The Australian Journal of
INDIGENOUS EDUCATION

Indigenous Australian Students' Participation Rates in Higher Education: Exploring the Role of Universities

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Indigenous Australians are underrepresented and considerably disadvantaged within the Australian system of higher education. The various measures taken by Australian universities over the past decades have produced varying levels of success in increasing Indigenous participation and completion rates. In order to continue improving Indigenous Australian participation in higher education, it is important to understand the current patterns of participation and factors within universities that are associated with participation and success. In this article we analyse higher education student and staff statistics available from the Department of Education, Employment and Workplace Relations (DEEWR) and information sourced from the web sites of 40 Australian universities to examine correlations between various Indigenous student support mechanisms and Indigenous students' higher education participation rates. Our results indicate that there is a dual system of Indigenous higher education, with one group of universities excelling at attracting Indigenous students, and a different group of universities demonstrating high Indigenous student completion rates. We argue that challenges remain in determining how to increase commencements at universities with high Indigenous completion rates without compromising entrance requirements or further diluting the level of student support, and how to increase completion rates at universities with higher numbers of Indigenous students.

∎ **Keywords:** Indigenous Australians, higher education, academic success, support, participation

Indigenous Australians are underrepresented and considerably disadvantaged within the Australian system of higher education. Although Indigenous commencement and completion numbers remained relatively stable during the last decade, Indigenous students' participation rates and levels of attainment remained significantly below those of non-Indigenous Australians (Department of Education, Employment and Workplace Relations [DEEWR], 1999–2009). While Indigenous commencement numbers have slowly increased since 2005, Indigenous completions have fluctuated. In 2006, non-Indigenous people were twice as likely as Indigenous peoples to have a nonschool qualification (53% compared with 26%) and more than four times as likely to have a Bachelor degree or above (21% compared with 5%; Australian Bureau of Statistics [ABS], 2008a). The *Review of Australian Higher Education* (Bradley, Noonan, Nugent, & Scales, 2008) identified Indigenous people as one of the three most disadvantaged groups within the Australian

higher education system. People with low socioeconomic status and those coming from regional and remote areas were the other two underrepresented groups (Bradley et al., 2008). Evidently, some Indigenous students may share more than one of these characteristics given that according to the National Aboriginal and Torres Strait Islander Social Survey (2008) 44% of the Indigenous population lived in regional areas and 24% in remote areas and that Indigenous people are more likely to be economically disadvantaged (ABS, 2008b).

Despite the 1990 Commonwealth Government equity objectives for participation in higher education pertaining to these disadvantaged groups, little progress has been made on the educational disadvantage of Indigenous

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Pechenkina, E., Kowal, E., & Paradies, Y. (2011). Indigenous Australian students' participation rates in higher education: Exploring the role of universities. *The Australian Journal of Indigenous Education*, 40, 59–68. DOI 10.1375/ajie.40.59

59

people (Yencken & Porter, 2001, p. 28). Low levels of academic readiness of Indigenous students completing their secondary education (Anderson & Potok, 2010) and financial hardships (Centre for Studies in Higher Education [CSHE], 2008), health problems, racism (Paradies, 2006; Thibodeaux, Harris, & Malin, 1997, pp. 28–38), and low academic aspirations of Indigenous students and their lack of education capital (Parente, Craven, Munns, & Marder, 2003, p. 8) are the main barriers faced by Indigenous students in a higher education environment (Augoustinos, Tuffin, & Every, 2005; Paradies, 2006; Wyatt & Cooke, 2008). Cultural issues also play a role. Clashes between Indigenous and non-Indigenous sociocultural values are reflected in teaching styles and pedagogies, course content and levels of available support (Nolan, Frawley, & White, 2009; Sonn, Bishop, & Humphries, 2000). As a result, though many Aboriginal and Torres Strait Islander students succeed in higher education, attending universities still remains an isolating experience associated with feelings of exclusion from the mainstream academic environment for many students (Nolan et al., 2009; Trudgett, 2009).

