

NATIONAL VOCATIONAL EDUCATION  
AND TRAINING RESEARCH PROGRAM

## RESEARCH REPORT

# Potential factors influencing Indigenous education participation and achievement

---

*Nicholas Biddle*

*Timothy Cameron*

CENTRE FOR ABORIGINAL ECONOMIC POLICY RESEARCH  
AUSTRALIAN NATIONAL UNIVERSITY

NCVER Building Researcher Capacity  
Fellowship Program 2010 participant



Australian Government

Department of Industry, Innovation  
Science, Research and Tertiary Education





**Australian Government**

**Department of Industry, Innovation  
Science, Research and Tertiary Education**

# Potential factors influencing Indigenous education participation and achievement

Nicholas Biddle  
Timothy Cameron

Centre for Aboriginal Economic Policy Research,  
Australian National University

Participant in the NCVER Fellowship Program 2010

**NATIONAL VOCATIONAL EDUCATION  
AND TRAINING RESEARCH PROGRAM  
RESEARCH REPORT**

The views and opinions expressed in this document are those of the author/  
project team and do not necessarily reflect the views of the Australian Government,  
state and territory governments or NCVER.

Any interpretation of data is the responsibility of the author/project team.

## Publisher's note

Additional information relating to this research is available in *Potential factors influencing Indigenous education participation and achievement: support document*. It can be accessed from NCVER's website <<http://www.ncver.edu.au/publications/2560.html>>.

To find other material of interest, search VOCEDplus (the UNESCO/NCVER international database <<http://www.voced.edu.au>>) using the following keywords: Indigenous education; Indigenous people; disadvantaged; outcomes; participation; completion; human capital.

As part of the National Centre for Vocational Education Research (NCVER) Building Researcher Capacity Scheme, a fellowship program has been created to encourage researchers to use NCVER datasets to improve our understanding of tertiary education. The fellowships also provide participants with an opportunity to have their research peer-reviewed and published by NCVER.

For more information see: <[http://www.ncver.edu.au/research/opportunities.html#NCVER\\_Fellowships](http://www.ncver.edu.au/research/opportunities.html#NCVER_Fellowships)>.

© Commonwealth of Australia, 2012



With the exception of the Commonwealth Coat of Arms, the Department's logo, any material protected by a trade mark and where otherwise noted all material presented in this document is provided under a Creative Commons Attribution 3.0 Australia <<http://creativecommons.org/licenses/by/3.0/au>> licence.

The details of the relevant licence conditions are available on the Creative Commons website (accessible using the links provided) as is the full legal code for the CC BY 3.0 AU licence <<http://creativecommons.org/licenses/by/3.0/legalcode>>.

The Creative Commons licence conditions do not apply to all logos, graphic design, artwork and photographs. Requests and enquiries concerning other reproduction and rights should be directed to the National Centre for Vocational Education Research.

This document should be attributed as Biddle, N & Cameron, T 2012, *Potential factors influencing Indigenous education participation and achievement*, NCVER, Adelaide.

ISBN 978 1 922056 34 4

TD/TNC 110.08

Published by NCVER, ABN 87 007 967 311

Level 11, 33 King William Street, Adelaide, SA 5000  
PO Box 8288 Station Arcade, Adelaide SA 5000, Australia

P +61 8 8230 8400 F +61 8 8212 3436 E [ncver@ncver.edu.au](mailto:ncver@ncver.edu.au) W <<http://www.ncver.edu.au>>

# About the research

## *Potential factors influencing Indigenous education participation and achievement*

Nicholas Biddle and Timothy Cameron, Centre for Aboriginal Economic Policy Research, Australian National University

This report examines two sets of issues, the first being whether Indigenous Australians obtain a lower return on investment in education and training than other Australians. If they do, then this would partly explain why, in general, Indigenous participation in education and training is relatively low. The second issue is whether Indigenous participation is different once background characteristics – such as remoteness – are taken into account. To investigate these questions, the research uses previous research and a number of datasets: the National Aboriginal and Torres Strait Islander Social Survey, the Census of Population and Housing, the Australian Early Development Index and the Longitudinal Surveys of Australian Youth.

## Key messages

- In terms of the return from education and training:
  - On average, Indigenous Australians are happier at school than other Australians, suggesting that a low level of happiness is not the main reason for low completion rates.
  - Once Indigenous students receive a tertiary admission rank they are as likely as non-Indigenous students to go to university.
- In terms of the effect of controlling for background characteristics:
  - Differences between Indigenous Australians and other Australians in education participation remain after controlling for remoteness and socioeconomic status.
  - Indigenous females may need to have a higher level of education than Indigenous males to experience the same level of wellbeing.

The overall message is that, on the whole, Indigenous Australians have a positive return from education and training. Therefore it can be concluded that differential returns are not especially important in understanding differences in participation. The authors also find that, almost universally, background characteristics (including academic achievement at an earlier age) do not explain differential participation. Differences appear at an early age and then compound through the schooling system.

This research was funded through the National Centre for Vocational Education Research (NCVER) fellowship program, which encourages researchers to use NCVER datasets to improve our understanding of education.

Tom Karmel  
Managing Director, NCVER



# Contents

Executive summary	6
Introduction and overview	8
A model of Indigenous education	10
The relationship between education attainment and Indigenous outcomes: research question 1	13
Variation in education participation by geography: research question 2	16
Early childhood education and school readiness: research questions 3, 4 and 5	18
High school education: research questions 6, 7 and 8	23
Post-school study and qualifications: research questions 9, 10 and 11	27
Discussion and conclusions	31
References	33
NVETR Program funding	35
Support document details	35

# Executive summary

The main aim of Indigenous policy is to improve the level of wellbeing of the Indigenous population. Borrowing from the capabilities literature, it can be argued that all Indigenous Australians should have the ability to live the type of life they value. It is fitting, therefore, that three of the six ‘Closing the Gap’ targets the Council of Australian Governments (COAG) has identified to improve the accountability of governments are related to education participation and attainment.

Meeting the Closing the Gap targets, however, will require a thorough understanding of why Indigenous Australians make the education decisions they do. By posing and attempting to answer a set of empirical research questions, we aim to make progress in the development of a behavioural model of education participation that is relevant to the Indigenous population. We also aim to identify key factors that are likely to be constraining education participation and which are potentially amenable to amelioration through public policy.

We combine information from a few datasets: the National Aboriginal and Torres Strait Islander Social Survey (the NATSISS), the Census of Population and Housing, the Australian Early Development Index (AEDI) and the Longitudinal Surveys of Australian Youth (LSAY). This allows us to partially answer some of the questions posed and be a little more definitive with others. Ultimately, we aim to shed some light on the process of Indigenous education participation and attainment.

The first question we consider in the paper is whether there is empirical support for there being large benefits from education for the Indigenous population and, if so, whether these benefits vary by gender or remoteness. We find that those people who have completed relatively high levels of education tend to have better outcomes than those without qualifications or those who drop out of school at a young age. Differences tend to be greatest for economic variables (employment, income and financial security), but are also present for a number of broader measures of wellbeing, such as self-reported happiness and sadness, self-assessed health and the ability to have a say within the community. Differences also tend to be greatest for females and those who live in non-remote Australia – two groups within the Indigenous population with relatively high levels of participation.

Having identified differences in benefits by remoteness, we then consider whether the geographic distribution of the Indigenous population explains disparities between them and non-Indigenous Australians in terms of education participation. What we find is that, while geography is important, the geographic distribution of the Indigenous population explains less than half of the difference in education participation between Indigenous and non-Indigenous Australians aged 15–19 years.

Having shown that geography is not the only factor explaining low education participation, we then turn our attention to the early childhood education experience. We show that Indigenous children are less likely to attend preschool than non-Indigenous children. Some of this difference is explained by geographic location and socioeconomic background. However, after controlling for these observed factors, differences in attendance still remain. The Indigenous presence in the preschool and carer experiences of discrimination are key determinants of participation.

It is not surprising, therefore, that Indigenous students in their first year of school were significantly more likely to be identified as being developmentally vulnerable than non-Indigenous children. Indigenous children who attended preschool were significantly less likely to be developmentally vulnerable than those who did not, with the biggest differences for literacy and numeracy. Closing the



gap in preschool attendance between Indigenous and non-Indigenous children will likely lead to a reduction in the disparity in school-readiness. However, it is unlikely to eliminate it entirely.

Another factor potentially driving differences in education participation is the school sector that Indigenous Australians are able to access. According to the 2006 census, 84.2% of Indigenous school students aged 5 to 17 years were attending a government school, compared with 64.6% of non-Indigenous students. These differences remain once other characteristics such as geography, demography and the socioeconomic status of the child's family are controlled for. To the extent that attendance at a private school confers benefits on the individuals, differences in participation between Indigenous and non-Indigenous students may explain some of the difference in later school outcomes.

One might expect that, given the barriers they face, Indigenous Australians would be less happy at school than their non-Indigenous counterparts. However, this does not appear to be the case. Indeed, Indigenous Australians are on average happier at school, with the difference widening once other characteristics (like socioeconomic background and average test scores) are controlled for. Indigenous students are also significantly more likely to agree that they really like being a tertiary student than their non-Indigenous counterparts. Low levels of happiness at school and in post-school education do not appear to be the main reason for low Indigenous completion rates.

Despite this relatively high within-school wellbeing, Indigenous Australians have relatively low expectations in terms of completing Year 12. However, this difference disappears once socioeconomic characteristics are controlled for, and becomes positive when a range of school factors (like test scores) are included in the model. While Indigenous Australians are less likely to expect to complete Year 12, this is driven by observable factors.

