Coefficients	Estimate[11]	Std. Error	Pr(>|z|)
(Intercept)	-0.05	0.47	0.92
Gender (male)	-0.46	0.28	0.11
Participation in prior enabling (no)	0.09	0.04	0.03 *
Study intensity (part-time)	-0.86	0.29	0.003**

*   Statistically significant at p<0.05, ** Statistically significant at p<0.01

When holding all other explanatory variables constant, the model found weak evidence that women have an increased probability of award success (11 percentage point over men). There is stronger evidence that participating in prior enabling courses decreases the probability of award success marginally (by two percentage points) compared with not participating. There is strongest evidence that studying full-time increases the probability of award success by 20 percentage points compared to studying part-time.

The McFadden test was used to describe the functional fit of the model. The McFadden value[12] associated with the optimised model in this analysis was only 0.04 suggesting that the range of student and study characteristics collected at enrolment have a very small amount of predictive power of the higher education award success of Indigenous students enrolled at CDU/CQUniversity.

Because this regression analysis was limited to two cohorts only, the predictive power of the resulting model was limited by the size of the cohorts relative to the number of explanatory variables (i.e. the student and study characteristics). It is further complicated by the relationships between the independent explanatory variables themselves as shown in the chi-square analysis. Therefore, although the cohort analysis identified other student and study characteristics to be associated with award success, the statistical power of other individual characteristics in predicting relative success wasn't proven by the regression analysis.

A better understanding of the relative impact of student circumstances on the probability of award success does allow prospective students to be better informed about their choices and decisions with regards to higher education participation. Therefore this type of analysis has research merit. Pooling more data has the potential to increase the statistical power of these types of multivariate data analyses (Wunsch et al. 2010), and other types of statistical modelling could also be considered (see Jeon 2015 for discussion). There may be potential for leveraging existing university networks such as the Regional University Network and Innovative Research Universities to develop larger regional/remote Indigenous student datasets. This should improve the ability of more complex statistical methodologies to strengthen understanding of Indigenous student success in regional and remote contexts, and ultimately allow students to be better informed.

RECOMMENDATION: Continue to monitor outcomes of Indigenous students enrolled in CDU/CQUniversity and consider extension to include groups of universities that are

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11 Interpreting LOGIT regression estimates requires additional computation.

[12] In the social sciences, a McFadden pseudo R-square value of between 0.2 and 0.4 is interpreted as a good model fit (Louviere et al. 2000).

servicing a majority of Indigenous students from regional and remote areas to increase the size of the analysis dataset.

Data limitations

The cohort analyses applied in this report are limited to finding associations between successful award completion and student/study characteristics. These associations cannot be discussed in terms of cause-effect relationships, however the addition of qualitative experiences gathered from Indigenous students in both universities, contextualises and adds weight to the statistical conclusions.

The OLT Case Study research also showed vastly differing experiences impacting on student success within the Indigenous student population. While we are making the assumption that there is homogeneity within the student populations we must also acknowledge differences in experiences and outcomes may be linked to the diversity of their backgrounds.

Despite higher participation levels of Indigenous students enrolled at CDU and CQUniversity the number of students included in these cohort analyses was relatively small. Numbers become even smaller when the data are again cut by different student and study characteristics, and when the analyses were restricted to only two cohorts (i.e. to optimise the opportunity for successful completion when applying the multivariate analysis). To respond to the numerous calls for a strong evidence base on which to evaluate the success of programs supporting Indigenous people's access, participation and success in higher education, university level commitment to continuing this work is required. This commitment will assist in building the required analysis dataset for continuous monitoring.

The robustness of any conclusions will be greatly improved by even larger student numbers. Pooling student data from other universities that are regionally located and have relatively high numbers of Indigenous students from regional and remote areas would increase the validity of research conclusions. Leveraging the extant partnerships of the *Regional Universities Network* and *Innovative Research Universities* could provide an effective platform for further discussion.

As discussed throughout the report, the quality of results are limited by the quality of the data collected at enrolment and maintained in data stores. Building a strong evidence base requires data to be accurate (i.e. the data properly describes these student characteristics) and coherent (i.e. data is collected and described in the same way over time). The following are likely to be issues that affect the quality of student enrolment data:

- *Differential identification of Indigenous status*. It is known that Aboriginal and Torres Strait Islander people do not always identify their Indigenous status and it is impossible to test whether those who don't identify themselves in university enrolment data have different levels of success compared with those who do. If ongoing monitoring is supported then it is important that universities encourage students to identify by explaining why Aboriginal and Torres Strait Islander status is being collected and how it will be used.
- *Remoteness*. To correctly identify where a student comes from, this data item should be based on the student's original home address from their application for enrolment and be maintained regardless of their enrolment address or term address. The potential to track student mobility over time could also provide insight on what type of 'home' circumstances support higher completion rates.
- *NESB.* Anecdotal reports from admission support staff suggest that identification of NESB is not well understood by Indigenous students, who may think the question is asking them whether they speak English. This data item is generally used to identify overseas born students or those with overseas born parents, or

overseas/international students electing to study in Australia. Indigenous students may not see the question's relevance to them. The collection of NESB data for Indigenous students (including question wording and context) needs improvement.

- *SES.* The use of SEIFA to identify relative economic advantage/disadvantage is questionable when describing the SES of a student because it is generalised to a geographic area and in the past has conflated Indigenous status with disadvantage. Use of a composite indicator that also reflects parental or household income may be a more valid indicator of the socioeconomic circumstances of the student.

- *First-in-family*. Studies citied in this report have shown first-in-family status to be a highly important predictor of both access to and participation in higher education. A proxy identifier has been collected on enrolment from 2010 but has not been incorporated into the cohort analyses. Data collected from 2010 identifies almost all Indigenous students at CDU and CQUniversity as having parents who did not undertake university level study. Although it would be reasonable to assume many of these students are *first-in-family*, better data collection is necessary to understand whether they are truly *first-in-family* — i.e. their direct relatives have not attended higher education.

- *Disability status*. Because very small numbers of Indigenous students identified a disability these data were removed from analyses. Avery (2018) suggests that Indigenous people are reluctant to acknowledge both Indigeneity and disability because of their perception of double discrimination. There is also research evidence suggesting remote Indigenous peoples conceptualise disability differently (Ariotti 1999; Maher 1999; Kendall & Marshall 2004). This needs to be addressed in the data collection process through sensitive question design and context.

Any analysis of data across time is impacted by macro-level change, such as shifts in higher education policy and funding arrangements. Meso level changes including how universities design their courses to maximise enrolments (e.g. a change to multi-mode, use of online content) also attracts issues around maintaining data coherence. For example changes to the way the universities classified the mode of study for nursing and education courses may impact analysis outcomes. These changes allowed more students to take a growing number of units externally and started to be advertised by CQUniversity in 2007. There are additional accuracy issues at the micro level. Cohort analysis assumes that data provided at enrolment remains static however results from these analyses suggest that students may change their study intensity, their field of study and even their study mode over time.

The data used in this report includes higher education completions only. As dual sector institutions, both CDU and CQUniversity have students who commence higher education awards but exit with VET awards. Based on current DET definitions, higher education students who complete a VET award are not counted as a completion and would typically be counted as attrition. This is unlikely to affect the early cohorts but it is becoming a greater limitation as time progresses because of the way some disciplines are being offered. For example, all primary and early childhood education students of the CQUniversity complete the requirements for the VET Diploma of Early Childhood Education as an embedded part of the first year of their degree. More sophisticated data systems are required to track all post-secondary level award completions.