Education is recognised as a powerful tool in achieving better economic outcomes, such as employment and income, and is considered one of the main strategies for addressing Indigenous disadvantage in Australia (Hunter & Schwab, 2003). It has been established that people with a higher level of education are more likely to secure fulltime employment and have a higher income (Australian Human Rights Commission, 2008). Internationally, education levels, particularly of women, are highly correlated with improved socioeconomic status (Aries & Seider, 2005; Haycock, 2001). Therefore, increasing Indigenous participation in higher education is one of the crucial factors in reducing Indigenous disadvantage overall. Within the last 10 years, universities have made various efforts to attract and support Indigenous students. Establishing a dedicated support unit or centre for Indigenous students is an approach taken by many universities. The history of designated Indigenous support centres dates to 1973 when the first such support unit was established at the South Australian Institute of Technology in collaboration with an Aboriginal Task Force. Since then, many other universities have established units of dedicated support to Indigenous students (Bin-Sallik, 2003; Rigney, 2001; Trudgett, 2009). Other measures include employing more Indigenous staff in support roles and academic positions as well as adopting an Indigenous education policy or strategy. One early example of the latter is the Senate of the Australian Catholic University's adoption of the Statement of Commitment to Reconciliation and Commitment to Aboriginal and Torres Strait Islander research in 1998 (Frawley & Wolfe, 2009).

At present nearly all Australian universities have dedicated units providing support and assistance to Indigenous students (Nolan et al., 2009). However, the size and type of these units differ between universities. Another factor in providing support for Indigenous students is the availability of a dedicated space, for instance such as the common room at the University of Melbourne's Centre for Indigenous Education (CIE, 2010) or the Australian Catholic University's 'Indigenous Reflection Space' (White, 2009).

The various measures taken by Australian universities over the past decades have produced varying levels of success in increasing Indigenous participation and completion rates. In order to continue improving Indigenous Australian participation in higher education it is important to develop a better understanding of the current patterns of participation and factors within universities that are associated with participation and access. As a part of a larger project examining success factors in Indigenous higher education, we have analysed trends in Indigenous higher education by using DEEWR statistics for the period 2004 to 2008. We also conducted a systematic search for information from the web sites of each university in Australia to record information about their Indigenous centres and the services offered to Indigenous students. A total of 40 Australian higher education institutions were examined according to a methodology described in the following section. The Batchelor Institute of Indigenous Tertiary Education (BIITE) was included among the 40 higher education institutions analysed for this article even though we recognise that it is technically not a university. BIITE was included because it is a major provider of Indigenous higher education. Currently BIITE is closely linked to Charles Darwin University after a memorandum of understanding was signed between the two institutions in 2005 (BIITE & CDU, 2005). When analysing Indigenous student support centres and staff, BIITE was excluded from the analysis due to its specific nature and the lack of information on dedicated Indigenous student support services and staff. Analysis of these data reveals a dual system of Indigenous higher education, with one group of universities excelling at attracting Indigenous students and a quite different group with high Indigenous student completion rates. Using these same data, we also consider the effects of direct support for Indigenous students, the presence of Indigenous staff, and broader institutional support on commencement numbers and completion rates for Indigenous students.

Methodology

Two sets of data were gathered and analysed for this research project: higher education statistics publicly available online from the DEEWR web site, and information collected from university web sites. DEEWR higher education statistics (DEEWR, 2004–2008) were used to generate ranked lists of 40 Australian universities based on Indigenous students' commencement numbers and com-

pletion rates. All Indigenous students and overall student statistics sourced from the DEEWR's web site were calculated as an average for the period 2004 to 2008. Indigenous student numbers included undergraduate and postgraduate students. All (Indigenous and non-Indigenous) staff statistics available from the DEEWR web site were for 2009.

Information on Indigenous support and research centres and specialised support staff employed at support centres was sourced from university web sites in June and July 2010. This information was presumed to be correct at the time of access. Information about support and research centres was obtained through links provided on the front page of each university web site. If such links were absent from the relevant web pages, a web site search was performed using the key words 'Indigenous' and 'Aboriginal and Torres Strait Islander'.

We tested a number of correlations between Indigenous students' completion rates and commencement numbers and the variables described in Table 1. These variables were selected as indicators of factors considered important in existing literature, such as institutional support and Indigenous role models (Day & Nolde, 2009; Trudgett, 2009). Additional information is provided below about three of the variables that are scores that we created.

Indigenous Support Centre Score

The proposed classification of university-based Indigenous support centres was based on Frawley and Wolfe's classification (Frawley & Wolfe, 2009). Their classification included such categories as (a) support centre, (b) research centre, (c) research and training centre, and (d) research, teaching and support centre.

