

# Longitudinal Surveys of Australian Youth (LSAY) analysis: literature review

## Final report

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Prepared by the National Centre for Vocational Education Research  
on behalf of the Australian Government Department of Education,  
Skills and Employment.



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# About the research

## *Longitudinal Surveys of Australian Youth literature review*

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The COAG Education Council has commissioned a review of senior secondary pathways into work, further education and training to examine how senior secondary students can better understand and be enabled to choose the most appropriate pathway to support their transition into work, further education and/or training. The review is centred around five key areas for consideration, outlined under the Terms of Reference for the review (refer <https://www.pathwaysreview.edu.au>) or appendix 1.

As part of the review, the Australian Government Department of Education, Skills and Employment<sup>1</sup> has asked the National Centre for Vocational Education Research (NCVER) to undertake a literature review of existing Longitudinal Surveys of Australian Youth (LSAY) research to provide insights of relevance to the Terms of Reference, as well as identifying key messages and themes for consideration. The literature review has also examined other ‘grey literature’ covering the same timeframe, including reports, working papers, government documents, white papers and evaluations.

The literature review was made up of close to 350 pieces of official research and more than 110 grey literature publications. A comprehensive list of each of the publications assessed for the purpose of this report has been provided in a separate document.

In conducting the literature review, it was apparent there were factors that have limited the usefulness of the findings, including that the research is generally dated, primarily because there was no 2012 cohort and the 2015 cohort has only recently left school. This in turn means that there is limited research into the outcomes associated with the introduction of legislated changes to compulsory secondary school age participation requirements (“earn or learn policies”) in each jurisdiction, as well as the impact of the uncapping of university places, over the last decade or so.

In acknowledging the above constraints of dated research and specificity of this project to LSAY research only, NCVER has compiled a supplementary report using additional data and findings from recent (unpublished) research to provide recency, and broaden the scope above and beyond LSAY research.

Simon Walker  
Managing Director, NCVER

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<sup>1</sup> Formerly known as the Australian Government Department of Education

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# Background

## The Longitudinal Surveys of Australian Youth

The Longitudinal Surveys of Australian Youth (LSAY) are a series of nationally representative surveys of young people that follow their transitions from compulsory schooling to post-school education and employment.

The content of the LSAY datasets can be loosely organised into four major areas:

- Demographics, such as gender, country of birth, indigeneity, socioeconomic status, and parents' education and occupation levels
- Education, including school characteristics, subject choice, post-school plans, higher education, and vocational education and training (VET)
- Employment, including hours worked, wages and benefits received, job-seeking methods, and job satisfaction
- 'Social', which broadly includes living arrangements, marital status, financial difficulties, volunteering activities, and life satisfaction.

To date, there have been six LSAY cohorts: the first began in 1995 and is referred to as Y95; further cohorts commenced in 1998, 2003, 2006, 2009, and 2015. These are referred to as Y98, Y03, Y06, Y09, and Y15 respectively. The Y95 and Y98 cohorts were drawn from representative samples of Year 9 students, with an average age of 14.5 years. Since 2003, LSAY participants have commenced the program at age 15 years, when they participate in the Programme for International Student Assessment (PISA) while at school. Respondents are then interviewed once per year for a further 10 years, taking part in their final surveys at age 25.

LSAY aims to understand the pathways young people take and as a longitudinal survey provides a robust data set from which to explore the transitions from school to work. However, there can be a natural lag in longitudinal research being released due to the length of time taken to collect the data – which for labour market outcomes can be the full eleven years – and then the time needed for researchers to investigate and publish.

## Limitations

The literature review looked at extant LSAY research and grey literature conducted from 1996 to the present focusing on the key review questions. What was noteworthy during the literature search phase was that the extent of research relating to use of the survey and its results somewhat declined in more recent years, possibly limiting our understanding of the more recent post-secondary school experience of young people. This decline can be at least partly explained by a few factors.

There was no Y12 cohort conducted in the LSAY survey which could have provided more recent insight into pathways as these participants would now be nearing the end of their time in LSAY, and the data isn't yet available for longitudinal analysis for the most recent Y15 cohort. This has meant that a significant amount of relevant research and analysis is now nearing 10-15 years old.

In addition, a once off injection of research funding was made through the Research Innovation and Expansion Fund (RIEF) during the 2000's which increased the output at that time, including published reports and scholarly articles. This was an initiative of the former Department of Education, Employment and Workplace Relations (DEEWR) to complement the LSAY program, and NCVET was contracted by the Department to manage and implement the program with the purpose of increasing

the quantity, quality, distribution and accessibility of independent research and analysis using LSAY data within the academic and public policy communities.

Further, the nature of the LSAY contract itself has changed over time more toward a focus on improvements in sample maintenance, data access and reporting and client engagement than on undertaking specific research which was a feature of much earlier contracts with both NCVET and the former contractor the Australian Council for Educational Research (ACER).

# Key messages for consideration

Aspirations of young people and their ‘influencers’ especially parents still focus unevenly on higher education pathways despite evidence that VET occupational pathways are in increasing demand in the Australian workforce. In addition, student’s aspirations are sometimes unrealistic and don’t always match with available opportunities in the labour market. Enhancing opportunities for VET as a comparable pathway to good jobs (as well as higher education) and increasing future opportunities for achieving degrees through VET study may be important in developing student’s interest and participation in the VET sector.