RECOMMENDATION: Continue this cohort analysis of Indigenous students enrolled in CDU/CQUniversity and consider extension to include groups of universities that are servicing a majority of Indigenous students from regional and remote areas to increase the size of the analysis dataset.

RECOMENDATION: Design better data and information systems that are equipped to capture the multiple higher education entry and exit points, and any changed study intensity, that have been noted in this report. This should be accompanied by a number of data initiatives including:

- university-led campaigns for collecting higher quality enrolment data on the personal characteristics of: Indigenous status; first-in-family status; place of usual residence on enrolment application; non-English speaking background; and disability status
- a single unique student identifier which can link study across the university and VET sectors that can assist in tracking transitions (across courses, universities and sectors) and identify success at various exit points
- ongoing survey collection and qualitative study focused on disengage/re-engage behaviours to understand why Indigenous students leave higher education study and what prompts them to return.

Conclusions

Data on the cohorts of Indigenous students enrolled in CDU or CQUniversity show that many are succeeding in gaining a university award, albeit at lower rates when compared to the national Indigenous higher education population. This is in the context of a student body more likely to belong to multiple equity groups and to have personal and study characteristics associated with lower completion rates in the national domestic all-student cohort analysis.

Despite limitations associated with the data, cohort analyses identified some significant stories about successful higher education award completions. CDU/CQUniversity Indigenous students are much more likely to be women, much more likely to be older, and much more likely to be studying part-time. This student profile suggests that Indigenous students may be delaying study to coincide with a different life stage compared with a typical higher education student who enrols in university directly from secondary school. Aspiration and motivation will be playing a significant role in why they are pursuing higher education, and the predominance of studies of society, education and nursing as their chosen field of study suggests that Indigenous students may see these professions as careers that align with strong community values of reciprocity and 'giving back' identified in the research conducted by Frawley et al (2017b; 2017d). The relationship between Indigenous achievement in higher education and self-efficacy postulated in these bodies of work could provide one explanatory framework for the differential success of Indigenous students when compared to the broader student body.

The lower participation by men also aligns with the ongoing trend of Indigenous men pursuing VET qualification over university study (Windley 2017; ABS 2017). With VET to higher education pathways of significant research interest, the limitations of current data systems means that moves from higher education to VET and the emergence of micro-credentials are not identified or understood in the context of success. This is an area requiring more focus in the broader framework of lifelong education and preparing people to be confident and active contributors to society. The ability to link data across these sectors needs to be enabled and particularly so for universities that are already dual sector.

The cohort analysis also shows that 'regionality'/remoteness is associated with success — students from regional areas are participating and succeeding in strong numbers, but so are students from remote areas and in this study, at higher rates than those situated in a metropolitan area. However they are doing so with a background of multiple barriers that makes the process of study much more difficult. Indeed the work by Pollard (2018) shows that students from remote areas are some of the most disadvantaged in terms of higher education access and support, with the lower availability and reliability of the internet and technology for online study, and the isolation and extra associated financial burdens just two examples. Additionally, CDU/CQUniversity enrolment data show few Indigenous students identifying as NESB and results from the cohort analysis show NESB has a negative association with success. This points to a continuing issue around this population group's low participation in higher education, but may also suggest that students are not identifying their NESB at enrolment because it is being poorly collected. More Indigenous people from remote areas speak languages other than English (ABS 2017). Supplementary support is likely to be needed for these students (as identified in staff interviews from the OLT study) and must be addressed if participation is to be turned into completion. Suggestions include: active attention to English literacy support; the provision of appropriate tertiary enabling courses; course design; and potentially the way units are assessed.

These cohort analyses also show that CDU/CQUniversity Indigenous students are taking longer to gather requisite units for their award, despite remaining committed to their studies — indeed six per cent of students remain enrolled at the end of 10 years. This observation, along with the relative completion success of Indigenous students with previous higher

education experience (albeit over an extended period of time), should not be viewed as disinterest in, or an inability to succeed, at university. Rather, it could suggest that Indigenous student engagement with universities is not necessarily perceived as a time-restrained activity in the way the Western higher education institutions are currently funded or geared towards. That is, iterative engagement with higher education studies will reflect ebbs and flows in study participation based on a multitude of familial, social, cultural and employment obligations. This conclusion is consistent with a recent NCSEHE-funded study by Burke et al. (2017) examining 'timescapes' among higher education students from regional and remote backgrounds. The study found that these students face significant time constraints in relation to a range of social and cultural factors, and typically did not miss classes or deadlines as a result of poor time management or low motivation, but out of necessity when juggling other demands on their time (Burke et al. 2017). The study also demonstrated that the advice and information about time management provided to students tends not to take into account the complex demands and expectations that students from regional and rural backgrounds confront (Burke et al. 2017).

These cohort analyses indicate that both full-time study intensity and study through multi-mode (combining both online and face-to-face experiences) are positively associated with successful award completion. Not being afforded the opportunity to study full-time has been acknowledged as a very relevant issue impacting the CDU/CQUniversity Indigenous student cohort more particularly. The evidence suggesting that study through multi-mode is positively associated with successful completion points to the importance of course design as a potential enabler for balancing life commitments with study while still being provided with enough personal contact and communication with lecturers and peers. Many of the OLT interviews (from both students and staff) identify the significant benefit of being able to meet face to face, of getting to know teachers and of forming strong relationships with peers. These opportunities come part way to building mutual understanding and trust. But the flexibility associated with studying online is also openly acknowledged as affording higher education access and opportunity to students who would be unable to study if an external mode was unavailable. The challenge for universities servicing regional and remote students, or indeed any student studying externally, is to effectively combine both face-to-face opportunities and the flexibility of online content to optimise success.

Finally, these cohort analyses showed that students participating in enabling courses remain highly vulnerable to non-completion. It is recognised that enabling courses are designed to prepare students for academic study, but may also help students to de-select higher education when their understanding of expectations is clearer. Previous research suggests that enabling courses are vital to developing the academic capacity of Indigenous students. More research is required on how pre-tertiary enabling courses activate this capacity, the limitations of current course design, and importantly who is participating and whether they succeed with their study intent.

Despite the data limitations associated with cohort analysis, quantitative data is able to paint a broad outline of both the person and study characteristics associated with higher education award success for Indigenous students in regional and remote areas. Improving the quality, coherence and utility of the student enrolment data, and continuing to monitor change over time will clarify the detail. However, it is clear that qualitative research is needed to provide the nuance necessary for the effective design and delivery of higher education policy and practice appropriate to the complex circumstances of Indigenous students from regional and remote areas. Therefore mixed-methods approaches that combine cohort analyses with narrative and/or student survey methods are highly recommended.

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# APPENDIX A: Analysis of national Indigenous student cohorts over time

From student cohorts commencing in 2005 through to 2012, 7,849 Indigenous students had completed a higher education award from an Australian university (see Table 1). Completion rates varied from 49 per cent to 26 per cent reflecting differences in the time period since commencement.