Indigenous Australians are more likely to drop out of school before completion than non-Indigenous Australians. However, this difference is driven by observable characteristics such as academic achievement at the age of 15. Once these characteristics are controlled for, there was no significant difference. There were, however, differences in the tertiary entrance rank attained by Indigenous students at the completion of Year 12. These results show that the gaps between Indigenous and non-Indigenous Australians in terms of school outcomes as opposed to school completion can still widen in the latter years of school. This has implications for future education prospects, which in turn can impact on economic and social wellbeing across the life course.

As with high school expectations, Indigenous Australians are significantly and substantially less likely to expect to undertake post-school education. This difference in expectations is not driven by the relative socioeconomic background of Indigenous youth, but the differences do disappear once other school-based characteristics such as the student's own test scores and the test scores of others in the school are controlled for. Once again, actual and perceived ability are driving the differences in education expectations between Indigenous and non-Indigenous youth.

An Indigenous youth is much less likely to undertake post-school study than a non-Indigenous Australian. This difference holds even after controlling for a range of important characteristics (for example, socioeconomic background and test scores). Once Indigenous students obtain a university entrance score they go to university with about the same probability as non-Indigenous students. This points to a need for a policy focus on why Indigenous students are less inclined to study towards a university entrance score. Moreover, policy should focus on the reasons Indigenous students receive lower scores on average, rather than on those students who have already received a score.

# Introduction and overview

Although the headline target for the Council of Australian Governments' Closing the Gap agenda is the elimination of the life expectancy gap between Indigenous and non-Indigenous Australians, in numerical terms, education dominates, with three of the six targets relevant to this area. This includes targets related to preschool access (Target 3), literacy and numeracy (Target 4) and Year 12 completion (Target 5). The setting of these targets clearly recognises that education itself is important, but it also recognises that, without reducing the educational disparities between Indigenous and non-Indigenous Australians, other targets on health and employment are unlikely to be met.

Closing the gap between Indigenous and non-Indigenous Australians in education outcomes will not be easy. The findings from the 2006 Census of Population and Housing indicate the scale of the challenge. First, 47.8% of Indigenous three to five-year-olds (who had not started school) were attending preschool, compared with 57.5% of non-Indigenous children. Across the Indigenous life course, this gap only widens. By the ages of 20 to 24, 36.0% of Indigenous Australians (who were not still at school) had completed Year 12, compared with 74.5% of non-Indigenous Australians. For all education types, 34.5% of Indigenous 15 to 24-year-olds were undertaking education compared with 55.3% of the same non-Indigenous age group.

One potential reason for this education disparity is physical and financial access. Biddle (2010) showed that Indigenous youth were more likely to live in remote areas than their non-Indigenous counterparts, and that within the Indigenous population there were substantial disparities by region in terms of education participation and attainment. Furthermore, on average, Indigenous Australians grow up in families with fewer material resources, meaning that it is more difficult to attend relatively expensive private schools (Biddle & Yap 2010).

While important, these financial and geographic disparities alone do not explain the gap in education attendance and attainment between Indigenous and non-Indigenous Australians. In all regions, including Australia's largest capital cities, Indigenous Australians had lower levels of education than their non-Indigenous counterparts (Biddle 2010). Biddle (2007) showed that the gap between the two populations in terms of participation also remained, once family income, employment and education were controlled for. Access is not the only issue driving the disparity in education between the two populations. For most Indigenous youth who wish to attend high school or a tertiary institution there is usually one available relatively close by that is free, or, in the case of universities, able to be paid off through the tax system later in life. It seems that many Indigenous youth do not see that the benefits of attending outweigh the costs.

To a certain extent, the choice made by some Indigenous youth to not participate in formal education should be respected. There are many activities outside the non-Indigenous mainstream that do not require extended formal education. If an Indigenous youth or their family does not see later secondary school or post-school education as being worthwhile, then compelling them to attend is likely to be counterproductive. Not only will the negative effects outweigh the positive, but those students who do not want to be at school may have a detrimental influence on those who do.

Such an approach, however, is only justified if those students who are opting out of school or post-school options are making informed choices. Furthermore, it is concerning if childhood and early school experiences are having an undue influence on the choices available to Indigenous Australians when they are considering their education options. There may be no direct effect of Indigenous status

on the choices made by Indigenous adolescents, once academic ability is controlled for. However, many of the constraints on the development of academic ability may be particularly an issue for Indigenous children.

Ultimately, the policy response to low education participation by Indigenous Australians will be determined by the reasons why Indigenous Australians make alternative education decisions and the constraints they face in making these decisions. Unfortunately, the data available to analyse this decision are far from perfect. There is no longitudinal data that allow analysis of the effect of early childhood experiences on later school choice. However, we know from other contexts that the early years are crucial in determining future educational options and constraints (Cunha et al. 2006). In addition, we do not have information that will allow us to estimate accurate returns from education for Indigenous Australians – information which is crucial when trying to gauge whether economic incentives are driving the education decision.

In situations such as these where data are lacking, it is important to have a solid theoretical model, based on empirical research in other contexts but also informed by the unique circumstances of the Indigenous population. Such a model will help to identify the likely impacts on the education decision, the key research questions that need to be answered and the data required to answer the questions. In the next section of the paper, we outline the beginnings of such a model and pose a number of research questions that stem from it.

The remainder of the paper summarises the analysis of these datasets. This paper is intended to be read as a stand-alone document. However, those who are interested in the detailed results of the analysis and the estimation methodology are referred to the accompanying support document.

# A model of Indigenous education

In developing a model of Indigenous education, we begin with the well-known human capital model (HCM). This model, in more or less its current form, was outlined by Becker in 1964. At the heart of the model is the assumption that, when deciding whether or not to undertake a certain type of education, potential students are rational (in the economic sense) utility maximisers who, above all, see education as an investment. An investment in education will improve an individual's performance in the workplace and s/he will invest until the returns from an additional unit of education (measured by increases in discounted future income) just equal the cost. That is, until marginal returns equal marginal cost.

Although the model has been quite influential in education research and policy-making, it has also been recognised that, at least under the basic specification presented above, it has a number of limitations. The first of these is whether the only effect of education is on enhancing productivity directly (as assumed in the model), or whether education in part acts as a signalling or screening device, whereby already productive workers are identified (for example, Arrow 1973; Spence 1973).

Under the alternative specification, employers assume that those with a higher innate ability find education easier (or less costly) and are therefore more likely to invest heavily in education than those who find education a struggle. An employer is therefore more likely to hire a person with relatively high levels of education, not because the education they have undergone has made them more productive, but because it has demonstrated that they were more productive in the first place.

Whether or not it is human capital or screening/signalling that is driving the differences in earnings has important implications for some aspects of policy development. If governments are trying to decide on the level of investment they make in education or the type of education to focus on, then under the human capital model, across-the-board increases in education lead to higher economy-wide productivity. Therefore there is a much stronger argument for government provision of education. Under a signalling/screening model, however, education has its greatest effect on relative earnings. Economy-wide increases in education may have some benefits in terms of improving the match of the supply of skills to the demand for skills. However, the effect of allocative efficiency will be much less than the direct productivity effects on economic growth of the model.

While the above is an important issue, the distinction between human capital and screening/signalling models is of less relevance when considering differences within a population in terms of education participation and attainment. If that is the focus, then the motivation for employers to pay higher wages to those with relatively high levels of education is less important than the factors that potential students take into account when deciding whether or not to undertake education.

The basic model also assumes that a person's utility can be adequately measured by their income. If discounted future additional income is higher than the cost of education, then people will invest in education. It is likely, however, that a student's current social situation is also important in influencing their behaviour. Specifically, children who have positive attitudes to school are more likely to intend completing Year 12 and are also more likely to actually do so (Khoo & Ainley 2005; Marks 1998). Students who don't like school are more likely to leave without completing their secondary education (Wehlage & Rutter 1986), and children who are happy in the later years of secondary school are more likely to complete university (Dockery 2010).

Despite this research, there is a lack of literature relating happiness at school to school completion rates, both generally and specifically in relation to Indigenous Australians. Most literature linking education and happiness tells the other side of the story: how education affects future happiness. Higher levels of education lead to, on average, higher future incomes, but it has been shown that education correlates weakly with happiness scores in rich countries (Hartog & Oosterbeek 1998). A recent study shows that Australian university graduates, despite their improved labour market outcomes, have lower levels of happiness than those who have only completed Year 12 (Dockery 2010).

In addition to income and school-level wellbeing, there are a number of other outcomes likely to be associated with higher education levels that people may take into account when making education investment decisions. Although there are indirect effects that operate via income, education may also have direct effects on such areas as health, the schooling of one's children, the efficiency of consumer choices and the ability to plan fertility decisions (Wolfe & Haveman 2001).

As indicated, the human capital model assumes that potential students make decisions based on a comparison between their future income streams with, and without, education. However, potential students cannot know their precise future income and must therefore form expectations based on what they do know. All students have access to different information, so it is possible that expectations are also formed differently (Dominitz & Manski 1996).

A model of Indigenous education participation would therefore take into account the fact that Indigenous Australians start school with lower levels of cognitive and non-cognitive ability (as valued in formal education), with the gap widening throughout the early school years. When making the decision to continue on at school beyond the compulsory years, Indigenous students may have different potential benefits of education due to the types of labour markets they can access. However, these returns may be estimated with uncertainty because of there being relatively few role models from whom they can access information. There are also other non-economic returns from education that may be important, but these must be traded off against the different non-economic costs of schooling.