Traditional perceptions that completing senior secondary school and undertaking higher education study naturally lead to better outcomes don’t necessarily hold true for all young people. Undertaking an alternative pathway such as an apprenticeship or full-time work can be a more suitable option for some rather than staying at school. Ensuring adequate information on alternative opportunities is available and promoting awareness of the implications of early school leaving can be beneficial.

A range of ‘practical factors’ are important in influencing the choices of post-secondary pathways for young people. These include cost of education – compounded by their ability to cover living expenses while undertaking education and training, proximity of education and training in relation to their home, particularly for young people who have limited access to transport, available options open to them and the quality of education providers in their area. Focussing on these factors in addition to the more aspirational and/or perceptual issues can help young people to make good transitions.

Barriers to students accessing all pathways equitably do exist and evidence from LSAY indicates there are inequities to accessing tertiary education particularly for young people from lower socio-economic circumstances, Indigenous Australians and those living in geographically remote areas. School-related effects such as location, class size, student-teacher ratios and co-educational status additionally influence likelihood of going to university and tertiary education rank. Other factors seem to play less of a role, including migrant background or financial stress. Of significance too are barriers to finding full-time employment with a significant proportion of young people indicating they lack the relevant practical work experience or technical skills needed. A focus on mediating some of the school-related effects can in part improve equity of access and educational persistence for young people and building enterprise skills such as problem solving, communication and teamwork coupled with work experience can accelerate successful transitions to full-time work.

Schools play a significant role in preparing students for further education and training. However, many students are unclear about VET, conveyed out-dated rather than contemporary portrayals of the sector, and are unclear about the pathway to VET-related occupations, despite career activities in schools which included VET-focused activities. This confusion about vocational training indicates many students lack clear, accurate and contemporary information about the sector. Strategies for addressing perceptions will likely require additional investment in both VET outreach to schools and teacher development.

Career advice provides a vital role in changing perceptions of the VET sector. Furthermore, if teachers and career advisers are to share up-to-date and accurate information with their students and convey positive perceptions of VET, it is critical that they understand the changing face of the VET sector and the career possibilities it provides – in addition to knowledge of higher education options.

# Executive summary

## Introduction

A literature review of LSAY research, guided by the first four terms of reference (ToR) from the Review of Senior Secondary Pathways has uncovered insights relating to senior secondary pathways into work, further education and training which are likely to prompt further discussions. The LSAY research literature review was designed to provide a response to the first four ToR, however, the detailed and specific nature of the ToR mean findings from the literature review are at times relevant across multiple terms or do not neatly fit under the prescribed terms.

In addition, the literature review has been underpinned by two fundamental statements highlighted in the Review of senior secondary pathways into work, further education and training Discussion Paper:

- young people are making poorly informed post-school choices through no fault of their own
- the need to disrupt traditional ways of thinking about pathways to work, further education and training.

## Project implications

As outlined previously, the list of both official and grey literature research publications that use LSAY as the primary dataset is extensive, however, the generally dated nature of many of these publications means conclusions pre-date certain legislative changes and therefore may have implications when trying to align these findings with the current environment.

For this report to identify key themes and messages relating to the transition secondary school students make to further education, training or work based only on the LSAY research literature may not necessarily reflect the current status quo. Based on this, we have compiled a secondary report which draws on a variety of data sources both internal and external to NCVER to complete the picture around student pathways and potentially bridge the gap between available LSAY research and the current state of play for secondary school students.

The limited scope of this report does not, however, negate some of the common themes that have arisen from the literature review with regards to successful and appropriate transitions for students from secondary school to further education, training and work, including:

- early careers advice for both students and parents
- expectations and aspirations that do not necessarily match workforce demand
- undertaking an apprenticeship or full-time work may be more suitable than remaining in school for some
- the lasting impacts of a school's socioeconomic status on student outcomes
- practical factors including cost of education, influenced by living expenses, proximity of education and training, options available and quality of education providers
- misaligned and dated perceptions of VET and VET-related pathways held by students and influencers
- developing clearer alignment between VETiS and workforce demands
- improving student attitudes towards school and engagement with learning.

## Post-school choices

The notion of students making ill-informed post-school choices through no fault of their own is supported by a range of perspectives. The literature review has found these to include aspects such as inappropriate careers advice<sup>2</sup>, parental and peer influence<sup>3</sup>, physical barriers of distance and geography influencing post-school aspirations<sup>4</sup>, the lasting effects of a school's socioeconomic status<sup>5</sup>, and year 12 subject choice extending beyond the simplicity of student selection<sup>6</sup>. Additionally, research by Hillman<sup>7</sup> identified that improving student engagement and attitudes towards schooling may have the flow on effect of better student outcomes.

Careers advice has been highlighted in several studies as an important influencing factor in the decision-making process of young people for post-school pathways, with research suggesting students would benefit from having career advice provided earlier. Thomas and Hillman<sup>8</sup> identified the importance of having a career or strategic plan in determining success later in life, while poor career advice could have an adverse effect on a student's post-school outcomes<sup>9</sup>.