Table 1-A: Number of Indigenous student award completions in each cohort for observation points, all Australian universities

Cohort	End of 4 years	End of 6 years	End of 10 years	End of 11 years	Total award completions	Percentage of cohort (a)
2005	563	811	949	970	970	48.7
2006	610	823	974		974	48.5
2007	587	873			872	40.3
2008	706	976			976	41.1
2009	714	1080			1080	40.9
2010	750	1185			1185	40.5
2011	832				832	26.3
2012	960				960	28.2

(a) Length of observation period changes across cohorts for percentage calculation

Across the period 2005 to 2012 there were large increases in the number of Indigenous students enrolled in higher education, growing steadily year on year and increasing by 71 per cent over the eight years. Although the total numbers of Indigenous students enrolled have increased there was variation across cohorts in the proportion of students still enrolled at each observation point (Figure 1). Significantly, a small proportion of students remained enrolled 10 years after they commenced their study.
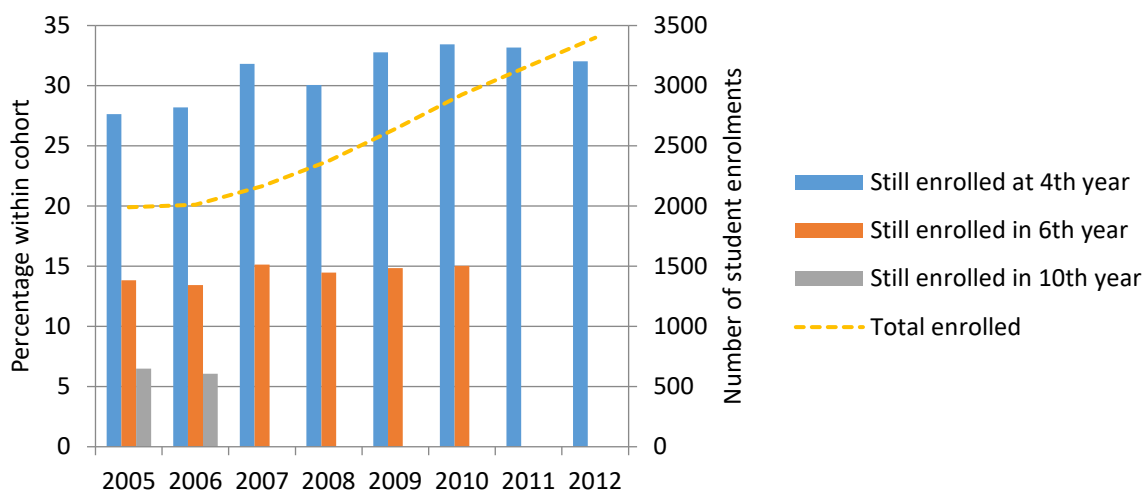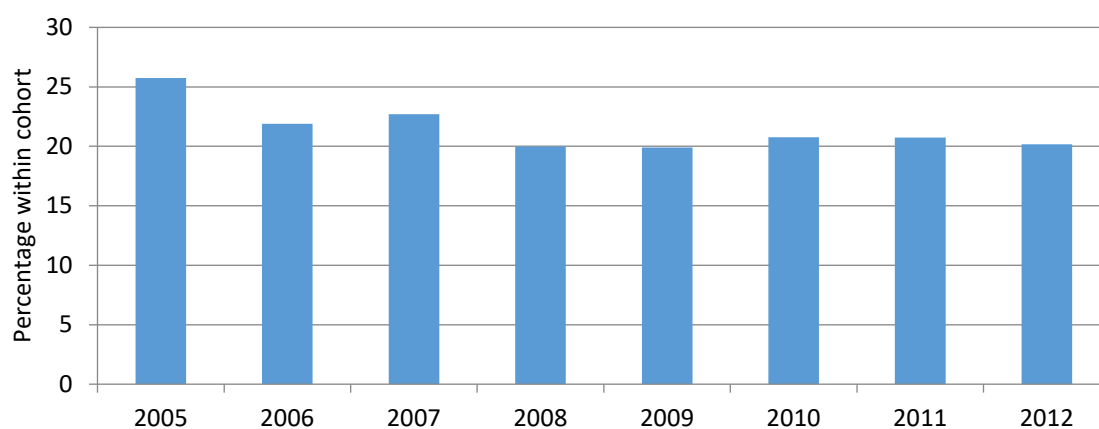

Figure 1-A: All Indigenous students at Australian universities by cohort, percentage enrolled at observed time points and total enrolled

At the end of four years completion rates varied from 26 per cent to 30 per cent across student cohorts. However there was almost no difference in completion rates when comparing the 2005 and 2012 cohorts. The proportion of students who never came back after their first year varied from 20 per cent to 26 per cent across the eight cohorts (see Figure 2) while the proportion of students who re-enrolled but opted out prior to the four year point varied less — from 18 per cent to 20 per cent.

At the end of six years completion rates increased and were stable across the cohorts at around 40 per cent. Attrition rates for students who had re-enrolled but opted out prior to the observation point increased and varied between 23 per cent and 26 per cent.

At the end of 10 years completion rates increased again however there was a smaller increment of improvement. The two cohorts that can be observed at this point (2005 and 2006) had similar rates of 48 per cent. Across the two cohorts that can be tracked to the 10 year point the proportion of student disengagement from study (i.e. those who never came back after the first year and those who opted out prior to the observation point) was 46 per cent and 45 per cent respectively. Six percent of students from both cohorts remained enrolled at the end of the tenth year from commencement.

At the end of 11 years, the completion rate for the 2005 cohort increased marginally from 47.7 per cent to 48.7 per cent. Of those commencing in 2005, five per cent of students remained enrolled and were yet to complete.

Figure 2-A: All Indigenous students at Australian universities, percentage opted out after first year

The analyses showed that by the end of the 10 year point in their study almost half of the national Indigenous student population in cohorts 2005 and 2006 had successfully completed a university level award. A small proportion of students remained enrolled however a significant proportion of students had disengaged, with around one in five opting out after their first year.

Cohort analysis provides a comprehensive perspective of completion rates and a robust methodology for tracking changes in student attrition. In the context of government agendas to increase Indigenous peoples' access and participation in higher education, and a new focus on success and completion, these analyses of the national Indigenous student population should continue.

APPENDIX B: Pair-wise chi-square analysis of CDU/CQUniversity Indigenous student and study characteristics

The null hypothesis tested in these analyses was that the relationship between the student and study variables are independent—i.e. there was no difference in the observed distribution of student or study characteristics when the variables are compared—and the null hypothesis was rejected when the chi-square statistic exceeded the critical value. Figure 1 provides a summary of the results, with the significance level associated with the p-value highlighted. Those with the highest statistical significance are shaded red, those where a significant relationship was found are shaded pink and finally those with a marginal relationship are highlighted as grey. From these results it is obvious that many of the student and study characteristics are correlated.

	Com. Year	Gender	Age Group	Mode of attend.	Studying Ed. or Nurs.	Region	Comm. Schship holder	Disability	Enabling	Basis of Admission	Study Intensity
Com. Year				...		.			.		
Gender											
Age Group				.				...		...	...
Mode of attend.	...		.		...	...	.				...
Studying Ed. or Nurs.				...					...		...
Region	.			...					..		...
Comm. Schship holder				.				..		.	...
Disability			...				..				
Enabling	.			...	..						..
Basis of Admission			...				.				.
Study Intensity			...	...	...	...	...		..	.	