The aim of this paper is to identify some of the parameters that would constitute a behavioural model of Indigenous education. To do this, we pose a number of research questions. We attempt to answer some of these questions by using a range of quantitative datasets. For the other research questions, we discuss results from previous analysis. The research questions are grouped as follows:

1. What are the apparent benefits of education and do they vary by gender or remoteness?
2. Does the geographic distribution of the Indigenous population explain disparities between Indigenous and non-Indigenous Australians in terms of education participation?
3. Are Indigenous children more or less likely to attend preschool than non-Indigenous children? Do these differences remain once the characteristics of their family and the area in which they live are controlled for?
4. Do Indigenous children start school with different strengths and weaknesses from non-Indigenous children? Do these differences remain once preschool participation has been controlled for?
5. Are Indigenous children more or less likely to attend private schools than non-Indigenous children? Do these differences disappear once other characteristics like geography and socioeconomic status are controlled for?

6. Are Indigenous Australians less happy at school than non-Indigenous Australians? Are there other aspects of wellbeing at school that are likely to impact on education outcomes?
7. Are Indigenous Australians more or less likely to expect to complete Year 12, conditional on their happiness, self-assessed ability and test scores at the age of 15?
8. After controlling for these differences in happiness and expectations, are Indigenous Australians more or less likely to drop out of school before completing Year 12 and, for those who do complete Year 12, are there differences in tertiary entrance score?
9. Are there significant differences in the immediate post-school expectations (at the age of 15) of Indigenous and non-Indigenous Australians?
10. Are there differences between Indigenous and non-Indigenous Australians in terms of immediate post-school study? Are there differences in university participation?
11. Are Indigenous Australians as satisfied with their post-school experience as non-Indigenous Australians?

# The relationship between education attainment and Indigenous outcomes: research question 1

In the first set of analyses discussed in this paper, we use the 2008 National Aboriginal and Torres Strait Islander Social Survey to consider the relationship between an Indigenous Australian's level of education and a number of outcome measures. The eight measures or determinants of wellbeing considered are: employment, income for those employed, happiness, sadness, health, cultural participation, ability to have a say on important issues, and ability to raise \$2000 in an emergency. Differences were calculated separately for males and females, as well as for those in remote and non-remote areas.

Results presented in the support document (tables 1 and 2) show that both Indigenous males and females are more likely to be employed if they have relatively high levels of education. This is not necessarily a causal effect, as those who would otherwise be more likely to be employed are more likely to undertake education. However, it does show that if the Council of Australian Governments target on halving the gap in employment outcomes between Indigenous and non-Indigenous Australians is to be met, then the education levels of the relatively low-skilled will probably need to be raised.

There appears to be greater variation in employment by education for females, particularly by post-school qualifications. This is a consistent finding across the literature and probably reflects the fact that females still tend to take on a greater role with respect to childcare, care within the community and unpaid work in general (Biddle & Yap 2010). The opportunity cost of not working is higher for females with relatively high levels of education. This means that it makes economic sense for females with relatively low levels of education to opt out of working and to focus on providing care.

For those Indigenous Australians who were working, there was a greater difference by education in terms of personal income for males rather than females, particularly at the lower end of the education distribution. This is explained once again by higher levels of caring responsibilities and unpaid work for females. Those females with low skills and low income are likely to have opted out of employment, meaning that only those who have a relatively high income are left in the sample of the employed.

There is a somewhat different association between education attainment and the two measures of emotional wellbeing for males and females. Although for both sexes higher levels of education are associated with higher levels of emotional wellbeing, this is not consistent across education type or by sex. For males, the only differences are between those who have completed Year 9 or less and the rest of the population. On the other hand, those females who have completed Year 10 or 11 also have lower levels of emotional wellbeing than those who have completed Year 12. Furthermore, having a diploma was associated with a lower level of sadness than having no qualification at all, whereas having a certificate I/II was actually associated with a higher level of sadness (albeit at the 10% level of significance only). In addition to emotional wellbeing, there is also a greater health gradient for

Indigenous females with regards to reporting one's health as fair or poor (in terms of statistical significance in particular).

Ultimately, all three of these measures of wellbeing are lower for those with relatively low levels of education, as is the probability of participating in cultural events, ceremonies and organisations. Undertaking formal education may impose significant social and emotional costs on Indigenous Australians (although, as discussed later in this paper, the empirical evidence for this is mixed). However, it would appear from these results that those Indigenous adults who have completed formal education are on average happier, less sad, have better health and are more likely to engage in Indigenous cultural activities.

Perhaps the biggest difference by gender in terms of the association between the measures of wellbeing and education is in relation to the ability with which individuals feel they are able to have a say in the community on important issues. For males, those who have completed Year 9 or less have lower levels of this measure of efficacy than those who have completed Year 12. There are small differences by qualifications, but these tend not to be significant, or only significant at the 10% level of significance. For females on the other hand, the differences by qualification are large and consistently significant. It is possible that those who would otherwise have a high sense of efficacy are more likely to undertake education in the first place. Nonetheless, the results presented in the support document give qualified support that prestige or stature in the community is one of the motivating factors in undertaking education for the Indigenous population, or at the very least, one of the potential outcomes.

The final outcome included in the analysis of differences between males and females is whether or not a person feels that their household could raise \$2000 within a week in an emergency. This measure of financial security is much higher for those with relatively high levels of education, with differences slightly larger for females than males. There are three potential causal explanations for this. Firstly, those with higher levels of education have greater income and wealth. Secondly, those with higher levels of education are more likely to be married to someone who also has relatively high levels of education (so called assortative mating;<sup>1</sup> Mare 1991), compounding the income effect at the household level. Finally, those with higher levels of education may be better able to plan their finances and seek alternative forms of credit beyond household income. However, there is also a possible reverse causal effect with this variable, with those with greater financial security in their household and in their wider social networks as they grow up better able to undertake education. Whatever the explanation, those with lower levels of education are much less likely to feel financially secure than those who have completed Year 12 or have qualifications.

In general, the results show a significant association between education attainment and a number of outcome measures. It is unfortunate that we cannot be more definitive with regard to the causal direction of these associations. However, a consistent finding is that there is a much greater education gradient for females for many of the wellbeing measures analysed. Putting this another way, Indigenous females may need to have a higher level of education than Indigenous males to experience the same level of wellbeing. If this is causal, and Indigenous females take this into account when making education decisions, this may be a reason for the generally higher levels of education participation amongst Indigenous females, as outlined in Biddle (2010) and demonstrated in later sections of this paper.

---

<sup>1</sup> Individuals tend to be partnered with those from similar backgrounds or characteristics, such as education.



What then about comparisons by remoteness? In both remote and non-remote Australia, the differences in economic outcomes are quite substantial. Although they are slightly larger in non-remote Australia (especially in terms of income), the results would still suggest that economic incentives to undertake education are reasonably high in remote Australia. There were also large differences in remote and non-remote Australia in the last two variables (the ability to have a say within the community and to raise \$2000 in an emergency), both of which have the potential to exert strong economic effects.

Unlike economic status, there are much smaller differences by levels of education in remote Australia for the measures of subjective wellbeing. Those who have completed Year 9 only are significantly less likely to report frequent feelings of happiness than those who have completed Year 12. However, there are no significant differences by high school completion in the probability of reporting intense feelings of sadness or of reporting one's health as being fair or poor (as opposed to good, very good or excellent). Similarly, there were no differences by education in having been involved in cultural events, ceremonies or organisations (apart from those with a degree or higher having a higher probability).

Even more so than by gender, it is difficult to label differences by education in remote and non-remote areas as being returns from education. Not only should the researcher be aware of the potential for unobserved ability to bias the results, the fact that where a person lives is a choice variable complicates the comparisons by remoteness. In particular, an individual has the potential to move to a different location to take advantage of better employment opportunities (conditional on education level) and hence obtain a higher return from their education investment than if they did not move.

Despite the reservations about calling the results returns from education, it is entirely possible that when making the education decision, those in particular areas put greater emphasis on those around them when gauging the potential effect that education will have on their outcomes. If this is the case, then the results presented in table 4 in the support document prompt a very important research question: do Indigenous youth in remote Australia take into account the potentially large economic benefits of education when making their decisions or are they more swayed by the apparently low social returns? It is impossible to answer this with the available data. However, it is an important avenue for further research, using a mix of qualitative, quantitative and experimental techniques.

# Variation in education participation by geography: research question 2

One of the defining characteristics of the contemporary circumstances of Indigenous Australians is their relative concentration in more remote parts of the country. According to estimates from the 2006 census, Indigenous Australians make up 2.5% of the total Australian population. However, this rises to 15.2% of the total population in remote Australia and 47.5% of the population in very remote areas.

One reason often given for why Indigenous Australians have less satisfactory education outcomes than non-Indigenous Australians is their relatively remote geographic distribution. Although the potential economic benefits of education are still quite high in remote areas, relative to Indigenous Australians in non-remote areas the social benefits appear to be somewhat lower. Furthermore, the financial costs of education are also likely to be relatively high, especially in terms of late secondary and post-school education, for which many Indigenous Australians would have to migrate in order to access.

According to data from the 2006 census, there are, indeed, much lower rates of education participation for those Indigenous (and non-Indigenous) Australians who live in relatively remote areas. Around 51.7% of the Indigenous population aged 15–19 years were attending some form of education at the time of the 2006 census (see table 5 in the support document). This rises to 58.1% for those who lived in major cities five years earlier (that is, when they were aged 10–14 years), but is as low as 32.9% for those who lived in very remote areas. The percentages for those who lived in regional and remote areas fall somewhere in between.