A study by Hillman and Rothman<sup>10</sup> found that just over half (54%) of Year 10 students had a career talk from a TAFE or university representative, while a much higher proportion of Year 12 students (76%) were recipients of this. In addition, talks from TAFE or university representatives were identified as one of the strongest positive influencers on students, aside from school career advisors. When taking into account the proportion of students in Year 10 and Year 12 who receive this type of careers advice (as outlined above), and level of influence it has, it would be valuable to consider findings from Polidano, Tabasso & Tseng<sup>11</sup> that quality careers advice should be incorporated earlier so that early school leavers don't miss out.

When considering the influence of early careers advice, Gemici and colleagues<sup>12</sup> highlighted parental influence as a significantly influential factor on student intentions to complete Year 12, along with plans to attend university and aspiring to higher-status occupations. Students with parents that expected university attendance, had friends intending to complete university, and who experienced positive student teacher relations had a 90% probability of planning to attend university, as opposed

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- 2 Anlezark, Alison, Patrick Lim, Ronnie Semo, and Nhi Nguyen. From STEM to leaf: where are Australia's science, mathematics, engineering and technology (STEM) students heading?, NCVET: Adelaide. 2008. Accessed December 12, 2019. <http://hdl.voced.edu.au/10707/155212>.
  - 3 Gemici, Sinan, Alice Bednarz, Tom Karmel, and Patrick Lim. The factors affecting the educational and occupational aspirations of young Australians. NCVET: Adelaide. 2014. Accessed December 10, 2019. <http://www.lsay.edu.au/publications/2711.html>.
  - 4 Parker, Philip D, John Jerrim, Jake Anders, and Thomas Astell-Burt. "Does living closer to a university increase educational attainment? a longitudinal study of aspirations, university entry, and elite university enrolment of Australian youth." *Journal of youth and adolescence* 45 (6): 1156-1175. 2016. Accessed November 15, 2019.
  - 5 Chesters, Jenny. "Alleviating or exacerbating disadvantage: Does school attended mediate the association between family background and educational attainment?". *Journal of education policy*, first published online 25 June 2018. 2018. Accessed November 19, 2019.
  - 6 Ainley, John. Year 12 subjects and further study. ACER: Melbourne. 2005. Accessed November 13, 2019. <http://www.lsay.edu.au/publications/1900.html>.
  - 7 Hillman, Kylie. Attitudes, intentions and participation in education: Year 12 and beyond. ACER: Melbourne. 2010. Accessed November 14, 2019. <http://www.ncver.edu.au/publications/2316.html>.
  - 8 Thomson, Sue and Kylie Hillman. Against the odds: influences on the post-school success of 'low performers. NCVET: Adelaide. 2010. Accessed November 15, 2019. <http://www.lsay.edu.au/publications/2285.html>.
  - 9 Liu, Shu-Hui and Nhi Nguyen. Successful youth transitions. NCVET: Adelaide. 2011. Accessed November 14, 2019. <http://www.lsay.edu.au/publications/2414.html>.
  - 10 Hillman, Kylie and Sue Rothman. Career advice in Australian secondary schools: use and usefulness. ACER: Melbourne. 2008. Accessed November 14, 2019. <http://www.lsay.edu.au/publications/2080.html>.
  - 11 Polidano, Cain, Domenico Tabasso and Yi-Ping Tseng. "A second chance at education for early school leavers", *Education economics* 23 (3): 358-375. 2012. Accessed December 10, 2019.
  - 12 Gemici, Sinan, Alice Bednarz, Tom Karmel and Patrick Lim. The factors affecting the educational and occupational aspirations of young Australians. NCVET: Adelaide. 2014. Accessed November 14, 2019. <http://www.lsay.edu.au/publications/2711.html>.

to those without these influences who had a 4% probability of this intention. When considering the significant influence of parents, it may be necessary to consider any potential misalignment between parental expectations and labour force needs, with Gemici and colleagues<sup>13</sup> suggesting that career advice be provided to parents in addition to students.

Disparity between workers post-school qualifications and their field of employment has to an extent been reflected in the same study<sup>14</sup>, which highlights a degree of unrealistic employment aspirations among students. Through their research, they identified that although two thirds of students have aspirations of a professional or paraprofessional occupation by aged 30, these types of positions only represent a third of available opportunities. The opposite has been found for clerical or labouring jobs, with few aspiring to these roles compared to the number of opportunities available<sup>15</sup>. These findings link back to the relative importance of ensuring students are provided with appropriate careers advice at a young age, with Nguyen & Blomberg<sup>16</sup> highlighting that educational aspirations at age 15 do not notably change as students grow older.

Research by Parker and colleagues<sup>17</sup> found that the barriers of distance and geography extended beyond the expected disadvantage of decreased access to resources and was also responsible for influencing post-school aspirations among young people. While research by Chesters<sup>18</sup> identified a school's socioeconomic status as a strong predictor of academic achievement and university enrolment, with students from a low socioeconomic background attending a high socioeconomic school performing better on achievement tests and having an increased likelihood of enrolling at university, compared with students of a similar background who attend a low socioeconomic school. In addition, Ainley<sup>19</sup> highlights socioeconomic background coupled with gender, school type and language background influences subject choice in Year 12, and subject choice in Year 12 tends to correspond with a student's chosen field of education in both university and VET.

Interestingly, the study by Curtis & McMillan<sup>20</sup> found the majority of early school leavers were engaged in either full-time employment, education or training at age 17, although this figure was much higher for males (80%) in comparison to females (58%). These authors also argued that early school leaving may at times be based on an awareness of alternative opportunities, and that some groups could have a greater understanding of these alternate opportunities, therefore the provision of quality careers advice may assist increasing awareness among students and their families of the available pathways.