Our web site search revealed that Indigenous centre structures vary between universities with some universities having more than one Indigenous support unit. Such units ranged from a faculty-based support structure (within a medical or law faculty, for instance) to a university-wide centralised support unit. Some universities had an independent Indigenous school or department (such as Nura Gili at the University of New South Wales and the Warawara Department of Indigenous Studies at the Macquarie University) that ran academic programs as well as provided support services. These units also varied in their internal structure, with some being purely support centres and others demonstrating various combinations of support, research and teaching. To capture this information we generated a score from one to five depending on the university's Indigenous support centre structure as derived from a centre's web site:

1. No support centre

TABLE 1

Description of Study Variables

Outcome measures	Summary statistics	Indicator	Collection methods/sources
Indigenous student completion rate	Mean: 0.37 SD: 0.16 Range: 0.13–0.91	Success in Indigenous student completion	Calculated by dividing an average (2004–2008) Indigenous completion number by average (2004–2008) commencement number. Source: DEEWR.
Number of Indigenous student commencements	Mean: 97.6 SD: 79.8 Range: 4.0–438.0	Success in attracting Indigenous students	Average 2004–2008 Source: DEEWR.
Overall student completion rate	Mean: 0.64 SD: 0.16 Range: 0.14–0.97	Success in general student completion	Calculated by dividing an average (2004–2008) overall student completion number by average (2004–2008) commencement number. Source: DEEWR.
Number of overall student commencements	Mean: 8429.9 SD: 4234.7 Range: 441–17,554	Success in attracting students overall	Average 2004–2008 Source: DEEWR.
Indigenous support centre score	Mean: 2.83 SD: 0.93 Range: 1–5	Level of support infrastructure	Source: University web sites (2010).
Indigenous research centre score	Mean: 1.33 SD: 0.57 Range: 1–3	Level of Indigenous academic presence	Source: University web sites (2010).
Support staff employed by the Indigenous centre	Mean: 9.0 SD: 5.62 Range: 3.0–34.0	Level of support personnel for Indigenous students	Number of staff employed at an Indigenous support centre (2010) Source: Universities' web sites.
Number of Indigenous staff employed at a university	Mean: 23.89 SD: 14.22 Range: 4–57	Level of institutional support for Indigenous employment and access to positive role models for Indigenous students.	Number of Indigenous staff employed at a university (2009) Source: DEEWR.
Web site score	Mean: 1.93 SD: 0.83 Range: 1–4	Level of institutional support for advertising Indigenous services	Source: University web sites (2010).

2. One support-only centre

3. One centre with combined support/research/teaching

4. Two separate support or combined support/research/teaching centres (e.g., support centres on different campuses)

5. Three or more separate support centres or combined support centres.

According to this classification, the majority of the 40 Australian universities that we have examined have one Indigenous centre that combined support, research and teaching (Score 3: 16 universities). Centres providing dedicated Indigenous support services only were the second most common (Score 2: 13 universities), followed by two separate or combined support, research and teaching centres (Score 4: 6 universities), and either no support centre at all (Score 1: 2 universities) or three or more separate or combined support centres (Score 5: 2 universities), (the Batchelor Institute of Indigenous Tertiary Education was not included in this analysis due to lack of data).

Indigenous Research Centre Score

For the purposes of this study, we have separated support centres from research centres, and generated a separate score for the dedicated Indigenous research centres as follows:

1. No dedicated Indigenous research/unit centre at all

2. One dedicated Indigenous research/teaching centre (university-wide, faculty-based or cross-faculty)

3. Two or more dedicated Indigenous research/teaching centres.

Most universities appeared to have no dedicated Indigenous research centre at all (Score 1: 28 universities), followed by nine universities having one dedicated Indigenous research centre (Score 2) and two universities having two or more dedicated research centres (Score 3). We propose that if a dedicated Indigenous support centre serves as an indicator of the level of Indigenous support infrastructure, a dedicated Indigenous research unit indicates the level of Indigenous academic presence at a university and, as role models, Indigenous academics may have a positive effect on Indigenous students' performance at a university.

Web Site Score

In addition to recording web site information about Indigenous support and research centres, we were interested in the visibility of these services across the university. As a proxy variable for this, we examined whether links to Indigenous services were prominently positioned on the university web site. A web site support score was generated by counting links to Indigenous support-related information on a university's front page and 'current students' and 'future students' web pages utilising the following system:

1. No links at all

2. One link

3. Two links

4. Three links.

Most universities had only one link to Indigenous students' information (19 universities' web sites), 13 universities' web sites had no links at all, six universities' web sites had two links and only two universities had three links.