Clearly, where Indigenous Australians lived immediately prior to making the decision about post-school education explains much of the variation in eventual participation. However, a comparison with the corresponding percentages for the non-Indigenous population shows that this does not explain all – or even most – of the differences between Indigenous and non-Indigenous Australians. It is true that the gap in education participation between Indigenous and non-Indigenous Australians was highest amongst those who lived in very remote areas. However, there are gaps of 15 percentage points or more in all of the remoteness regions.

One way to test for the extent to which geography explains differences in Indigenous education participation is to estimate what proportion of Indigenous Australians would be attending an education institution if the Indigenous population had the same geographic distribution as the non-Indigenous population. Similar to age standardisation of disease rates (Ahmad et al. 2000), geographic standardisation uses the proportion of the Indigenous population in each geographic region (in this case the statistical local area of usual residence five years earlier) as the basis of the calculations, but weights each region by the share of the non-Indigenous population in that region, as opposed to the Indigenous population, when calculating national percentages.

The national, non-geographically standardised percentage of the Indigenous population aged 15–19 years who were attending an educational institution was 51.7%. After standardising the Indigenous population to the non-Indigenous distribution, the geographically standardised rate for the Indigenous population rises to 61.5%. While this is higher than the raw Indigenous percentage, it is still substantially below the non-Indigenous rate of 75.5%.

In answer to the research questions posed in the introduction: yes, there are differences in Indigenous education participation by geography. However, based on geographic standardisation, this geographic distribution explains less than half (41.2%) of the difference in education participation between Indigenous and non-Indigenous 15 to 19-year-olds. Geography is important. However, there are additional factors that explain the disparities.

# Early childhood education and school readiness: research questions 3, 4 and 5

One potential factor that may explain some of the remaining difference is the early childhood education experience of Indigenous Australians. The model outlined in the introduction to this paper allowed for the empirical finding that those with higher levels of ability (as valued in formal education) find education easier or less costly and are therefore more likely to feel that the benefits outweigh the costs.

There are two components of ability that are assumed to influence outcomes: cognitive and non-cognitive ability. Cognitive ability refers to a person's intelligence or scholastic aptitude and is traditionally measured by instruments like intelligence quotient (IQ) tests. Non-cognitive ability refers to things like self-discipline, motivation and time preference that are not traditionally measured by IQ tests, but nonetheless have been found to influence academic achievement (Duckworth & Seligman 2005). Furthermore, non-cognitive ability has effects on academic achievement and future economic prospects, even after controlling for the effect of cognitive ability (Heckman & Masterov 2005).

There is no evidence to suggest that any ethnically based group has lower innate levels of ability, so it must be assumed that the distribution within the Indigenous population is no different from that of other groups. The fact that by Year 3 (when children are roughly eight to nine years old) there is already a large gap between Indigenous and non-Indigenous Australians on national literacy and numeracy tests would suggest that the constraints on the development of Indigenous children's cognitive ability start early in life and continue throughout their schooling.

One of the constraints on the development of cognitive and non-cognitive ability is access to quality preschool options. This is recognised by the Council of Australian Governments in the setting of their Closing the Gap targets, with the third target being to 'ensure access to early childhood education for all Indigenous four-year-olds in remote communities within five years' (Department of Families, Housing, Community Services and Indigenous Affairs 2009, p.5). Geographic access is important. However, even if there is a preschool in the area in which an Indigenous child lives, that does not mean that the child will necessarily attend: just as with later in life, the parents or guardians of the children need to feel that the benefits of attendance outweigh the costs. Keeping this in mind, the third set of research questions we ask are whether Indigenous children are more or less likely to attend preschool than non-Indigenous children and whether these differences remain once characteristics of their family and the area in which they live are controlled for.

Biddle (2007) is the most comprehensive study to date of the factors associated with Indigenous preschool participation. Using data from the 2001 census, the author looked at the relationship that age, sex and Indigenous status has with preschool participation, as well as the household and geographic factors associated with participation. The main finding from the analysis was that:

after controlling for only a limited set of factors associated with preschool attendance, an Indigenous three-year-old is more likely to attend preschool than is a non-Indigenous child of the same age. Although Indigenous four- and five-year-olds are less likely to attend after controlling

for the same factors, the marginal effect of being Indigenous is less than the raw probabilities would suggest. (Biddle 2007, p.14)

What this means is that differences between the socioeconomic and geographic characteristics of the households and areas in which Indigenous children grow up compared with those of non-Indigenous children explain much of the difference in their preschool attendance rate. To put this another way, the most important difference is between relatively advantaged Indigenous children and relatively disadvantaged Indigenous children, not between Indigenous and non-Indigenous children from broadly similar backgrounds. A further finding from the census that relates to variation within the Indigenous population was that ‘the presence of a preschool worker who identifies as Indigenous and is working in the area where a child lives significantly increases attendance’ (Biddle 2007, p.14).

Indigenous-specific factors matter as well. Biddle (2011) looked at some of these, using data from the Longitudinal Study of Indigenous Children. The first major finding from the analysis was that ‘those children who have lived in two or more homes since birth are significantly less likely to be participating in preschool than those who had lived in the same household since birth’ (Biddle 2011, p.24). Disruption from changing households may be having a negative effect on early childhood education. The second major finding was that ‘children who have a carer who felt they were discriminated against because of their Indigenous status are significantly less likely to be attending preschool’ (Biddle 2011, p.24). Although the finding was not causal, if at all, any biases are likely to minimise differences (since those carers with children in preschool are likely to be more exposed to discrimination). It would seem, therefore, that ongoing discrimination against carers is a cause of disengagement from formal education for children in their care.

While it is justified for the Council of Australian Governments to focus on access to preschool, this alone will not ensure that Indigenous children start school with the same level of ability as their non-Indigenous peers. As discussed, there is systematic variation in whether or not a child attends preschool, regardless of whether there is a preschool close by. In addition, a binary comparison of those who have and who have not participated in preschool will only explain a small part of the variation in ability, with family socioeconomic background and the quality of the preschool having an effect as well. This raises the fourth set of research questions covered in this paper: do Indigenous children begin school with different strengths and weaknesses from non-Indigenous children and, if so, do these differences remain once preschool participation has been controlled for?

The main finding from the analysis of the Australian Early Development Index<sup>2</sup> presented in the support document is that Indigenous children in their first year of school are substantially more likely to be reported as having one or more domains in which they are developmentally vulnerable than non-Indigenous children. Specifically, 70.0% of Indigenous children in the sample were identified as being developmentally vulnerable across one or more domains compared with 45.0% of non-Indigenous children. At the other end of the distribution, 8.8% of Indigenous children are identified as being developmentally vulnerable in eight or more domains compared with 2.4% of non-Indigenous children. This represents a considerable disadvantage at the start of a child’s school career.

Not all of the domains in the Australian Early Development Index are likely to be of equal importance. Furthermore, although Indigenous children are more likely to be rated by their teachers as being

---

<sup>2</sup> Collected for the first time in 2009, the Australian Early Development Index is based on a checklist completed by the teachers of children in their first year of full-time school. The checklist measures five key areas or domains of early childhood development: physical health and wellbeing, social competence, emotional maturity, language and cognitive skills (school-based), and communication skills and general knowledge.

developmentally vulnerable for each of the 15 domains, the size of the differences vary considerably by domain. Indigenous children are 1.3 times as likely to be rated as developmentally vulnerable in terms of physical independence (10.6% compared with 8.4%) and 1.5 times as likely to be rated as developmentally vulnerable in terms of anxious and fearful behaviour (16.1% compared with 11.1%). These are clearly large differences. However, 34.6% of Indigenous children in their first year of school are identified as being developmentally vulnerable in terms of basic numeracy – 3.4 times as high as the percentage for non-Indigenous children (10.2%). There is almost as large a gap for basic literacy (30.7% compared with 9.1% respectively).

Indigenous children therefore do indeed start school with strengths and weaknesses different from non-Indigenous children. That is not to say that all, or even most, Indigenous children start off poorly. While they are more likely to be reported as developmentally vulnerable in all of the domains covered in the Australian Early Development Index, there is only one domain for which a third or more of Indigenous children are listed as being developmentally vulnerable. For seven of the 15 domains, more than four out of five Indigenous children are not reported as being developmentally vulnerable. Nonetheless, the results from the index suggest that Indigenous children start school with lower levels of cognitive and non-cognitive ability than their non-Indigenous peers.

One obvious explanation for this lower level of reported ability is that Indigenous children are less likely to attend preschool than non-Indigenous children. This raises the question of whether Indigenous children are still more likely to be developmentally vulnerable in each particular domain once preschool attendance has been controlled for. The results from the Australian Early Development Index do show that those who attended preschool appear to have higher measured cognitive and non-cognitive ability than those who did not. On average, a non-Indigenous child who attended preschool was identified as being developmentally vulnerable in 1.2 domains (out of a possible 15). This is significantly lower than the 1.8 domains that a non-Indigenous child who did not attend preschool was identified as being developmentally vulnerable in. This should not be interpreted as a causal effect, as there are other observed and unobserved characteristics that vary by preschool attendance that are not controlled for. Nonetheless, the result does show that preschool is associated with lower levels of developmental vulnerability.