.	Slightly significant (p<0.05)
..	Significant (p<0.01)
...	Highly significant (p<0.001)

Figure 1-B: Statistical correlation of student and study characteristics, CDU/CQUniversity cohorts 2005 and 2006

Highly significant relationships (those shaded red) were found across the following student and study characteristics, and the relationship is described in relation to what was expected under the null hypothesis of independence:

- Study mode and commencement year — Students in the 2005 cohort were more likely than expected to be studying internally, while those in the 2006 cohort were more likely than expected to be studying via multi-mode.
- Age group and basis of admission — students aged 35 years and over were more likely to be admitted to university through pathways other than secondary school education, while students aged less than 20 were more likely to admitted through secondary school education (with or without an ATAR).
- Age group and disability — students aged 35 years and over were more likely to identify a disability.
- Age group and study intensity — students aged less than 20 were more likely to be studying full-time.
- Enrolment in nursing/teaching and study intensity, study mode — fewer students than expected who were enrolled in either nursing or teaching were studying externally or studying part-time.
- Enrolment in nursing/teaching and participation in enabling — students enrolled in nursing/teaching were less likely than expected to have participated in prior enabling.
- Enrolment in nursing/teaching and mode of study — students enrolled in nursing/teaching were more likely to be studying internally or through multi-mode.
- Region and study mode, study intensity — fewer than expected metropolitan-addressed students were studying internally and more than expected were studying part-time. Conversely more than expected remote-addressed students were studying externally.
- Region and prior participation in enabling — metropolitan-addressed and remote-addressed students were less likely to have participated in enabling programs.
- Study intensity and prior participation in enabling — students who participated in prior enabling were more likely than expected to be studying full time.
- Study intensity and study mode — larger proportions of students studying part-time were also studying externally, and conversely fewer part-time students were studying via multi-mode or internally.
- Commonwealth scholarships and basis of admission, study intensity — more commonwealth scholarships than expected were awarded to students admitted through secondary school, and fewer commonwealth scholarships holders than expected were studying part-time.

APPENDIX C: Regression analysis of CDU/CQUniversity Indigenous student and study characteristics on likelihood of higher education completion

Regression analysis is a statistical modelling technique that is helpful for zeroing in on the most important predictors of observed outcomes (for this analysis, the likelihood of award completion). Logistic regression was undertaken on all students in the 2005 and 2006 cohorts at the end of the 10 years (to optimise the opportunity for successful completion). Therefore the total number of students included in the analysis was 305. The dependent variable was created as a binomial response (award completed/award not completed) for each student. The same variables tested in the chi-square analysis were included as independent (or predictor) variables:

- commencement year (2005, 2006)
- gender (female or male)
- age group (<20, 20–24, 25–34, 35 plus)
- study mode (internal, external, multi-mode)
- whether course led to teacher or nursing qualification (teacher, nurse, neither)
- region (metropolitan, regional, remote)
- whether student a commonwealth scholarship holder (yes, no)
- whether student identified a disability (yes, no)
- whether student identified a NESB (yes, no)
- whether student participated in an enabling course (yes, no)
- whether student admitted via secondary school attainment (yes, no)
- study intensity (full-time, part-time).

Initially a simple binomial model was passed over each independent variable separately to identify the strength of relationship with the odds of successful completion. Table 1 shows the p-value associated with each relationship, with the strongest predictor of success identified as study intensity (i.e. whether study is full-time or part-time).

Table 1-C: Student and study characteristics, relationship with completion success (cohorts 2005 and 2006, 10 year observation)

Relationship with completion success		
Independent variables	p-value	Inclusion in multiple regression model?
Commencement year	0.082	Yes
Gender	0.057	Yes
Age group	0.077	Yes
Study mode	0.663	No
Teaching/nursing qualification	0.649	No
Region	0.150	Yes
Commonwealth Scholarship holder	0.645	No
Student with a disability	0.587	No
Student with NESB	0.420	No
Participation in prior enabling course	0.090	Yes
Basis of admission	0.106	Yes
Study intensity	0.004	Yes

The cut off value for inclusion in the multiple LOGIT regression analysis was set at p = 0.15 resulting in the following variables being included in the next step of the analysis:

commencement year; gender; age group; region; participation in enabling; basis of admission; study intensity. Backwards step-wise regression was then applied which takes out the least significant variable in each step and refits the model. This protects against model over-fitting, particularly where more than one variable is contributing in the same way to the variability associated with success (i.e. there is collinearity between these variables therefore they can really be substituted for each other in accounting for the odds of success). Setting the p-value of variable significance at 0.05, the optimised model included just two significant variables — participation in prior enabling courses and study intensity (Table 2). The model suggests that gender could also play a small role in predicting completion success.

Table 2-C: Summary results of LOGIT regression predicting completion success

Coefficients	Estimate	Std. Error	Pr(>|z|)
(Intercept)	-0.05	0.47	0.92
Gender (male)	-0.46	0.28	0.11
Participation in prior enabling (no)	0.09	0.04	0.03 *
Study intensity (part-time)	-0.86	0.29	0.003**

*   Statistically significant at p<0.05, ** Statistically significant at p<0.01

The model indicates that when holding all other independent variables constant, there is weak evidence that women have an increased probability of award success of 11 percentage points over men. There is stronger evidence that participating in prior enabling courses decreases the probability of award success marginally (by two percentage points) compared with not participating. There is strongest evidence that studying full-time increases the probability of award success by 20 percentage points compared to studying part-time.

The McFadden test was used to describe the functional fit of the model. In the social sciences, a McFadden pseudo R-square value[13] of between 0.2 and 0.4 is regarded as good (Louviere et al 2000). The McFadden value of the optimised model in this analysis was 0.04 suggesting that the range of student and study characteristics collected at enrolment only have a small amount of predictive power of the higher education award success of Indigenous students enrolled at CDU/CQUniversity.

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[13] McFadden's R square is defined as 1-l_mod/l-null where l_mod is the log likelihood value for the fitted model and l-null is the log likelihood for the null model which includes only an intercept as the predictor.

APPENDIX D: Comparing Indigenous and non-Indigenous student completions, CDU/CQUniversity

Because of similarities in the student profiles of Indigenous and non-Indigenous students enrolled at CDU/CQUniversity, it is relevant to investigate relative differences between these population groups to understand whether student and study characteristics are affecting student completion and attrition in similar ways. The following analysis was again undertaken at the end of six years. Data was pooled and averaged for completion and enrolment status across cohorts commencing 2005 through to 2010.

At the end of six years, 28 per cent of Indigenous students had completed their award compared to 44 per cent of non-Indigenous students (Figure 1). More Indigenous students were still enrolled (17 per cent compared with 15 per cent), however more Indigenous students never came back after their first year of study (24 per cent compared with 19 per cent).
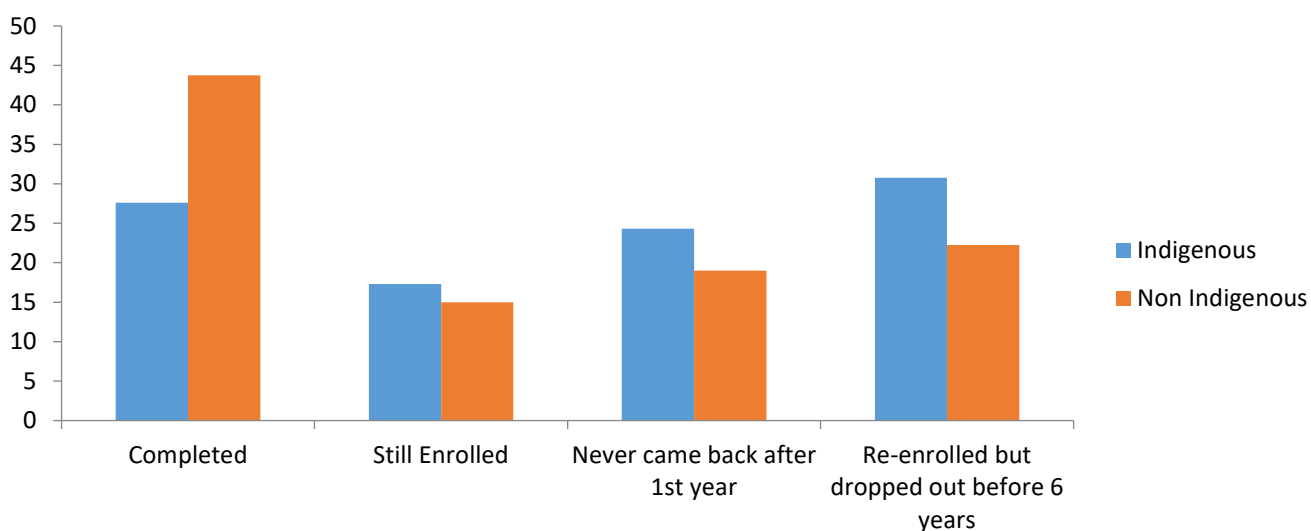