Data Analysis

Forty Australian universities were ranked based on their Indigenous students' completion rates (Table 2) and commencements (Table 3) calculated as an average for 2004 to 2008. For the purposes of presentation, only the first top ten universities are included into the tables.

We examined associations between Indigenous student commencement numbers and completion rates and the study variables described in Table 1. Raw commencement numbers were utilised instead of commencement rates due to the extremely small number of Indigenous students as a proportion of the total student body at any particular university. However, Indigenous student completion rates were used (rather than numbers) as this could be calculated with both the numerator and denominator pertaining to Indigenous students rather than the entire study body.

A nonparametric approach was utilised as variables were nonnormally distributed. Specifically, spearman's rank correlations were utilised with confidence intervals calculated based on Fisher's transformation. Given the sample size was small (33–40 universities depending on the association being examined), 90% confidence intervals were calculated. All analysis was conducted using Stata 10 Intercooled for Windows. According to established convention, correlations were designated as no significant correlation (-0.1 to 0.1), weak (-0.3 to -0.1 or 0.1 to 0.3),

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TABLE 2

Top Ten Australian Universities With Highest Indigenous Students' Completion Rates

Ranking	University	University Indigenous completion group rate; 2004 to 2008
1	The University of Melbourne	Go8	90%
2	Monash University	Go8	59%
3	University of Wollongong	—	57%
4	Macquarie University	—	56%
5	The University of Sydney	Go8	56%
6	The University of Queensland	Go8	54%
7	The Australian National University	Go8	54%
8	Curtin University of Technology	ATN	48%
9	La Trobe University	IRU	45%
10	The University of New South Wales	Go8	44%

TABLE 3

Top Ten Australian Universities With Highest Indigenous Students' Commencement Numbers

Ranking	University	University group	Indigenous students' commencements; 2004 to 2008
1	Bachelor Institute of Indigenous Tertiary Education	—	438
2	Curtin University of Technology	ATN	264
3	Griffith University	IRU	165
4	The University of Newcastle	IRU	165
5	Deakin University	—	162
6	James Cook University	IRU	159
7	Charles Sturt University	—	150
8	Central Queensland University	—	147
9	Edith Cowan University	—	145
10	Queensland University of Technology	ATN	144

moderate (-0.5 to -0.3 or 0.3 to 0.5) or strong (-1.0 to -0.5 or 0.5 to 1.0). If the 90% confidence interval includes zero, this indicates there is no significant correlation. The small sample size, missing data for some variables and nonnormality precluded the use of multivariable regression methods to examine the joint influence of study variables on the Indigenous student commencement numbers and completion rates.

Results

Indigenous Students' High Commencements Versus High Completion Rates: A Dual System of Indigenous Higher Education in Australia

According to DEEWR's higher education statistics (DEEWR, 2004–2008) Indigenous students' completion numbers and completion rates in Australia's 40 universities have been slowly increasing over the period of 2004–2007 with a slight drop in completions in 2008 (see Figures 2 and 3). However, average commencements of Indigenous students have been slightly decreasing since 2004 (see Figure 1).

Analysis of Indigenous students' completion rates and commencement numbers indicate that universities with the highest completion rates differ from those with the highest commencement numbers. The 'dual' nature of Indigenous higher education is illustrated in Table 2 and Table 3, which list the top ten lists of institutions with the highest completion rates and commencement numbers respectively. Six out of the top ten universities with highest completion rates are Group of Eight (Go8) universities, with the University of Melbourne (Go8) topping the list with a completion rate far ahead of the next ranked university (Monash).

Three universities within the top ten list of institutions with the highest Indigenous students' commencement numbers belong to the Innovative Research Universities

(IRU) group and two to the Australian Technology Network (ATN) group of universities. There are no Go8 universities in the top ten list of universities with the highest commencement numbers of Indigenous students. Similarly, there are no Go8 universities present on the list of top ten higher education institutions that have the highest proportion of Indigenous staff (data available on request). The best positioned Go8 university with regards to employment of Indigenous staff is the University of Western Australia which is ranked twenty third. This finding is in accordance with the previous data showing that Go8 universities generally fall below the national average for participation of students from low SES backgrounds. For instance, the University of Melbourne,
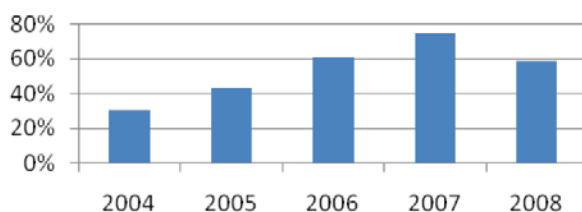

FIGURE 1

Average commencement numbers of Indigenous students in Australian universities (N = 40) throughout 2004 to 2008. Compiled based on DEEWR data on higher education statistics.