While preschool is associated with better school readiness, preschool participation does not explain all of the difference between Indigenous and non-Indigenous children. The average number of domains for Indigenous children who attended preschool was 2.8. This is significantly lower than the 3.4 domains for those who did not attend preschool, showing that there is an association for both Indigenous and non-Indigenous children. However, compared with the 1.2 domains for non-Indigenous children who attended preschool, it is clear that preschool attendance is only one aspect of the difference between the two populations in terms of school readiness.

Looking at each of the domains separately, Indigenous children who attended preschool were predicted to be significantly less likely to be developmentally vulnerable than those who did not attend preschool in eight of the 15 domains, with the biggest differences for the literacy and numeracy variables. Once again, this should not be treated as a causal effect, as those who attend preschool are different in other ways not controlled for in the model. Nonetheless, the results do at least demonstrate an association and give *prima facie* evidence that expanding access to preschool education has the potential to improve the school readiness of Indigenous children.

While those Indigenous children who attend preschool are less likely to be developmentally vulnerable in many of the domains than those who did not, comparing Indigenous and non-Indigenous preschool

attendees shows that this does not explain much of the gap in school readiness. There is only one variable – physical independence – for which Indigenous preschool attendees do not have a significantly higher predicted probability than non-Indigenous preschool attendees. For the other variables and in particular for literacy and numeracy levels, there are still large differences between Indigenous and non-Indigenous children, regardless of previous preschool attendance.

In addition to preschool attendance, as explained below, one of the potential reasons for the differential development of cognitive and non-cognitive ability is the type of school sector that Indigenous and non-Indigenous students attend. In Australia, there are three main education sectors: government schools (administered by the applicable state or territory education departments), the Catholic school system and other non-government schools. Government or public schools do not charge fees and generally accept students based on geographic criteria. The other two sectors also receive funding from the government, but in addition they charge fees for attendance.

Although they follow a similar curriculum to the government sector, Catholic and other non-government schools have greater autonomy in how they provide education and how they accept students into the school. Some schools will use academic or sporting/artistic criteria, whereas others will accept students primarily based on the order in which they enrol. While almost all non-government schools charge some form of fee for attendance, these are often waived through the provision of scholarships, often on equity grounds.

The proportion of students attending non-government schools has increased quite substantially in the last 30 to 40 years. This has been caused in part by Commonwealth Government funding to non-government schools, which began in the early 1950s and has increased reasonably steadily (even on a per capita basis) since. Ryan and Watson (2004) show that the increase in funding has not led to a fall in school fees charged by non-government schools, but rather an increase in the extent of the resources devoted to each student. This in turn has led to a continuation of non-government school students being from a relatively high socioeconomic status background. This is particularly the case for independent schools or, non-Catholic, non-government schools.

Of the three sectors, Indigenous students are more likely to be attending government schools than their non-Indigenous counterparts. According to the 2006 census, 84.2% of Indigenous school students aged 5–17 were attending a government school, compared with 64.6% of non-Indigenous students. On the other hand, only 5.6% of Indigenous students were attending independent schools, compared with 14.1% of non-Indigenous students.

These results are replicated in the Longitudinal Surveys of Australian Youth. In Wave 1 of the survey when the students are 15 years old, 78.4% of Indigenous students were attending a government school compared with 59.5% of the non-Indigenous sample. Results presented in the support document show that these differences hold, even after controlling for a range of demographic, geographic and socioeconomic outcomes.

In Australia the resources devoted to students in non-government schools is on average higher than those in government schools (Le & Miller 2003). Furthermore, Vella (1999) and Le and Miller (2003) showed that, even after controlling for the type of student who attends, non-government school students had a higher rate of school completion than those in government schools. Economic resources are not the only input into a quality school environment, and most government schools continue to provide a high-quality education by international standards. Nonetheless, parents would not be spending significant amounts of money sending their children to non-government schools if

they did not think it would lead to better outcomes for their children, whether they be academic outcomes or social, sporting or cultural returns.

Because Indigenous Australians attend non-government schools at a relatively low rate (both before and after controlling for other characteristics), they are likely to be missing out on many of these benefits, meaning that their skills development may lag behind that of the non-Indigenous population. Many private schools recognise this and provide targeted support to Indigenous students who would not otherwise attend. Nonetheless, differences in school sector are likely to explain at least some of the gap in school completion.



# High school education: research questions 6, 7 and 8

Internationally, there are a number of papers that consider the different and generally higher costs of education for minority groups. Akerlof and Kranton (2002), as well as Austen-Smith and Fryer (2005), consider situations where a minority subgroup faces a trade-off between higher wages and the social stigma an individual receives from their own subgroup. This stigma results from expending time in an activity associated with the majority group. These economic models follow a large body of sociological and ethnographic evidence that proposes that certain population subgroups view effort in education as a form of ‘selling-out’. The most commonly cited research on this issue is *Learning to labour: how working class kids get working class jobs* (Willis 1977), which studied the resistance to the dominant culture by working-class youth in inner-city England. Other examples of research in this area include Baumeister and Muraven (1996), Fordham and Ogbu (1986) and Hirschman, Lee and Emeka (2003). While the extent to which the fear of ‘acting white’ affects people’s actual behaviour is a subject of debate, it is generally accepted that different population subgroups perceive different social outcomes from undertaking education.

There are parallels with these international situations for the Australian Indigenous population. According to a detailed ethnographic study of the Indigenous population in an inner-city area, ‘there appeared to be less shame in running the streets than fighting a losing classroom battle’, and ‘resisting school offered a sense of solidarity, another individual struggling against the wider oppression and rejecting success offered by the system under its own terms’ (Munns & McFadden 2000, p.67).

This resistance can be traced in part to the historic institutional racism faced by Indigenous Australians in the formal education system. As far back as 1840 the Protector of Aborigines in Adelaide, South Australia, stated that: ‘Our chief hope now is decidedly in the children; and the complete success as far as regards their education and civilisation would be before us if it were possible to remove them from the influence of their parents’ (cited in Parbury 1999). While this was of course not a universally held view throughout the history of Indigenous education in Australia, it is clear from Parbury (1999) and the sources cited that many saw the role of formal education as being one of civilising or ‘Christianising’ the Indigenous population. Even today, many Indigenous youth would have family members who were part of the Stolen Generation – people who were removed from their families by the state.

Given the role of previous and potentially even current practices in shaping the resistance of Indigenous youth towards formal education, the social costs and benefits of education are likely to be heavily influenced by a person’s household context. Those households where someone has had a positive experience with education themselves are likely to be more encouraging of children and youths in the household attending and completing high school, and better able to mitigate some of the perceived racism and alienation that constitute a large social cost of education (Schwab 1999).

In essence, how happy a child is at school may influence their desire to continue on at school. However, analysis of the first wave of LSAY presented in the support document shows that an Indigenous Australian who is currently attending school is on average happier at school than a non-Indigenous Australian (born in Australia) of the same age, gender and broad region of usual residence.

Furthermore, this difference not only holds once other characteristics such as test scores and the individual's own assessment of their ability are controlled for, but actually widens. Indigenous Australians are, on average, happier at school than their non-Indigenous counterparts. A student's happiness is important in its own right. The more positive a person feels while at school, the higher their emotional wellbeing across the life course. In addition to happiness, there is a fairly comprehensive set of wellbeing measures in Wave 1 of the 2006 LSAY that relate to how Indigenous Australians feel about their schooling.

Of the six variables on student wellbeing created and summarised in the support document, there were only two where Indigenous Australians have lower values, after controlling for demographic and geographic characteristics. Indigenous Australians aged 15 years are significantly less likely to feel confident at school than their non-Indigenous counterparts (at the 1% level of significance) and less likely to feel safe and secure (at the 10% level of significance). However, once other observed characteristics such as test scores and an individual's own assessment of their ability are controlled for, there are no significant differences in the variable which measures feelings of safety and security. Furthermore, Indigenous Australians are slightly more likely to feel confident at school than an otherwise identical non-Indigenous student and significantly and substantially more likely to have positive views towards their teachers and to see their current schooling as being of benefit.

There is a significant issue related to sample selection for the analysis of student wellbeing. Indigenous students who are not happy at school or feel unsafe or insecure may well have dropped out or stopped attending by the age of 15. New data from the Longitudinal Study of Indigenous Children and the Longitudinal Study of Australian Children will help to identify whether there are differences between Indigenous children and other children at a much younger age. Nonetheless, analysis of the student wellbeing variables in LSAY would suggest that differences in happiness and wellbeing are not the main cause of ongoing Indigenous disengagement from formal schooling amongst those aged 15 years or over. The one factor with the potential to be driving some of the observed difference is confidence. However, this lower confidence appears to be driven by other observable characteristics, rather than Indigenous status.

The expectations that a person has about their future education outcomes are important for two reasons. First, they provide an indication of early disengagement from school. More importantly, however, a student's expectations may be self-fulfilling. Cheng and Starks (2002, p.306) summarised the available literature on expectations formation by noting that 'children's educational expectations have strong effects on school performance and educational attainment'. Those who do not expect to complete high school are unlikely to put in much effort at school. Instead, they are likely to focus on paid work experience or, while they are at school, on non-academic activities.

There may not be anything inherently wrong with this alternative focus. If expectations are formed rationally and are well informed, then focusing on work experience or even social/sporting activities while at school makes economic sense for those who are unlikely to complete Year 12. However, issues are likely to arise if expectations are formed with incomplete or misleading information. Given that Cheng and Starks also showed that 'children's educational expectations vary by racial group' (2002, p.306) and are strongly influenced by the characteristics of one's peers, parents and teachers, there is a strong possibility that this is indeed the case.