Figure 1-D: CDU/CQUniversity Indigenous student enrolment status, average student outcomes for cohorts 2005 to 2010 at sixth year, by Indigenous status

Study intensity impacted completion and enrolment status in similar ways for both population groups (see Figure 2) however the differential in completion rates and engagement consistently favoured non-Indigenous students. The exception was enrolment rates at the end of six years — these were the same for both Indigenous and non-Indigenous students (18 per cent). When compared with non-Indigenous students, more full-time Indigenous students were enrolled at the end of the six year point suggesting they may be taking longer to successfully gather requisite units or that their study intensity may be changing across time — i.e. changing from full-time to part-time status.
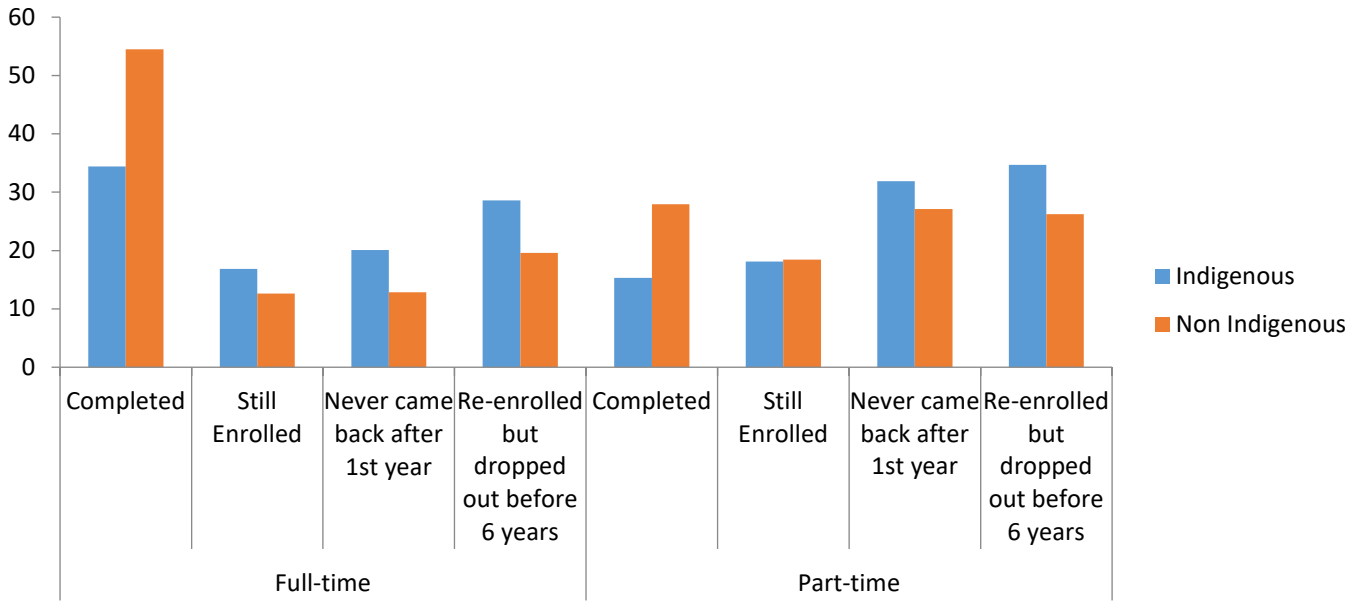
Figure 2-D: Study intensity, average student outcomes for cohorts 2005 to 2010 at sixth year, by Indigenous status

Overall, mode of attendance also followed a similar pattern for both student populations, with those studying via multi-mode having higher completion rates. For students studying externally, the proportion still enrolled at the end of six years was the same for both student populations (17 per cent) however there were more Indigenous than non-Indigenous students still enrolled who studied internally and via multi-mode — Figure 3.
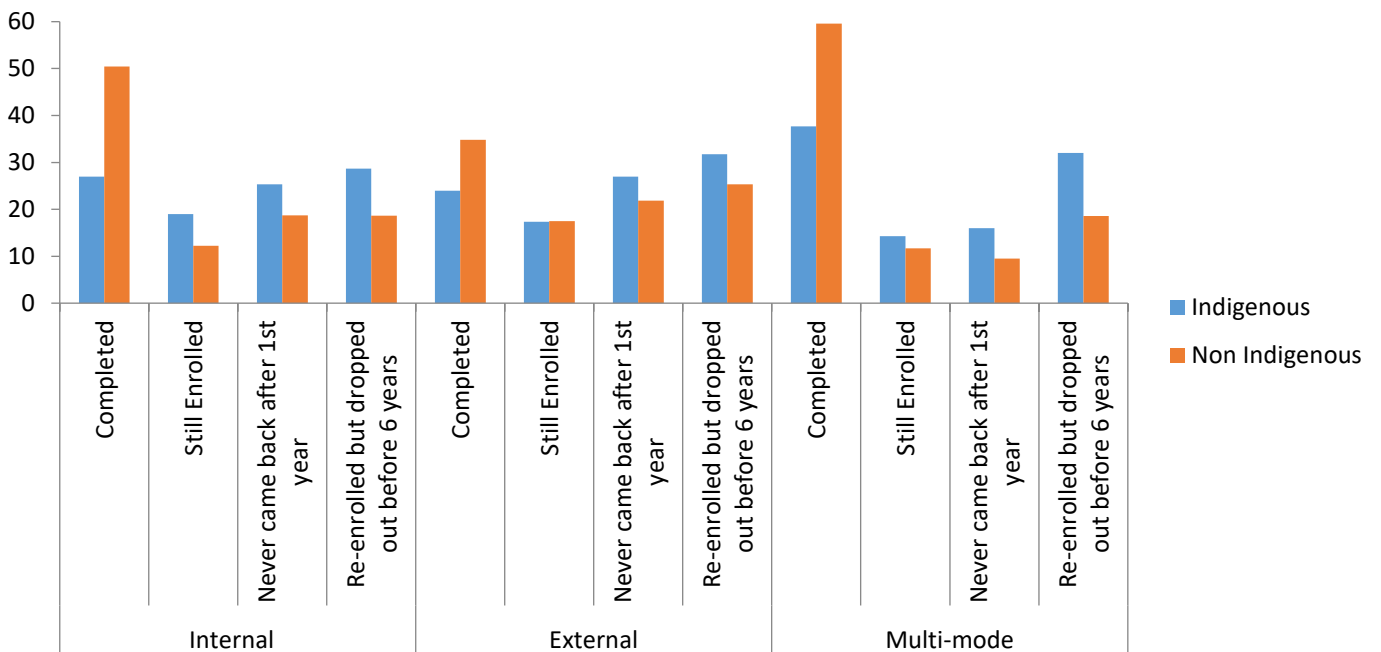
Figure 3-D: Mode of attendance, average student outcomes for cohorts 2005 to 2010 at sixth year by Indigenous status