In addition, a number of studies have looked at the effect of Vet in Schools (VETiS) on post-school outcomes with a mix of results. Findings from Anlezark et al<sup>21</sup> indicate that at the top level, VETiS does not necessarily influence student engagement in post-school education, however, for certain subgroups, the effects are more obvious. Specifically, males who study building or engineering as a

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13 Ibid.

14 Ibid.

15 Curtis, David and Julie McMillan. School non-completers: profiles and initial destinations. ACER: Melbourne. 2008. Accessed November 14, 2019. <http://www.lsay.edu.au/publications/2088.html>.

16 Nguyen, Nhi and Davinia Blomberg. The role of aspirations in the educational and occupational choices of young people. NCVET, Adelaide. 2014. Accessed November 15, 2019. <http://www.lsay.edu.au/publications/2710.html>.

17 Parker, Philip D, John Jerrim, Jake Anders, and Thomas Astell-Burt. "Does living closer to a university increase educational attainment? a longitudinal study of aspirations, university entry, and elite university enrolment of Australian youth." *Journal of youth and adolescence* 45 (6): 1156-1175. 2016. Accessed November 15, 2019.

18 Chesters, Jenny. "Alleviating or exacerbating disadvantage: Does school attended mediate the association between family background and educational attainment?". *Journal of education policy*, first published online 25 June 2018. 2018. Accessed November 19, 2019.

19 Ainley, John. Year 12 subjects and further study. ACER: Melbourne. 2005. Accessed November 13, 2019. <http://www.lsay.edu.au/publications/1900.html>.

20 Curtis, David and Julie McMillan. School non-completers: profiles and initial destinations. ACER: Melbourne. 2008. Accessed November 14, 2019. <http://www.lsay.edu.au/publications/2088.html>.

21 Anlezark, Alison, Tom Karmel, and Koon Ong. "Have school VET programs been successful." *Journal for vocational and technical education and training* 5(1): 56-65. 2005. Accessed December 9, 2019.

part of VETiS tended to have the clearest pathway to post-school education. Additional research by Nguyen<sup>22</sup> also highlighted not only poor alignment between VETiS and the workforce/further study requirements, but that many students who do undertake further VET tend to do so in a field unrelated to their VETiS subjects.

Student attitudes towards, and engagement with, school have also been identified through research by Hillman<sup>23</sup> as factors which may influence participation in post-compulsory schooling as well as completing secondary school (through to Year 12). A positive attitude towards school amongst students tends to be underpinned by factors such as supportive teacher student relationships, interest in learning, and valuing learning opportunities external to the school environment.

## Disrupting traditional ways of thinking

The literature review identified findings which could be considered as falling outside the scope of the traditional and expected thought patterns, and therefore deemed as potentially disrupting the current status quo. These findings relate to encouraging apprenticeship participation earlier<sup>24</sup>, and recognising early school leaving as a viable pathway<sup>25</sup>.

The incidence of apprenticeship participation tends to be influenced by a range of factors, including gender, home language and father's occupation, yet participation rates are also higher among students who study VET subject(s) in Year 11 or Year 12, and attend a school with high enrolment levels in technology subjects<sup>26</sup>. Hence, developing and growing trade-related interests, particularly in early schooling, as well as a school curriculum that provides technological studies alongside VETiS programs may be used as a tool to increase apprenticeship participation<sup>27</sup>.

Although LSAY data has been used across many studies to support the belief that completing secondary school is of value for youth transitions, Dockery<sup>28</sup> has argued that it may be unsuitable to view all young people in the same light as some, in essence, are not suited to the schooling environment. Dockery identified that for less academically inclined students, there were no notable benefits for these students to remain in school. In raising this point Dockery was not necessarily arguing in favour of young people leaving school early, rather identifying the importance of alternative pathways such as apprenticeships and appropriate employment opportunities not being ignored for the sake of additional school years. Therefore, Dockery states that policy needs to be designed around the provision of flexible pathways that meet a range of student needs, abilities and preferences, as opposed to simply increasing the levels of education.

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22 Nguyen, Nhi. The impact of VET in Schools on the intentions and achievements of young people. NCVER: Adelaide. 2010b. Accessed November 15, 2019. <http://www.lsay.edu.au/publications/2294.html>.

23 Hillman, Kylie. *Attitudes, intentions and participation in education: Year 12 and beyond*. ACER: Melbourne. 2010. Accessed November 14, 2019. <http://www.ncver.edu.au/publications/2316.html>.

24 Ainley, John, Steve Holden and Sheldon Rothman. *Apprenticeships and traineeships: participation, progress and completion*. ACER: Melbourne. 2010. Accessed November 13, 2019. <http://www.ncver.edu.au/publications/2317.html>.

25 Dockery, Alfred Michael. *Education and happiness in the school-to-work transition*. NCVER: Adelaide. 2010. Accessed November 14, 2019. <http://www.ncver.edu.au/publications/2239.html>.

26 Ainley, John and Matthew Corrigan. *Participation in and progress through New Apprenticeships*. ACER: Melbourne. 2005. Accessed November 13, 2019. <http://www.lsay.edu.au/publications/1842.html>.