Given the way in which expectations are formed, it is quite likely that an Indigenous youth aged 15 years would be less likely to expect to complete Year 12 than a non-Indigenous counterpart. Initial analysis of Wave 1 of LSAY supports this supposition. On the one hand, 74.3% of Indigenous students in

the sample expect to complete Year 12. That nearly three in four Indigenous youths expect to complete Year 12 is a sign of the commitment of the population to education, despite the varied constraints that they face. However, this figure is significantly and substantially lower than the 83.8% of non-Indigenous 15-year-olds who expect to complete Year 12.

There are two potential reasons why a population subgroup may, on average, have lower expectations. First, their actual objective probability of completion may be lower due to their average academic ability, their access to secondary schools, financial and other support from their parents, and other observable characteristics. That is, they are making a rational prediction based on what they know about themselves. Alternatively, they may have more pessimistic expectations even after controlling for these factors. The policy response to such low expectations will vary, depending on which of these two explanations dominates. If it is because of observable characteristics, then it is these characteristics that should ideally be targeted. However, if there are still differences once other characteristics have been controlled for, then the formation of expectations is itself a legitimate target for government policy.

Age, gender and geographic location do not explain all of the difference in expectations, as a non-Indigenous Australian male aged 15 years who was born in Australia and who lives in a major city has a predicted probability of expecting to complete Year 12 of 0.752. An Indigenous Australian with otherwise identical characteristics has a predicted probability of 0.697, a difference of 0.055. Given that Indigenous Australians are more likely to live in provincial and remote Australia (lower probability) and much less likely to be born overseas or to have a parent born overseas (higher probability), the average difference between Indigenous and non-Indigenous Australians is likely to be greater than the marginal effect.

However, there is no significant difference between Indigenous and non-Indigenous Australians in terms of expected completion of Year 12 once language spoken at home, parental education and parental occupation are controlled for. Although the marginal effect is still negative, it is not significant even at the 10% level of significance – a reasonably conservative criterion, given the sample size. More detailed modelling would suggest, therefore, that observable characteristics are associated with low expectations. Furthermore, once an even greater range of at-school characteristics are controlled for, Indigenous Australians are estimated to be more likely to expect to complete Year 12. It is true that there is a strong potential for these variables to be endogenously determined. For example, those who do not expect to complete Year 12 may be less happy (because they see less reason to attend school), have lower test scores (because they have put in less effort up until age 15) and attend schools with lower average attendance (because the costs associated with finding alternative schools may not outweigh the benefits).

Separating these endogenous relationships is an area of important future research, using additional information in LSAY or alternative data sources. Nonetheless, one can be reasonably confident that an Indigenous youth is at least as likely to expect to complete Year 12 as a non-Indigenous Australian with otherwise identical characteristics.

Having identified the fact that Indigenous Australians are at least as likely to expect to complete Year 12 as non-Indigenous Australians (conditional on their socioeconomic and other characteristics), we next consider whether school completion and school outcomes (conditional on completion) vary. Results presented in the support document show that by Wave 4 an Indigenous Australian in the sample is more likely to have dropped out of school before completion than a non-Indigenous Australian (conditional on age, gender and broad geographic classification).

It is useful to look at some specific estimations to put these results in perspective. For a non-Indigenous male aged 18 years, the predicted probability of having dropped out of school by Wave 4 was 0.215. For an Indigenous male of the same age, on the other hand, the probability increases to 0.324, a difference of 0.109. The difference falls slightly when language and socioeconomic status are controlled for, but is still large, relative to other variables, and statistically significant at the 1% level of significance. It should be noted however that, while the marginal effect is still positive and reasonably large, this difference is not statistically significant when sample weights are incorporated.

The issue of sample attrition in LSAY clearly clouds our analysis of school completion. Nonetheless, on balance it would appear that, even after controlling for socioeconomic status, an Indigenous youth is more likely to drop out of school than a non-Indigenous youth.

While this is an important result, the major finding from the analysis of school completion is that differences between Indigenous and non-Indigenous youth disappear once ability (self-assessed and measured through test scores), happiness at school, hours worked and expectations are controlled for. Once again, this lack of difference may be due to differential rates of sample attrition, with Indigenous youth in Wave 1 who are more likely to drop out of school being more likely to be lost from the sample by Wave 4 (due to unobserved reasons). We can't rule out there being a direct impact of Indigenous status on school completion. However, it would appear that other characteristics are at least as important as Indigenous status in explaining school drop-out and perhaps even more so.

Looking at school outcomes (as opposed to school completion), an Indigenous Australian who completes Year 12 has a lower predicted tertiary entrance score than a non-Indigenous person (born in Australia) of the same age and gender. With a coefficient of -8.4, this difference is not only statistically significant, but it is also quite large, relative to the predicted score for the base case (77.0).

Unlike dropping out of school, there is still a significant difference between Indigenous and non-Indigenous Australians after controlling for a number of components of the expanded human capital model discussed earlier in this paper. These extra variables explain a large amount of variance and have the expected signs. Those who assessed their own ability relatively highly have a higher score on average, whereas those who worked five hours or more in paid employment (and especially 15 hours or more) had a lower score. Finally, those who had a higher test score at the age of 15 years had a higher tertiary entrance ranking when they completed Year 12. These results are not surprising. However, the important thing to note is that, even after controlling for a relatively rich set of observed characteristics, Indigenous Australians who complete Year 12 do so with a lower score on average.

Taking these two sets of results together, the policy implications are reasonably clear. In order to reduce the gap in Year 12 completion between Indigenous and non-Indigenous Australians, the main focus of government policy should be on the years leading up to late secondary school. Early childhood education (both before a child commences school and in the early years), as represented by self-assessed ability and test scores, as well as how happy a youth is at school, are important factors.

While focusing on the early years (and continuing current initiatives) might go some way to achieving one of the Council of Australian Governments targets (Year 12 completion), it would not sufficiently reduce the socioeconomic disadvantage caused by education disparities. There is still a sizable gap in tertiary entrance scores between Indigenous and non-Indigenous Australians that is not eliminated once a rich set of characteristics at the age of 15 are controlled for. Analysis of LSAY therefore supports the conclusions from Cunha et al. (2006) that early childhood education is crucial. However, the results also show that gaps between Indigenous and non-Indigenous Australians in terms of school outcomes, as opposed to school completion, can still widen in the latter years of school.

# Post-school study and qualifications: research questions 9, 10 and 11

The Closing the Gap targets discussed at the start of this paper follow a life course approach and move from access to early childhood education to literacy and numeracy outcomes to Year 12 completion (or equivalent). However, education participation clearly does not end at school. According to 2006 census data, 34.3% of the population aged 20–24 years were attending some form of education. Furthermore, results discussed earlier showed that those who had completed some form of post-school study had significantly and substantially improved economic and social outcomes compared with those who had not (even after controlling for school completion).

Closing the gap in high school completion between Indigenous and non-Indigenous Australians would probably lead to substantial improvements in Indigenous outcomes. However, gaps between the Indigenous and non-Indigenous population in terms of life expectancy and employment (two of the other Closing the Gap measures), as well as broader notions of wellbeing, would likely remain large unless there was relative improvement in post-school attainment.

Just as with high school expectations, students who expect to undertake post-school studies are likely to act accordingly, through the subjects chosen at school and the effort devoted to these subjects. According to census data presented in Biddle (2010), 23.9% of Indigenous Australians aged 15 years and over (who are not currently attending school) have completed Year 12. It is likely, therefore, that an Indigenous youth knows a range of people who have completed Year 12, making it a realistic prospect for them. However, only 4.4% of Indigenous adults had completed a degree in 2006, with an additional 3.7% having a diploma as their highest level of qualification. An Indigenous youth is therefore much less likely to come into regular contact with someone with advanced post-school qualifications, making it seem much less attainable.

Bivariate comparisons of data from the 2006 LSAY show that Indigenous youth are indeed less likely to expect to undertake post-school studies than their non-Indigenous counterparts. Specifically, 47.1% of Indigenous respondents in the sample expected to either go to university, TAFE (technical and further education) or a vocational education and training (VET) institute, or undertake some other study or training in the year immediately after leaving school. This is compared with 59.5% of the non-Indigenous sample. Of those Indigenous youth who did expect to undertake one of these options, only 68.6% expected to undertake a degree. While this is higher than the percentage who would end up doing so, it is significantly and substantially lower than the comparable figure for non-Indigenous youth (79.6%).

Indigenous youth would appear, therefore, to be less likely to expect to undertake post-school study in general and university studies in particular compared with their non-Indigenous counterparts. Once again, though, the more policy-relevant question is whether these differences hold after controlling for other observed characteristics. After controlling for demographic and geographic components only, Indigenous Australians are significantly and substantially less likely to expect to undertake post-school education after leaving school. Specifically, around 48% of non-Indigenous males living in a

major city are predicted to expect to undertake post-school qualifications. This falls to around 41% for Indigenous males in major cities, a predicted difference of 7.2%.

Those students who were living in remote Australia at the time of the survey were also substantially less likely to expect to undertake post-school qualifications. In addition to the direct association between Indigenous status and post-school expectations, therefore, expectations for the average Indigenous Australian are likely to be substantially lower than those of the average non-Indigenous Australian.

Furthermore, this difference in expectations is not driven by the relative socioeconomic background of Indigenous youth. Although those children whose parents have relatively high levels of education and/or are managers and professionals are more likely to expect to undertake post-school qualifications, the difference in predicted probabilities between Indigenous and non-Indigenous Australians does not change substantially once these characteristics are controlled for. However, the differences between Indigenous and non-Indigenous youth do disappear once other school-level characteristics are controlled for.