Note: Indigenous commencements were in decline throughout 2004 to 2008.
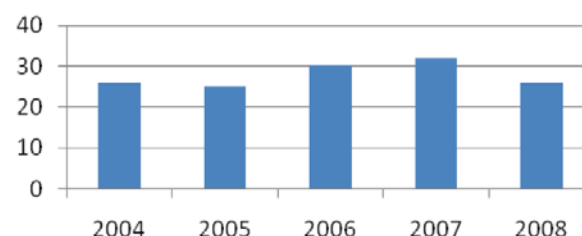
FIGURE 2

Average completion numbers of Indigenous students in Australian universities (N = 40) throughout 2004 to 2008. Compiled based on DEEWR data on higher education statistics.

Note: Indigenous completions remained nearly unchanged throughout 2004 to 2008.

FIGURE 3

Average completion rate (calculated by dividing average Indigenous student's completion numbers by commencement) in Australian universities (N = 40) throughout 2004 to 2008. Compiled based on DEEWR data on higher education statistics.

Note: There has been a steady growth in Indigenous students' average completion rate throughout 2004 to 2007, with a slight decline in 2008.

however well known for its efforts in student equity, proportionately enrols nearly seven times the numbers of students from high SES backgrounds as it does low SES students (James, 2007). As explored in the introduction, as Indigenous students are more likely to be from a low SES background, and also often have additional areas of disadvantage to overcome, it is not surprising Indigenous students are less likely to gain admission to a Go8 as opposed to a non-Go8 university.

Based on these statistics, we propose that there is a dual system of Indigenous Australian higher education: those that have high commencement numbers and a high proportion of Indigenous staff, and those that have high completion rates with the Go8 universities dominating this second group. This proposition is explored in the next section, where correlations of completion rates and commencement numbers are presented. We go on to examine the determinants of these patterns drawing on the variables presented in Table 1 above.

Exploring the Determinants of Commencement and Completion

The results of correlation analyses to better understand what factors drive Indigenous commencement numbers and completion rates are presented in Tables 4 and 5.

No correlation was found between Indigenous student commencement numbers and Indigenous student completion rates, confirming the concept of a dual system of Indigenous higher education such that universities excelling at Indigenous commencements differ from those that excel at Indigenous completions. Based on the data in Table 4, there are two trends evident in relation to factors influencing Indigenous commencement numbers and completion rates.

A weak positive correlation was found between Indigenous student commencement numbers and commencement numbers of overall students which confirms the idea that there are different factors influencing a university's Indigenous student recruitment strategies as

opposed to recruiting students in general. However, when analysing a connection between Indigenous and overall students' completion rates, we found a moderate positive correlation. This suggests that both Indigenous and overall students are influenced by similar factors when it comes to completing their university degree. We return to this in the discussion where we consider the effect of 'elite' universities on completion rates for Indigenous and other minority students.

Based on the data in Table 5, there are two trends evident in relation to factors influencing Indigenous commencement numbers and completion rates. First, the presence of specialised Indigenous support and research centres are both moderately correlated with Indigenous student completion rates. Universities with more complex Indigenous support and research infrastructure demonstrate higher Indigenous student completion rates. We argue that universities that were allocated higher scores based on their Indigenous support and/or research system show a higher level of university investment into Indigenous education and research and therefore play an important role in facilitating high Indigenous completion rates. At the same time, the presence of specialised Indigenous support and research centres has no correlation with Indigenous student commencement numbers.

Second, high numbers of staff employed by a specialised Indigenous support centre at a university have a strong correlation with Indigenous students' commencement numbers but not with the completion rates. This result can be explained by the fact that Indigenous support centre staff dedicate a significant amount of time to Indigenous students' recruitment as well as guiding Indigenous students through admissions processes as suggested by the types of services offered by Indigenous support centres. As explained above, universities with high commencement numbers are not the universities with high completion numbers, which goes some way towards explaining why higher numbers of support staff have no correlation with completion rates.