27 Ainley, John, Steve Holden and Sheldon Rothman. *Apprenticeships and traineeships: participation, progress and completion*. ACER: Melbourne. 2010. Accessed November 13, 2019. <http://www.ncver.edu.au/publications/2317.html>.

28 Dockery, Alfred Michael. *Education and happiness in the school-to-work transition*. NCVER: Adelaide. 2010. Accessed November 14, 2019. <http://www.ncver.edu.au/publications/2239.html>.

# LSAY literature review – detailed findings

## ToR 1

*Explore the efficacy of senior secondary education in preparing young people for diverse pathways to further learning and work, including:*

- a. identifying from existing curriculum frameworks and relevant research, the essential knowledge, skills and values needed for diverse pathways to life long learning, work and effective participation in civic life.*
- b. identifying the skills and knowledge students, employers, vocational education and training (VET) providers, and higher education institutions perceive are essential for successful post school transitions.*
- c. clarifying the roles and responsibilities of key stakeholders, such as schools, students, parents, VET providers, higher education institutions, and employers, in supporting inclusion and preparing school leavers for life beyond school, whatever pathway they choose.*

### **Key messages**

- Young people who were struggling to find employment said that this was because they didn't possess the relevant vocational and practical work experience, technical skills, or interview and job application skills needed to gain access to full time work
- There is no evidence that low reading proficiency leads to poor labour market outcomes at age 25 or for projected outcomes at 45, which may be due to students with low reading proficiency achieving good VET outcomes or enrolling in courses with good graduate outcomes
- No gender difference in overall high school STEM subject enrolments, but girls are overrepresented in enrolment in life science courses and boys in physical science subjects.
- Only 5% of girls expect a mathematics-intensive career, in comparison with 20% of boys. Although girls do not lag behind boys in ability, they are considerably less confident.
- Although being Indigenous and female are both associated with lower attitudes towards math, Indigenous girls were less negative than their non-Indigenous peers.

Although LSAY considers the pathways young people take from senior secondary education onwards, there are very few questions asking the respondents about specific skills or knowledge. LSAY has only begun looking at soft skills in recent waves and researchers have yet to make advantage of these questions. In response to the first term of reference, we have explored the literature surrounding the skills that are impacting their ability to secure full-time employment, and how reading achievement scores at age 15 are associated with university enrolment, and employment. Finally, as science, technology, engineering and mathematics (STEM) skills have been identified as areas of continuing importance for the Australian workforce, the review considers multiple aspects of STEM, from respondent's self-belief in mathematics, to enrolment in high-school level STEM courses, and associations with university and then career outcomes.

## Problems looking for work

By asking young people who were struggling to find work why they believe they are having difficulty, LSAY can provide valuable insight into the skills needed to transition to employment. A recent report found that while nearly 60% of young Australians held a post-school qualification at age 25, 50% were unable to secure more than 35 hours of work per week<sup>29</sup>. When accounting for activities such as gap years and returning for further education, it took on average 2.6 years to transition from leaving education to full-time employment with an estimated 21% working full-time hours in casual employment, and 18% doing so through multiple jobs. There were multiple self-identified barriers to finding full-time employment with three-quarters believing they don't possess the relevant vocational and practical work experience to gain full-time work, half saying they lack the technical skills needed to gain full-time work, and a quarter saying they lack the necessary interview and job application skills to be able to attain full-time work. Approximately 70% of young people also said that insufficient job availability was a barrier for them to enter the full-time workforce.

The authors identified four factors that could accelerate the transition from full-time education to full-time work: an education that builds enterprise skills; undertaking relevant paid work experience; finding employment in a growing sector; and an optimistic mindset. Enterprise skills such as problem-solving, communication and teamwork were found to increase the rate of earning full-time work by 17 months whereas working 2000 hours in a relevant job could speed up the transition by five months and working 5000 hours accelerated the transition by 12 months.

## PISA

Research using LSAY data has also considered PISA achievement scores which identifies reading proficiency as a crucial skill. In 2018, the Organisation for Economic Co-operation and Development examined data from five countries including Australia, finding that students in the top quartile for PISA reading achievement were 38-53% more likely to complete university than those in the bottom quartile. Six per cent of students in the bottom quartile were unemployed at age 25, compared with just 2% in the highest quartile. Only 14% of students ended up in skilled employment by age 25, compared with 50% in the highest quartile<sup>30</sup>.

Polidano and Ryan<sup>31</sup> looked at the labour market outcomes for young people who had low reading proficiency in school. There was no evidence that low proficiency led to poor outcomes, with no substantial difference in rates of full- and part-time employment and study at age 25 between those with low and medium proficiency in reading. There was also no suggestion that projected outcomes at 45 would be different. Those with low reading proficiency at age 15 may be avoiding labour market disadvantage by achieving good VET outcomes, by enrolling in courses with positive graduate outcomes. Low reading proficiency may drive those students to invest in VET earlier and given the large number of VET courses available which prepare students for specific careers, it may give those students an advantage in early career preparation. The researchers argue that for students who are academically struggling, to achieve the best outcomes, there is a need to ensure VET access for those who find learning difficult in academic settings and to increase career counselling would help in the development of vocational career plans.

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29 Foundation for Young Australians & AlphaBeta. *The new work reality*, FYA new work order report series. Foundation for Young Australians: Melbourne. 2018. Accessed December 10, 2019.