Indigenous Australians who expect to undertake post-school qualifications are significantly less likely to expect to undertake university (as opposed to TAFE, VET or other studies) once demographic, geographic and socioeconomic factors are controlled for, but not after controlling for school-based factors. Once again, it would appear that it is observable characteristics, rather than Indigenous status per se which shape education expectations. While many of these observable characteristics are likely to be influenced by Indigenous status, by the time a student reaches school-leaving age, it is these observable characteristics rather than Indigenous status which should be the focus of any policies that aim to improve expectations.

While the results are explained to a certain extent by observable characteristics, the results from Wave 1 of LSAY nonetheless show that Indigenous Australians are less likely to expect to undertake post-school study. According to data from Waves 2–4 of the 2006 LSAY, these low expectations are reflected in low participation. Specifically, 39.4% of the Indigenous sample was undertaking some form of study in their first year after leaving school. This percentage is quite high in historic terms and, assuming it led to some form of qualification, would be likely to result in a significant improvement in education levels relative to earlier cohorts of Indigenous Australians. However, Indigenous youth are likely to be competing in the labour market with non-Indigenous youth as opposed to older Indigenous Australians. Comparisons to this population are less positive, with 56.2% of the non-Indigenous sample undertaking some form of study in their first year after leaving school.

One might think that this difference is due to Indigenous Australians being less likely to have completed Year 12 than their non-Indigenous counterparts (as demonstrated earlier in this paper). However, although those who have completed Year 12 are more likely to undertake some form of post-school study in their first year out of high school than those who did not, the differences between Indigenous and non-Indigenous Australians in the LSAY sample stay more or less constant. The percentage of Indigenous Australians who had completed Year 12 and who were undertaking some study was 42.4%, compared with 58.8% of the comparative non-Indigenous group. Regardless of school completion, Indigenous Australians are less likely to undertake post-school study than their non-Indigenous counterparts.

These results are replicated in the econometric analysis presented in the support document. Specifically, after controlling for basic demographic and geographic variables, an Indigenous student is significantly and substantially less likely to pursue any form of study in the year after leaving

school. Controlling for a range of socioeconomic factors reduces the magnitude of this difference (from -0.117 to -0.090), but the coefficient on Indigenous status still stays significant at the 1% level of significance. Finally, even after controlling for a range of observable characteristics of the individual at age 15 (including expectations and test scores), as well as the highest year of schooling they completed, an Indigenous youth is significantly and substantially less likely to undertake post-school study than a similar non-Indigenous youth.<sup>3</sup>

While study is defined quite broadly and Wave 4 data do not allow us to consider those who return to study in the many years after leaving school, the results give reasonably strong evidence that Indigenous youth are much less likely to study in their first year out of school.

While earlier analysis in this paper showed that there were potentially high benefits from all forms of post-school study, it was clear that those who have completed a university degree tended to have the best outcomes. This was especially the case for the economic variables in the analysis. Focusing on those students who completed Year 12 and obtained a tertiary admissions rank, we can see that once Indigenous students obtain a university entrance score they go to university with about the same probability as non-Indigenous students and may also attend at higher rates, conditional on their score. This gives *prima facie* evidence that the policy focus should be on the reasons why Indigenous students are less inclined to study towards a university entrance score, as well the reasons for their receiving lower scores on average, rather than on those students who have already received a score.

The range of student wellbeing questions in LSAY is much smaller for tertiary as opposed to secondary school students. One question however that summarises student wellbeing reasonably well is whether the student agrees that they really like being a student. This question is asked only of those students studying for a tertiary qualification and only in their first year of study. Pooling the data from those students who were in their first year of study in Waves 3 and 4, there were 2792 respondents in LSAY who answered this question. Of these, 95.9% of Indigenous students agreed or strongly agreed that they really liked being a student, compared with 90.7% of non-Indigenous responders. While this difference was reasonably large, it was statistically significant at the 10% level of significance but not the 5% level. So, while the standard errors are quite large and the percentage is estimated without too much precision, there is weak evidence that Indigenous students are at least as happy being a tertiary student as their non-Indigenous counterparts and perhaps even more satisfied.

This finding in LSAY echoes similar results to those in National Centre for Vocational Education Research (NCVER 2010) statistics with regards to VET. Using data from the Student Outcomes Survey, NCVER (2010) showed that a higher percentage of Indigenous graduates reported that they were satisfied with the overall quality of training compared with non-Indigenous Australians (91.5% compared with 88.8%). Furthermore, a slightly higher percentage reported that their training fully or partly achieved their main reason for doing the training (87.1% compared with 85.2%).

It is not possible to rule out the possibility that the differences found using LSAY and the Student Outcomes Survey are due to non-sampling error. LSAY has quite high rates of sample attrition for the Indigenous population and the survey relies on students opting into the sample. It is probable that those Indigenous Australians who are unhappy with their schooling experience are less likely to be part of the survey than those who are relatively happy. However, for this to be biasing the results, the differences would need to be greater than the differences for the non-Indigenous population.

---

<sup>3</sup> While the size of the marginal effect is similar, the coefficient on Indigenous status is no longer significant when sample weights are used in the analysis. Clearly, there are issues relating to the precision of the estimates when using four waves of LSAY data, given the level of sample attrition for the non-Indigenous population.

Nonetheless, to the extent to which LSAY (and the Student Outcomes Survey) provide our best available evidence, we need be less concerned about the enjoyment Indigenous Australians have as tertiary students than with other reasons for low participation.



# Discussion and conclusions

With such a wide range of research questions considered, it is difficult to draw out one or two main conclusions from the analysis. However, there were a number of key themes that recurred throughout the paper. The first of these is that geographic, demographic and socioeconomic characteristics matter when explaining Indigenous education participation and achievement, but they do not tell the entire story.

It is true that Indigenous Australians in non-remote areas appear to have higher predicted benefits from education across a number of domains. However, benefits were still found to be high in remote areas. Similarly, analysis of census data showed that controlling for the geographic distribution of the Indigenous population explained less than half of the difference in education participation between Indigenous and non-Indigenous Australians. Remoteness and socioeconomic status were also found to be significant in a number of the econometric regressions using LSAY. However, even after controlling for them, differences between Indigenous and non-Indigenous Australians often remained.

A second major finding from the analysis was that constraints on education participation and achievement appear to start early. Indigenous children in their first year of school were identified as being more likely to be developmentally vulnerable in all 15 of the domains included in the Australian Early Development Index. Controlling for prior preschool participation eliminated only a small part of this difference. Access to preschool education is one of the most obvious (and arguably easiest to use) policy levers available to the government. However, access to preschool alone is unlikely to improve school readiness. A convincing argument can be made that schools need to be more accommodating of Indigenous difference. However, difficult questions will continue to need to be asked about how prepared Indigenous students are for school and whether there is more that governments can do to help Indigenous students start school with equal chances of success.

Not only do constraints start early in life, they also have long-lasting effects. Indigenous children are less likely to attend preschool and less likely to attend private schools than non-Indigenous children, both of which have been shown in other analysis to have benefits for students beyond selection effects. This explains in part why Indigenous Australians had lower measured academic ability at the age of 15 years (as documented in De Bortoli & Thomson 2010). However, what the results presented in this paper have shown is that this measured ability explains much of the difference in education outcomes for those 15-year-olds and later in life. Controlling for them effectively eliminates the gap in confidence, expectations (in terms of both high school and post-school study) and the probability of dropping out of school. It also reduces the gap in tertiary acceptance rank and post-school study. While it may seem obvious, it bears repeating that, by the time an Indigenous student reaches 15 years, much of the explanation for their school outcomes has already been written. That is not to say that interventions late in secondary school cannot be successful. Rather, the results imply that these interventions are likely to be quite costly and difficult to make effective.

If the above was the main contribution of the paper, then readers might come away either somewhat depressed or shaking their heads saying 'yes, but we already knew most of this'. However, in our view, one of the main contributions was to eliminate a number of potential explanations for low Indigenous education, or at least provide strong evidence that they are unlikely to be the main factor. We showed that the benefits of education appear to be quite high even amongst a number of social outcomes and even in remote areas. We also showed that Indigenous students are at least as happy at school and in tertiary institutions as non-Indigenous students and probably even happier.

A final point to note from the empirical analysis is that statistical significance shouldn't be confused with determinism. It is true that (in the absence of controls) Indigenous Australians have lower expectations than their non-Indigenous counterparts. However, around three-quarters (74.3%) of Indigenous 15-year-olds still expect to complete Year 12 and almost half (47.1%) expect to undertake further study immediately after school. Many of these students will meet their expectations. There are many Indigenous Australians successfully engaged with education, despite the many impediments they may face. In 2006, there were 9275 Indigenous children enrolled in preschool, 140 389 Indigenous school students, 67 841 attending VET, and 8854 attending university (Department of Education, Employment and Workplace Relations 2008). With an estimated resident population of only 517 174 people, this represents a significant investment in education.

Despite this investment, the fact remains that Indigenous Australians are still less likely to undertake and complete high school and post-school studies. In answering the research questions posed at the start of this paper, our analysis has identified some of the potential reasons for this, while showing that others are unlikely to be the dominant factor. However, the research questions covered in this paper were deliberately chosen because they were at least in part answerable with the data available. Many other important research questions remain unanswered. For example:

- What is the size of the direct effect of education on Indigenous outcomes and how much of the observed difference is due to the fact that those who would otherwise do well in the mainstream economy and society are those who undertake formal education?
- Does the positive association with preschool attendance last beyond the first year of school and is there a causal effect of preschool on school outcomes, or does the association simply reflect the background characteristics of those who attend?
- Do the schools that Indigenous Australians attend and the peers to whom they are exposed influence later education outcomes?
- Is discrimination in the labour market a significant deterrent for Indigenous Australians contemplating completing high school or undertaking post-school study?