Similarly, a higher number of all Indigenous staff employed at a university has a strong correlation with Indigenous students' commencement numbers but not with completion rates. This finding appears to contradict the idea that the greater presence of Indigenous role models would facilitate Indigenous completion rates. It may be explained if the Indigenous staff are predominantly employed in support roles (as explained earlier, it was not possible to ascertain what proportions of support centre staff were Indigenous and non-Indigenous). Further research could explore the nature of Indigenous employment in the tertiary sector, whether Indigenous staff (academic and otherwise) act as role models to Indigenous students, and how to enhance this role. The presence of relevant information on universities' web sites

TABLE 4

Correlations Between Completion Rate and Commencements Numbers of Indigenous and Overall Students

Correlated variables	Spearman's rank correlation	90% CI	Nature of correlation
Completion rate of Indigenous students vs. number of commencing Indigenous students' (n = 40)	-0.207 -0.207	-0.446 to 0.060	No significant correlation
Indigenous students completion rate to all students completion rate (n = 40)	0.624	0.430 to 0.762	Strong positive correlation
Indigenous students commencement number to all students commencement number (n = 40)	0.247	0.018 to 0.480	Weak positive correlation

TABLE 5

Factors That Influence Indigenous Student Completion Rate and Number of Commencements

Correlated variables	Spearman's rank correlation	90% CI	Nature of correlation
Indigenous support centre score vs. Indigenous students completion rate (n = 40)	0.370	0.117 to 0.577	Moderate positive correlation
Indigenous support centre score vs. Indigenous students commencement number (n = 40)	0.116	-0.153 to 0.369	No significant correlation
Indigenous research centre score vs. completion rate of Indigenous students (n = 40)	0.302	0.041 to 0.524	Moderate positive correlation
Indigenous research centre score vs. Indigenous students commencement number (n = 40)	0.174	-0.094 to 0.419	No significant correlation
Support centre staff vs. Indigenous student completion rate (n = 33)	0.081	-0.216 to 0.364	No significant correlation
Support centre staff vs. Indigenous student commencement number (n = 33)	0.637	0.424 to 0.783	Strong positive correlation
All Indigenous staff vs. completion rate of Indigenous students (n = 38)	0.216	-0.058 to 0.460	No significant correlation
All Indigenous staff vs. commencement number of Indigenous students (n = 38)	0.616	0.415 to 0.760	Strong positive correlation
Web site score vs. completion rate of Indigenous students (n = 40)	0.145	-0.394 to 0.124	No significant correlation
Web site score vs. commencement number of Indigenous students (n = 40)	0.200	-0.067 to 0.441	No significant correlation

had no correlation with Indigenous students' commencement numbers or completion rates.

Indigenous Students' Participation Trends: What Makes a Difference?

This analysis has shown that there is a dual system of Indigenous higher education; that support and research centres are associated with higher completion rates; and that support staff and Indigenous staff are associated with higher commencement numbers. Although we can't say at this stage whether these variables have a causal effect on Indigenous student educational outcomes, our results show there are clear associations between these factors. The small number of Australian universities with complete data also precludes us from simultaneously adjusting for these factors to determine which are most important in driving Indigenous commencement numbers and completion rates. The challenge remains to completely explain these findings, particularly why research and support centres are not associated with higher commencement numbers, and why support staff and Indigenous staff are not associated with completions. It may be that these observations are

explained by the broader finding of a 'dual' system, with Go8 universities tending to invest in infrastructure and admitting smaller numbers of more successful Indigenous students and having higher staff to student ratios, and other universities investing in support staff and attracting more Indigenous students and staff. Another possibility to explain higher Go8 completions is that this group of universities admits more Indigenous postgraduate students enrolled in Research Higher Degrees.