Again, there were similar patterns of student outcomes by gender across both population groups (Figure 4). Women are completing at higher rates and males are more likely to have disengaged from study, however the difference is more marked for the group who have re-enrolled but dropped out prior to the sixth year point. There is almost no difference in the proportion of Indigenous and non-Indigenous men who are still enrolled after six years, however Indigenous women are more likely to still be enrolled than non-Indigenous women (18 per cent compared with 15 per cent).
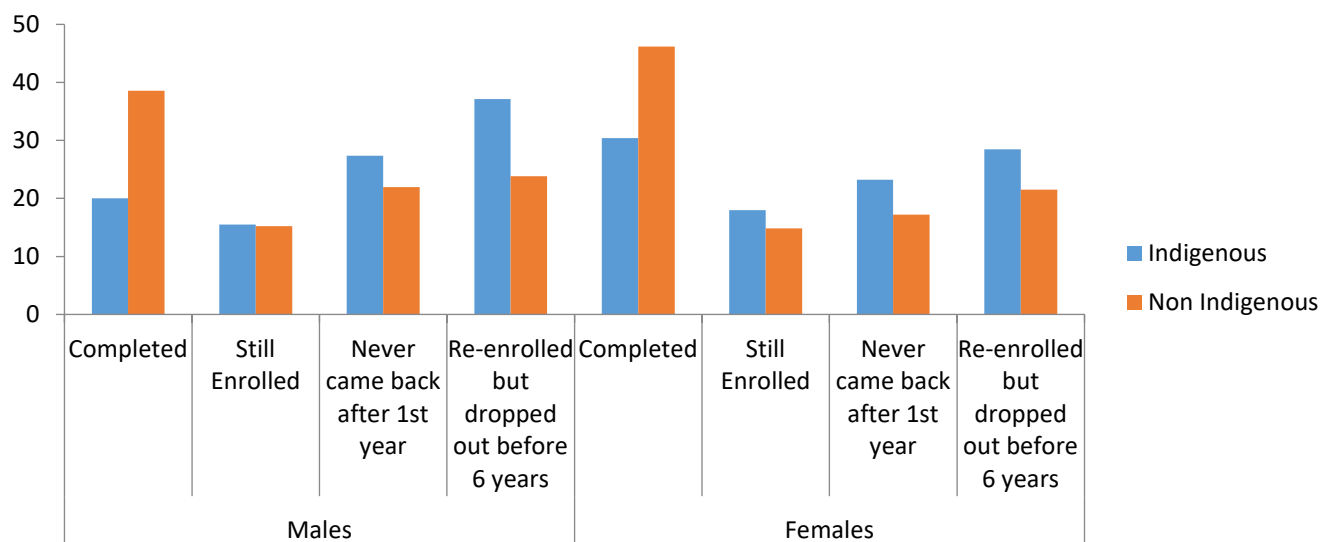
Figure 4-D: Gender, average student outcomes for cohorts 2005 to 2010 at sixth year by Indigenous status

There are some differences in completion rates across age groups by Indigenous status. For Indigenous students, those aged 35 years plus were the most likely group to have completed, however for non-Indigenous students coming straight from school (<20 years) was associated with the highest levels of completion. There were also larger differences in completions between age groups for non-Indigenous students with a differential of 13 percentage points when students with the highest levels of completions (school leavers) were compared to those with the lowest levels of completion (students aged 25–34 years). The greatest difference in completion success for Indigenous students from the different age groups was three percentage points — Figure 5.
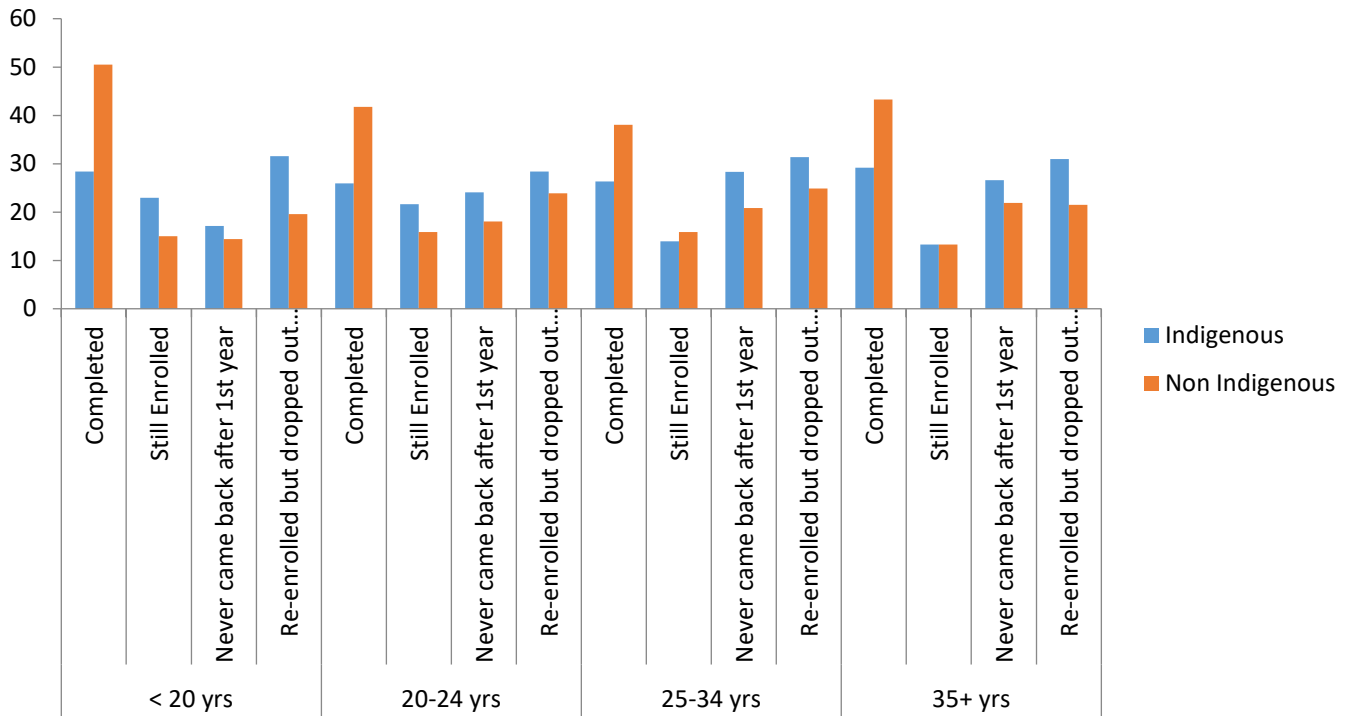
Figure 5-D: Age groups, average student outcomes for cohorts 2005 to 2010 at sixth year by Indigenous status