Perhaps, however, the most important question is what specific policies or interventions will encourage an Indigenous child or youth who would otherwise drop out of school or post-school study to attend or complete school. To answer this and other important research questions, new data are needed. Some of these data could be collected through cross-sectional databases. However, most will need to be collected through longitudinal databases or through ethically and rigorously conducted randomised controlled trials. Creative uses of administrative datasets will help to contain the costs and respondent burden somewhat. However, administrative datasets will only take the policy and research community so far.

With such a large focus on Indigenous education policy in Australia and considerable resources devoted to improving the overall wellbeing of the Indigenous population, all levels of government should be steadfastly committed to doing so in the most effective, efficient and equitable way possible. A strong commitment to data collection and dissemination is the most effective way to design policy that meets these three aims.

# References

- Ahmad, OE, Boschi-Pinto, C, Lopez, AD, Murray, CJL, Lozano, R & Inoue, M 2000, *Age standardization of rates: a new WHO standard*, GPE discussion paper no.31, World Health Organization, Geneva.
- Akerlof, GA & Kranton, RE 2002, 'Identity and schooling: some lessons for the economics of education', *Journal of Economic Literature*, vol.40, no.4, pp.1167–201.
- Arrow, KJ 1973, 'Higher education as a filter', *Journal of Public Economics*, vol.2, no.3, pp.193–216.
- Austen-Smith, D & Fryer, RG 2005, 'An economic analysis of 'acting white'', *Quarterly Journal of Economics*, vol.120, no.2, pp.551–83.
- Baumeister, RF & Muraven, M 1996, 'Identity as adaptation to social, cultural and historical context', *Journal of Adolescence*, vol.19, no.5, pp.405–16.
- Becker, GS 1964, *Human capital*, National Bureau of Economic Research, New York.
- Biddle, N 2007, 'Indigenous Australians and preschool education: who is attending?', *Australian Journal of Early Childhood*, vol.32, no.3, pp.9–16.
- 2010, 'A human capital approach to the educational marginalisation of Indigenous Australians', Centre for Aboriginal Economic Policy Research working paper series no.67, ANU, Canberra.
- 2011, 'An exploratory analysis of the Longitudinal Study of Indigenous Children', Centre for Aboriginal Economic Policy Research working paper series no.77, ANU, Canberra.
- Biddle, N & Yap, M 2010, *Demographic and socioeconomic outcomes across the Indigenous Australian lifecourse: evidence from the 2006 census*, Centre for Aboriginal Economic Policy Research research monograph no.31, ANU E Press, Canberra.
- Cheng, S & Starks, B 2002, 'Racial differences in the effects of significant others on students' educational expectations', *Sociology of Education*, vol.74, no.4, pp.306–27.
- Cunha, F, Heckman, JJ, Lochner, L & Masterov, DV 2006, 'Interpreting the evidence on life cycle skill formation', in *The handbook of the economics of education*, eds E Hanushek & F Welch, Elsevier Science, Amsterdam.
- De Bortoli, L & Thomson, S 2010, *Contextual factors that influence the achievement of Australia's Indigenous students: results from PISA 2000–2006*, ACER Press, Camberwell.
- Department of Education, Employment and Workplace Relations 2008, *National report to Parliament on Indigenous education and training, 2006*, DEEWR, Canberra, viewed March 2010, <[http://www.dest.gov.au/NR/rdonlyres/C7CB8111-A9D3-4F54-9028-8484A3817089/24215/2006\\_NRPReportFINAL\\_WEB.pdf](http://www.dest.gov.au/NR/rdonlyres/C7CB8111-A9D3-4F54-9028-8484A3817089/24215/2006_NRPReportFINAL_WEB.pdf)>.
- Dockery, AM 2010, *Education and happiness in the school-to-work transition*, NCVER, Adelaide.
- Dominitz, J & Manski, CF 1996, 'Eliciting student expectations of the returns to schooling', *Journal of Human Resources*, vol.31, no.1, pp.1–26.
- Duckworth, AL & Seligman, MEP 2005, 'Self-discipline outdoes IQ in predicting academic performance of adolescents', *Psychological Science*, vol.16, no.12, pp.939–44.
- Department of Families, Housing, Community Services and Indigenous Affairs 2009, *Closing the gap on Indigenous disadvantage: the challenge for Australia*, FaHCSIA, Canberra.
- Fordham, S & Ogbu, J 1986, 'Black students' school success: coping with the burden of acting white', *The Urban Review*, vol.18, no.3, pp.176–206.
- Hartog, J & Oosterbeek, H 1998, 'Health, wealth and happiness: why pursue a higher education?', *Economics of Education Review*, vol.17, pp.245–56.
- Heckman, JJ & Masterov, DV 2005, *The productivity argument for investing in young children*, viewed 25 March 2010, <<http://jenni.uchicago.edu/Invest/>>.
- Hirschman, C, Lee, JC & Emeka, AS 2003, 'Explaining race and ethnic disparities in educational ambitions', paper presented at a Washington State Project workshop, University of Washington, Seattle.
- Khoo, ST & Ainley, J 2005, *Attitudes, intentions and participation*, LSAY research report no.41, viewed August 2011, <[http://research.acer.edu.au/lsay\\_research/45](http://research.acer.edu.au/lsay_research/45)>.
- Le, AT & Miller, PW 2003, 'Choice of school in Australia: Determinants and consequences', *Australian Economic Review*, vol.36, no.1, pp.55–78.
- Mare, RD 1991, 'Five decades of educational assortative mating', *American Sociological Review*, vol.56, no.1, pp.15–32.
- Marks, G 1998, *Attitudes to school life: their influences and their effects on achievement and leaving school*, LSAY research report no. 5, viewed August 2011, <[http://works.bepress.com/gary\\_marks/25](http://works.bepress.com/gary_marks/25)>.

- Munns, G & McFadden, M 2000, 'First chance, second chance or last chance? Resistance and response to education', *British Journal of Sociology of Education*, vol.21, no.1, pp.59–75.
- NCVER (National Centre for Vocational Education Research) 2010, *Australian vocational education and training statistics: Indigenous students 2010*, NCVER, Adelaide, viewed August 2011, <<http://www.ncver.edu.au/publications/2393.html>>.
- Parbury, N 1999, 'Aboriginal education: a history', in *Teaching Aboriginal studies*, ed. R Craven, Allen and Unwin, Sydney.
- Ryan, C & Watson, L 2004, *The drift to private schools in Australia: understanding its features*, CEPR discussion paper no.479, Centre for Economic Policy Research, ANU, Canberra.
- Schwab, RG 1999, *Why only one in three? The complex reasons for low indigenous school retention*, Centre for Aboriginal Economic Policy Research research monograph no.16, ANU, Canberra.
- Spence, M 1973, 'Job market signaling', *The Quarterly Journal of Economics*, vol.87, no.3, pp.355–74.
- Vella, F 1999, 'Do Catholic schools make a difference? Evidence from Australia', *Journal of Human Resources*, vol.34, pp.208–4.
- Wehlage GG & Rutter RA 1986, 'Dropping out: how much do schools contribute to the problem?', *Teachers College Record*, vol.87, pp.374–92.
- Willis, P 1977, *learning to labour: how working class kids get working class jobs*, Saxon House, Farnborough, England.
- Wolfe, B & Haveman R 2001, 'Accounting for the social and non-market benefits of education', in *The contribution of human and social capital to sustained economic growth and well-being*, ed J Helliwell, University of British Columbia Press, Vancouver.

# NVETR Program funding

This work has been produced by NCVET under the National Vocational Education and Training Research and Evaluation (NVETRE) Program, which is coordinated and managed by NCVET on behalf of the Australian Government and state and territory governments. Funding is provided through the Department of Industry, Innovation, Science, Research and Tertiary Education.

The NVETRE program is based on priorities approved by ministers with responsibility for vocational education and training. This research aims to improve policy and practice in the VET sector. For further information about the program go to the NCVET website <<http://www.ncvet.edu.au>>. The author/project team was funded to undertake this research via a grant under the NVETRE program. These grants are awarded to organisations through a competitive process, in which NCVET does not participate.

# Support document details

Additional information relating to this research is available in *Potential factors influencing Indigenous participation and achievement: support document*. It can be accessed from NCVER's website <<http://www.ncver.edu.au/publications/2560.html>>. It contains:

- Analysis of the 2008 National Aboriginal and Torres Strait Islander Social Survey
- Analysis of the 2006 Census of Population and Housing
- Analysis of the Australian Early Development Index
- Analysis of the Longitudinal Surveys of Australian Youth: Wave 1
- Analysis of the Longitudinal Surveys of Australian Youth: Waves 1–4
- Data limitations and data needs
- References
- Appendix A: Data table





National Centre for Vocational Education Research Ltd  
Level 11, 33 King William Street, Adelaide, South Australia  
PO Box 8288, Station Arcade, SA 5000 Australia  
Telephone +61 8 8230 8400 Facsimile +61 8 8212 3436  
Website [www.ncver.edu.au](http://www.ncver.edu.au) Email [ncver@ncver.edu.au](mailto:ncver@ncver.edu.au)