The finding that there is a dual system of Indigenous education is mirrored by international research. A significant amount of research exists on access to higher education by students from various minority backgrounds in the United States (US; Aries & Seider, 2005; Haycock, 2001) and other English speaking countries (Ball, Reay, & David, 2002; Yorke & Thomas, 2003). The US-based research indicates that there are significant differences between public and private universities (or state vs. 'elite' institutions) in relation to ethnicity and socioeconomic class-based identity. Though lower income students at both types of universities acquire 'new forms of cultural capital' and overcome hardships associated with assuming a new identity as an educated college student, issues such as exclusion, powerlessness and discomfort are more critical for minority students in 'elite' institutions (Aries & Seider 2005). Although there seems to be no literature yet explicitly suggesting a two-tiered system of higher education in Australia, some authors point out there is clearly a difference in a way Go8 and non-Go8 universities approach an issue of student equity (Gale, 2009, 2010; James, 2007). Universities comprising Group of Eight (Go8) are assumed to be the leaders in Australian higher education and can be described as 'elite' institutions in Australia (Go8, 2006–2008).

Based on the findings, universities that excel at Indigenous students' commencements differ from those that excel at Indigenous students' completions. Go8 universities dominate the high completion category therefore those universities can be further studied as 'success models' to learn what factors determine Indigenous students' academic success. These 'models of success' can then be replicated and implemented elsewhere.

Challenges remain as to how to increase commencements at Go8 universities (without either compromising entrance requirements such that students are 'set up to fail' or further diluting the level of support offered) and how to increase completion rates at universities with high numbers of Indigenous students. One model for increasing commencements at a Go8 university are alternative entry programs that provide intensive support to Year 12 graduates otherwise deemed ineligible for a university entry based on the test scores. An example of such program is Bachelor of Arts Extended that was introduced in 2009 as a collaboration between the Centre for Indigenous Education (now Murrup Barak), Trinity

College and the Faculty of Arts at The University of Melbourne (The University of Melbourne, 2011).

This research would also suggest that increasing the number of support staff and Indigenous staff may increase commencement numbers, and creating more Indigenous support and research centres may increase completion rates. It should be stressed, however, that we cannot yet say whether these relationships are causal, or whether they reflect another confounding factor. Ongoing ethnographic research with Indigenous students at The University of Melbourne is being undertaken by the first author to investigate whether and how greater Indigenous research and support infrastructure may relate to completion rates, and whether such factors as Indigenous role models and mentors, support staff, academics and alumni facilitate a 'culture of achievement' which leads to Indigenous students' higher completion rates.

This research has not accounted for the fact that student characteristics have a major effect on completion rates, which is likely to be equally or perhaps more important than the level of support offered. It has been previously established that such factors as household income, parental educational level and home resources as well as student's racial and ethnic background, region and pre-university schooling experiences play a significant role in students' academic achievement (Braxton, 2000, p. 178; Sirin, 2005). In the Australian context, students' Indigenous status has also been included in this list of factors (Marks, McMillan, & Hillma, 2001).

The situation in Australian higher education may show similar trends regarding Indigenous students' academic performance. Go8 universities have higher entrance scores and potentially attract better performing students which will effect Indigenous students' completion rates. Given this, a major limitation of this research is the lack of data relating to Indigenous student characteristics and socioeconomic status. In future research, this information could be sought directly from universities.

The data employed in this article have other limitations. Although statistical data collected from the DEEWR web site is objective, information collected from the web sites of 40 Australian universities is somewhat open to interpretation. All support centre-related information was sourced from centres' web sites as outlined in the methodology section. We have been able to identify a type of centre based on its structure and services and facilities as listed on a centre's web site. However, not all Indigenous support centres had information on number of staff, their roles and nature of their employment (which is reflected by a number of missing observations in the statistical analysis). The level of detail available online also varied between centres. While we acknowledge that information listed on Indigenous support centres' web sites may be out of date or incomplete, we consider web site searching to be an effective tool for cross-sectional analysis. A formal

survey of each university would be a way to access more comprehensive and up to date information, such as the exact number of staff employed by each support centre, the Indigenous status of support staff members and their roles and type of employment.

Another avenue for further research would be an international level comparison between Australian Indigenous population's participation rates in higher education with those of other First Nation peoples in the US, Canada, New Zealand and other comparable countries. This study would allow identification of the processes and trends at work and draw parallels between Australia and other countries with similar settler-colonial contexts.

Despite the efforts of government and universities in improving Indigenous students' situation in higher education, Indigenous participation remains low. After a short period of growth, Indigenous commencements and completions now appear to be decreasing. Recruiting more Indigenous students who have completed school and are prepared for a university is paramount to overall Indigenous success in education. More Indigenous students are needed in higher education, especially completing postgraduate degrees, to become positive role models and 'set up a positive cycle of aspiration in Indigenous communities' and take on leadership positions (James, 2007).

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