30 Organisation for Economic Co-operation and Development. *Equity in education: breaking down barriers to social mobility*. Programme for International Student Assessment. OECD: Paris. 2018. Accessed December 10, 2019.

31 Polidano, Cain and Chris Ryan. What happens to students with low reading proficiency at 15?: evidence from Australia. Melbourne Institute working paper 33(16). Melbourne Institute of Applied Economic and Social Research: Melbourne. 2016. Accessed December 10, 2019.

## STEM

As LSAY follows respondents for 11 years, researchers have been able to investigate the impact of respondent's self-rated proficiency in STEM skills, and the effect of studying STEM through to post-school choices and outcomes.

Parker et al<sup>32</sup> looked at math self-efficacy (defined as how an individual describes their competence in the math domain) and self-concept (how they evaluate their ability in math subjects). Self-efficacy could predict university entry, suggesting that when academic outcomes were based on progression, such as making the choice to progress to the next level of education, a young person's ratings of self-efficacy became important. However, self-concept could predict whether they selected a STEM course or one from a different domain. Self-efficacy and self-concept were also independent predictors of TER (Tertiary Entrance Rank) even when prior achievement was controlled for.

A common theme in LSAY research has been ongoing female underrepresentation in STEM subject enrolment, degree enrolment, and career orientation, although observed effects depend on the STEM area examined. When viewed in their totality, research has found no gender differences for high school STEM subject enrolment<sup>33</sup>. While the literature tends to agree that females are underrepresented in mathematics, girls are overrepresented in Year 12 life science courses, whereas boys are overrepresented in Year 12 physical science courses<sup>34</sup>. Girls are also more likely to plan a career in the life sciences, whereas boys are more likely to plan a career in physical science.

There is limited evidence to suggest this gender difference is moderated in single-sex schools, but this is likely due to differences in individual characteristics such as academic performance and self-belief rather than the gendered school environment. Increased class time devoted to science study, and improved availability of qualified science teachers increases the likelihood that girls will opt into physical science courses<sup>35</sup>.

Research into gender gaps in mathematics have yielded more consistent findings. Girls are 37% less likely than boys to study advanced mathematics, and only 5% of girls (compared with 20% of boys) expect a mathematics-intensive career. Although girls do not lag behind boys in terms of mathematical ability, they are considerably less confident in their abilities. This lack of confidence is a better explanation for the gender gap in mathematics uptake than any disparity in performance<sup>36</sup>.

Consequently, a significant body of work has sought to explain gender differences in aspirations and subject choice. The selection of high school STEM courses is influenced by self-belief, the value placed by the individual in STEM, attitudes towards mathematics, levels of mathematics-associated anxiety, support from teachers, and prior achievement in both mathematics and science<sup>37</sup>. Students are more likely to enrol in STEM courses if they believe science and mathematics are interesting or enjoyable, for which gender differences exist. Girls have higher levels of mathematics-associated anxiety, and lower self-efficacy, self-concept, interest, and belief in the value of mathematics.

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32 Parker, Philip D, Herbert Marsh, Joseph Ciarrochi, Sarah Marshall and Adel Salah Abduljabbar. "Juxtaposing math self-efficacy and self-concept as predictors of long-term achievement outcomes." *Educational Psychology* 34(1):29-48. 2014. Accessed November 15, 2019.

33 Marsh, Herbert, Brooke Van Zanden, Philip D Parker, Jiesi Guo, James Conigrave, and Marjorie Seaton. "Young women face disadvantage to enrolment in university STEM coursework regardless of prior achievement and attitudes." *American educational research journal* 56(5): 1629-1680. 2019. Accessed November 15, 2019.

34 Sikora, Joanna. "Gender gap in school science: are single-sex schools important?". *Sex roles* 70(9-10): 400-415. 2014. Accessed November 15, 2019.

35 Ibid.

36 Law, Helen. "Gender and mathematics: pathways to mathematically intensive fields of study in Australia." PhD thesis, Australian National university: Canberra. 2017. Accessed November 15, 2019. <http://hdl.handle.net/1885/125139>; Helen Law. 2018, "Gender and mathematics: pathways to mathematically intensive fields of study in Australia." *Advances in life course research* 37: 42-56. Accessed November 15, 2019.

37 Marsh, Herbert, Brooke Van Zanden, Philip D Parker, Jiesi Guo, James Conigrave, and Marjorie Seaton. "Young women face disadvantage to enrolment in university STEM coursework regardless of prior achievement and attitudes." *American educational research journal* 56(5): 1629-1680. 2019. Accessed November 15, 2019.

Conversely, being male and coming from a higher socioeconomic background is associated with positive attitudes towards mathematics. Although girls from low socioeconomic backgrounds have the lowest beliefs in their mathematical abilities, the gender gap in these beliefs becomes larger among students from higher socioeconomic backgrounds<sup>38</sup>. Students who speak only English at home are also less likely to take physical science subjects, whereas first generation migrants are twice as likely to do so<sup>39</sup>.

Several studies have also examined other demographic influences on STEM participation. Self-motivation and interest in working in a STEM career (as measured in Year 9), higher performance in STEM subjects, and the attitudes of the school and science teachers influence the STEM pathway from Year 12 subject choice, to studying STEM post-school and then moving into a STEM career, although males were more likely to be self-motivated and less influenced by other people's attitudes, and also to rely more on their self-assessment of academic strength<sup>40</sup>. This suggests that motivation to study STEM is well developed even before making Year 12 subject choices.