Admission based on previous higher education was associated with the highest completion rates for both Indigenous and non-Indigenous and admission through secondary education followed for both student groups (Figure 6). Of note was the larger proportion of Indigenous compared with non-Indigenous students coming through a secondary school pathway still being enrolled after six years (23 per cent and 16 per cent respectively).
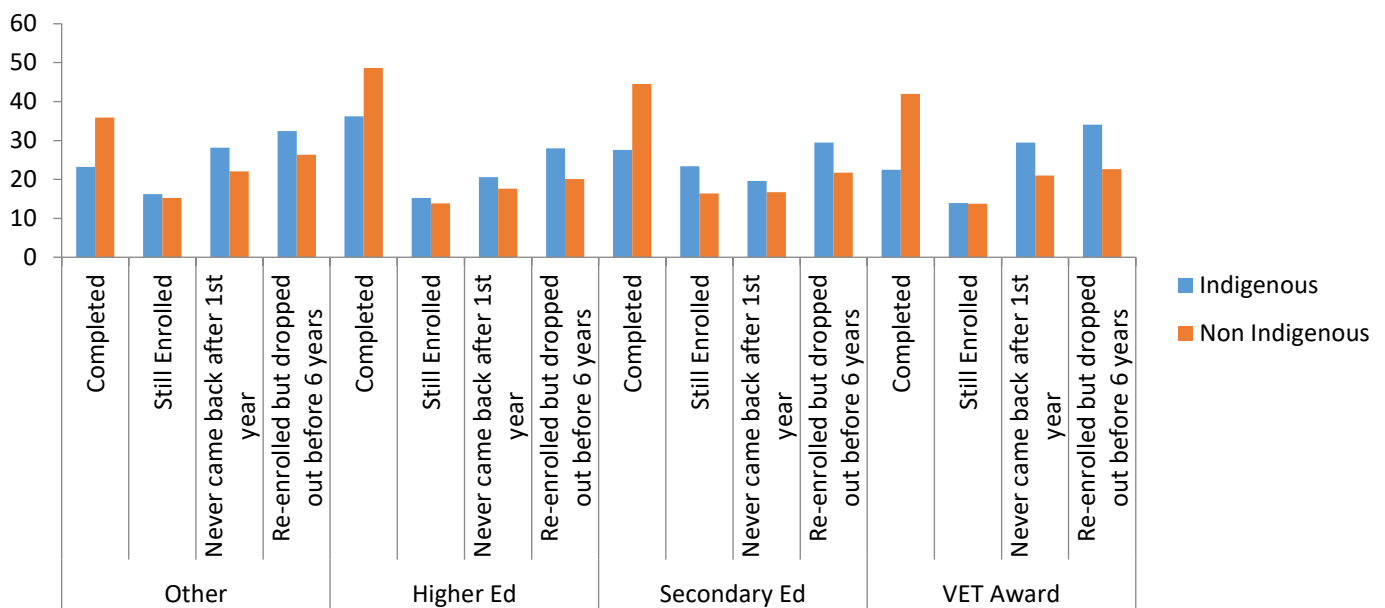

Figure 6-D: Basis of admission, average student outcomes for cohorts 2005 to 2010 at sixth year by Indigenous status

Identifying a NESB appeared to have a different impact on the likelihood of completion when comparing both population groups (Figure 7). Non-Indigenous students from a NESB were more likely to have completed their award compared with other non-Indigenous students (48 per cent compared with 44 per cent), however this was opposite for the Indigenous student population (24 per cent compared with 28 per cent). Caution should be exercised when interpreting this result because of small numbers contributing to the outcomes of Indigenous NESB students in both the CDU/CQUniversity and national student populations.
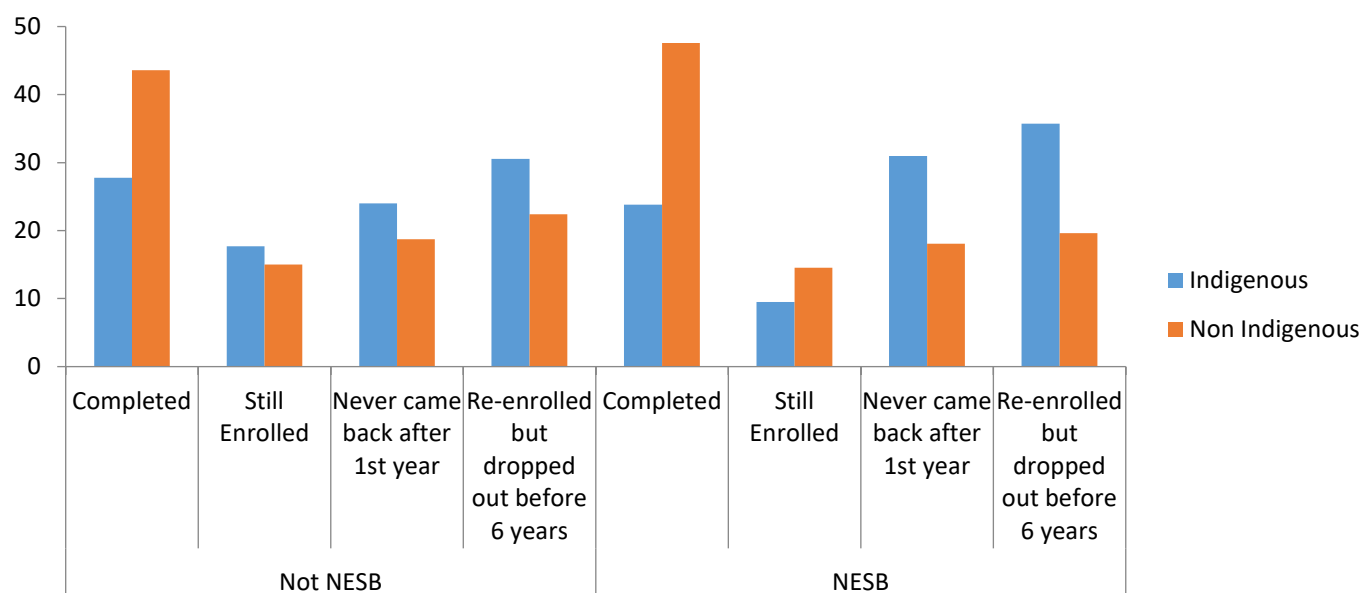
Figure 7-D: NESB, average student outcomes for cohorts 2005 to 2010 by Indigenous status

Indigenous students who participated in an enabling program were almost twice as likely as non-Indigenous students who participated in an enabling program to be still enrolled in study after six years (28 per cent compared with 16 per cent), however they were also half as likely to have completed their award (22 per cent compared with 41 per cent) — Figure 8.
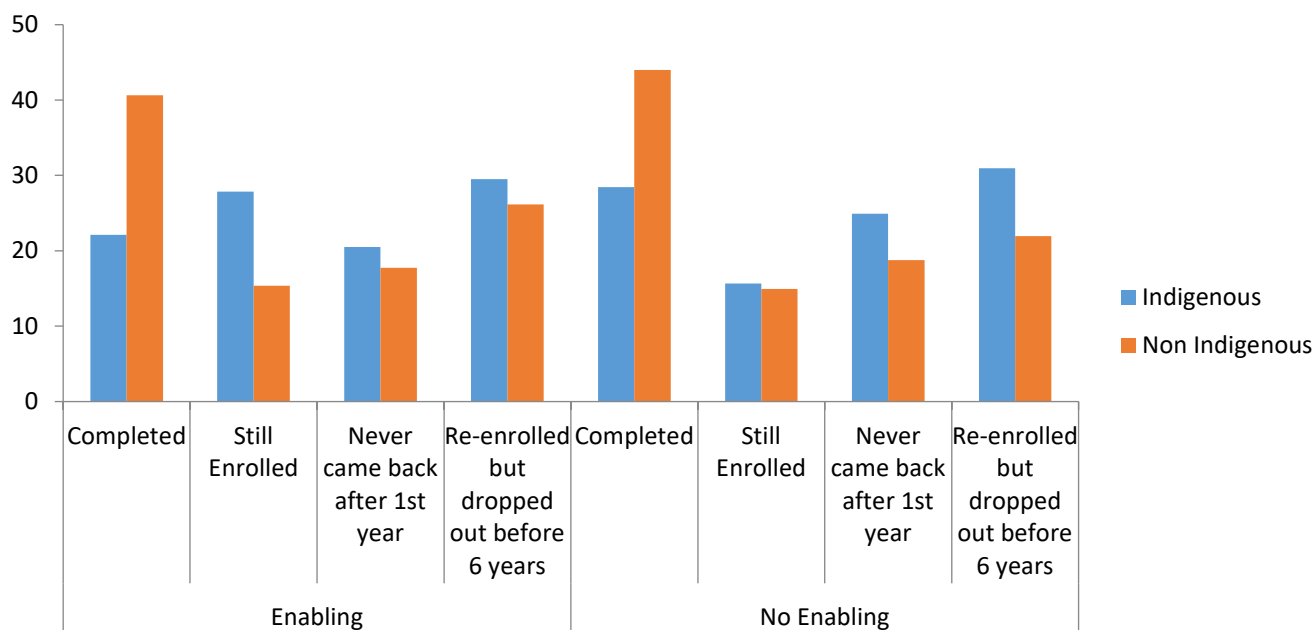
Figure 8-D: Participation in prior enabling, average student outcomes for cohorts 2005 to 2010 by Indigenous status