One intriguing finding was that although being Indigenous and being female were both associated with lower attitudes towards math, Indigenous girls were less negative towards math than their non-Indigenous peers. Additionally, Indigenous girls outperformed Indigenous boys in mathematics, in part because they had higher motivation to learn. This, in turn, was driven by the belief that mathematics would benefit them later in life<sup>41</sup>.

Beyond high school, girls are significantly less likely to enrol in STEM university courses. Efforts to attract women to STEM may therefore be better focussed on university study rather than high school study<sup>42</sup>. There is also evidence that STEM study may also be driven by strategies that have little to do with interest or ability. Sikora and Pitt<sup>43</sup> investigated reasons for studying mathematics courses among New South Wales senior secondary students. Students expressed beliefs that some course choice strategies were systematically rewarded, such as enrolling in less intensive mathematics courses in order to improve ATAR.

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38 Van Zanden, Brooke. "Understanding the psychological and social origins of gender disparities in self-beliefs, motivation, and educational attainment." PhD thesis, Australian Catholic University: Sydney. 2018. Accessed November 15, 2019. <https://doi.org/10.26199/5b85dca699796>.

39 Sikora, Joanna. "Gender gap in school science: are single-sex schools important?". *Sex roles* 70(9-10): 400-415. 2014. Accessed November 15, 2019.

40 Anlezark, Alison, Patrick Lim, Ronnie Semo, and Nhi Nguyen. *From STEM to leaf: where are Australia's science, mathematics, engineering and technology (STEM) students heading?*, NCVET: Adelaide. 2008. Accessed December 12, 2019. <http://hdl.voced.edu.au/10707/155212>.

41 Van Zanden, Brooke. "Understanding the psychological and social origins of gender disparities in self-beliefs, motivation, and educational attainment." PhD thesis, Australian Catholic University: Sydney. 2018. Accessed November 15, 2019. <https://doi.org/10.26199/5b85dca699796>.

42 Marsh, Herbert, Brooke Van Zanden, Philip D Parker, Jiesi Guo, James Conigrave, and Marjorie Seaton. "Young women face disadvantage to enrolment in university STEM coursework regardless of prior achievement and attitudes." *American educational research journal* 56(5): 1629-1680. 2019. Accessed November 15, 2019.

43 Sikora, Joanna and David GW Pitt. "Does advanced mathematics help students enter university more than basic mathematics? Gender and returns to Year 12 mathematics in Australia". *Mathematics education research journal*, first published online 22 September 2018. 2018. Accessed November 15, 2019.

## ToR 2

*Investigate whether current certification and university entry requirements, including other credentials such as the International Baccalaureate, assist in allowing students to make the study choices that are right for them to develop the skills and knowledge they need to access the most appropriate pathway into work, further education and/or training.*

### Key messages

- Undertaking VET subjects while at school improves post-school outcomes of Year 11 and Year 12 school leavers who are not university bound.
- There is evidence of poor alignment between the type of VET studied while at school and the requirements of the workforce or with further study, with most students, particularly females, who undertake VET study after school doing so in a field unrelated to that subject.
- Working for five hours per week while at school offers the best balance between improving post-school employment prospects without significantly affecting academic performance.
- Working while at school can lead to increased likelihood of making the transition to being fully engaged in work or study, with this being the biggest advantage for early school leavers.
- The flexibility and need-orientation of the Canadian college system may also help to keep it responsive to changes in the labour market. However, the Australian VET system may function better as a pathway for disadvantaged and underachieving school students which does not exist in the Canadian system.

Working part-time while at school may not be done as part of an entry requirement or for certification, however LSAY data can be used to show how it can affect study and whether it can set young people up for better transitions post-school. No studies located have used LSAY to compare outcomes of respondents who have done International Baccalaureate courses, likely because the sample of respondents from those certifications are so small. An alternative way of comparing pathways comes from contrasting Australia's vocational education system with that of another country who are also involved in PISA. Below we examine a study comparing Australia's VET system with the Canadian Collège d'enseignement général et professionnel (CÉGEP; in English is the College of General and Vocation Education).

### Combining school with work

Working while at school has the potential to give young people valuable experience as well as financial benefits, but students have to balance time spent working with time studying. Although a higher proportion of female students work while at school, male students tend to do so for longer hours. Combining school and work tends to have a negative impact on school as well as post-school study outcomes when students work for more than 20 hours per week. Students who work longer hours tend to be those in pursuit of less academic post-school pathways; it is possible that these students have chosen to pursue a pathway into the workforce over further study<sup>44</sup>.

Working for five hours per week seems to offer the best balance between improving post-school employment prospects without significantly affecting academic performance. Maximum benefits for employment opportunities occurred at 15-20 hours per week for females, and 10-15 hours per week for males.

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44 Anlezark, Alison and Patrick Lim. *Does combining school and work affect school and post-school outcomes?*, NCVER: Adelaide. 2011. Accessed November 13, 2019. <http://www.ncver.edu.au/publications/2398.html>.

There is also some evidence that working while at school can lead to increased likelihood of making a better transition to being fully engaged in work or study, with this being the biggest advantage for early school leavers although still substantial for year 12 completers<sup>45</sup>.