When considering 'regionality', the patterns of completions, enrolment and engagement are similar for Indigenous and non-Indigenous students across the areas of regional, remote and metropolitan (Figure 9). However Indigenous students in remote areas were slightly more likely to have completed their award when compared to those in metropolitan areas, whereas non-Indigenous students were slightly more likely to have completed their award if they lived in metropolitan areas. In both student populations, those living in regional areas had the highest likelihood of completing their award.
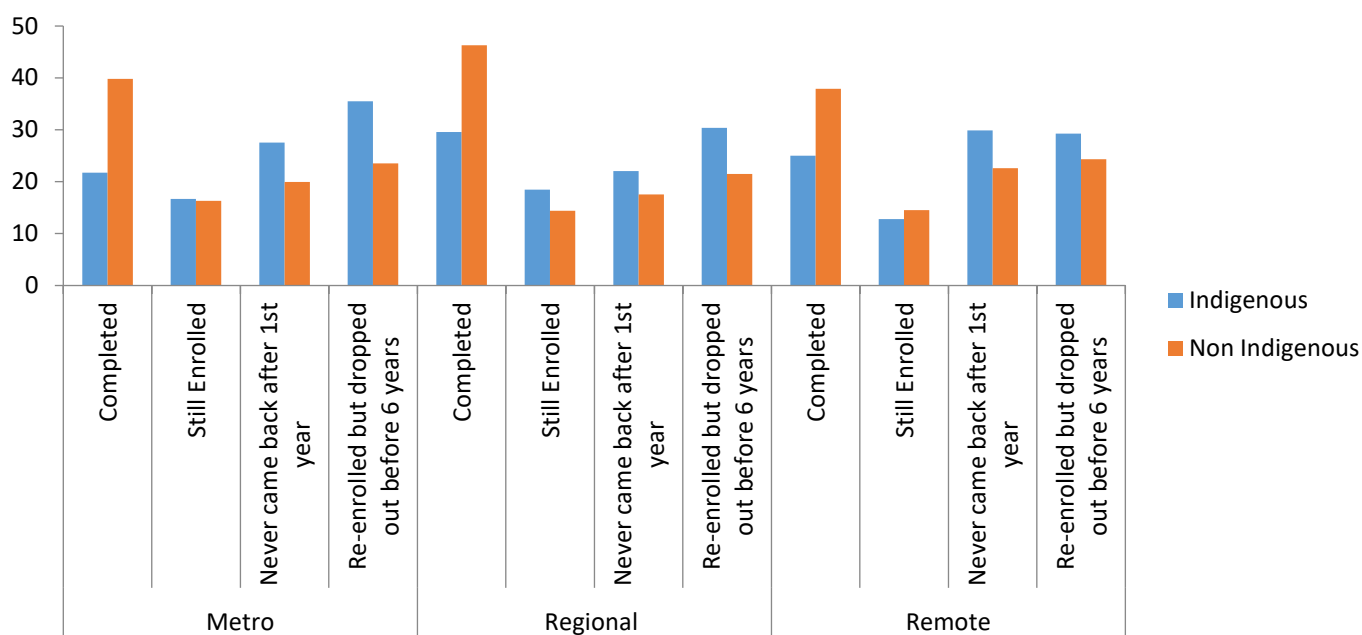

Figure 9-D: 'Regionality' of student location, average student outcomes for cohorts 2005 to 2010 by Indigenous status

There appears to be very little association between completions and engagement and whether the SES of a student's address is Low or Med/High. This holds for both Indigenous or non-Indigenous students, with patterns of completions and engagement almost the same (Figure 10).
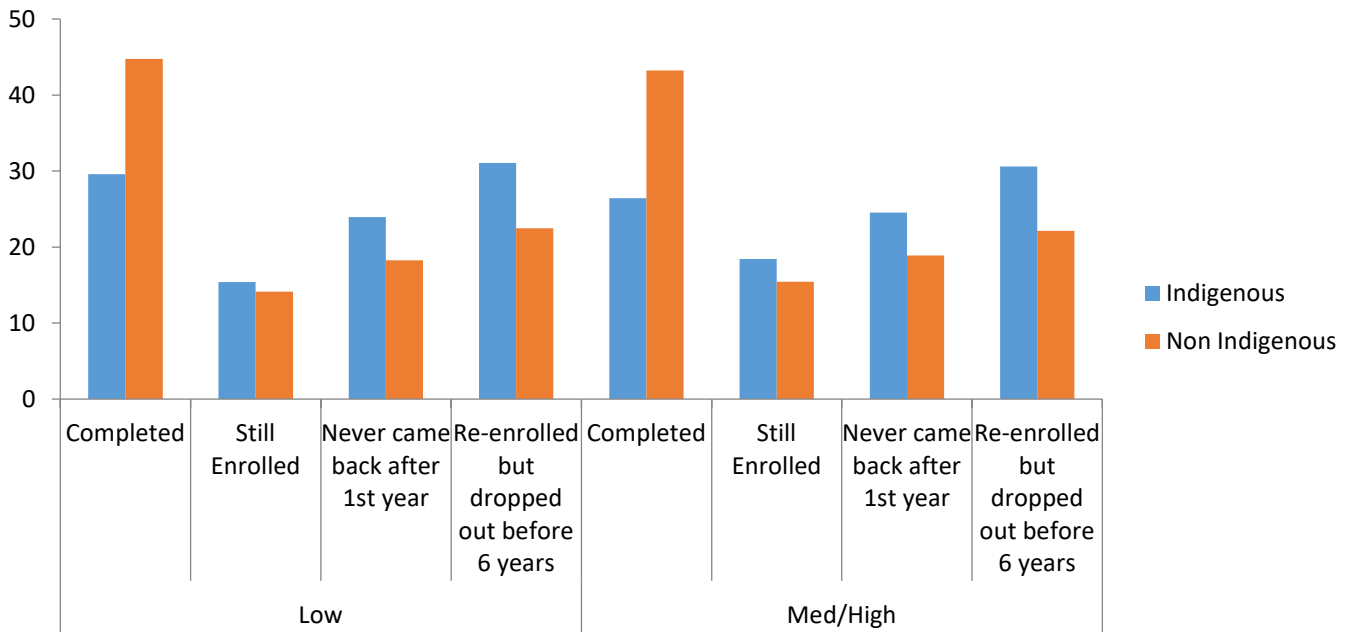
Figure 10-D: SES of student's initial address, average student outcomes for cohorts 2005 to 2010 by Indigenous status