Abhayaratna and colleagues<sup>46</sup> found that out of the surveyed participants who were 15 years old in 2003, around half were working, with 95% part-time. Ninety-eight percent said they were working so they could have spending money of their own. Over 80% said they believed working would assist in finding a job after finishing study, but fewer than 20% said that they would want similar work for their post-education career. Therefore, the part-time work done while at school was not seen as on-the-job training. Students who were working full time were more likely to see future career prospects in the job they were working. When surveyed again in 2007, most students said that their job did not adversely impact their school work, with 90% saying they had enough time to do their homework. However around one third also said that if they were not working, they would spend more time studying and 25% percent thought they would get better marks. Students who were working full-time hours were much more likely to say they would get better marks than those working only part-time.

## VET in schools

LSAY research examining the effectiveness of VET in schools (VETiS) programs can be divided into two categories: those which examine effects on school retention, and those which examine post-school outcomes of participating in VETiS.

The broad profile of the young people who participate in VETiS has not changed over the two decades prior to 2009: they tend to have lower levels of achievement and come from more disadvantaged backgrounds<sup>47</sup>. VETiS programs have positive effects on attitudes towards school and satisfaction with school<sup>48</sup> and improve Year 10 to Year 11 retention<sup>49</sup>. Students who undertake VETiS are more likely to change their intentions to complete Year 12 between Years 9 and 11<sup>50</sup>. However, the post-school plans of students change little between Years 11 and 12, so participation in VETiS programs in the senior years of secondary schooling may be too late to influence post-school plans<sup>51</sup>. In fact, VETiS programs appear to have a small negative effect on Year 11 to Year 12 retention<sup>52</sup>. While there are clear, positive outcomes from participating in VETiS programs for students who leave school before completing Year 12, there do not appear to be any effects for students who complete Year 12<sup>53</sup>.

Taking VETiS subjects does not affect overall engagement in post-school education but does seem to affect the pathway that is followed. While VETiS programs provide a clear pathway for some students, especially boys who study building or engineering, for most students the pathway is not so direct<sup>54</sup>. Students who take VET subjects are more likely to pursue VET study rather than higher education

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45 Deloitte Access Economics. Youth transitions evidence base: 2012 update. Department of Education and Training: Canberra. 2012. Accessed December 10, 2019.

46 Abhayaratna, Joanna, Les Andrews, Hudan Nuch, and Troy Podbury. Part time employment: the Australian experience. Productivity Commission staff research paper. Productivity Commission: Canberra. 2008. Accessed December 9, 2019.

47 Coates, Hamish and Sheldon Rothman. Participation in VET in schools. ACER: Melbourne. <http://www.lsay.edu.au/publications/2120.html>. 2009. Accessed November 14, 2019.

48 Nguyen, Nhi. The impact of VET in Schools on the intentions and achievements of young people. NCVET: Adelaide. 2010b. Accessed November 15, 2019. <http://www.lsay.edu.au/publications/2294.html>.

49 Anlezark, Alison, Tom Karmel, and Koon Ong. "Have school VET programs been successful." *Journal for vocational and technical education and training* 5(1): 56-65. 2005. Accessed December 9, 2019.

50 Liu, Shu-Hui and Nhi Nguyen. Successful youth transitions. NCVET: Adelaide. 2011. Accessed November 14, 2019. <http://www.lsay.edu.au/publications/2414.html>.

51 Nguyen, Nhi. The impact of VET in Schools on the intentions and achievements of young people. NCVET: Adelaide. 2010b. Accessed November 15, 2019. <http://www.lsay.edu.au/publications/2294.html>.

52 Anlezark, Alison, Tom Karmel, and Koon Ong. "Have school VET programs been successful." *Journal for vocational and technical education and training* 5(1): 56-65. 2005. Accessed December 9, 2019.

53 Ibid.

54 Ibid.

after leaving school, indicating that VETiS may be effective at promoting VET careers<sup>55</sup>, although males are less likely to obtain post-school qualifications at certificate III level or above if they have participated in a VETiS program<sup>56</sup>.

For those students who intend to enter employment directly after leaving school, VETiS can influence them to pursue further VET study or to undertake an apprenticeship or traineeship<sup>57</sup>. Among students who do not go to university, initial outcomes from VETiS programs after leaving school are more positive in terms of higher chances of getting an apprenticeship, studying at TAFE, or obtaining full-time employment<sup>58</sup>.

The structure of VETiS programs also affects outcomes. Structured workplace learning, where students attain industry-relevant, on-the-job experience appears to be a necessary component for any positive effects on Year 12 completion and post-school engagement in work or study<sup>59</sup>.

Undertaking VET subjects while at school therefore improves the post-school outcomes of Year 11 and Year 12 leavers who are not university bound, as it appears to provide a smoother transition to employment or post-school VET<sup>60</sup>. Nevertheless, 37% of students who undertake VETiS intend to go to university<sup>61</sup>. These students may be seeking extra training and workplace experiences in their desired fields of university study, which may also help them to find employment during and after study.

A common finding has been that there tends to be a poor alignment between the type of VET studied while at school and the requirements of the workforce (or further study). Indeed, most students who undertake further VET do so in a field that is unrelated to their VETiS subjects<sup>62</sup>. In one cohort, almost a quarter of students had taken a VETiS subject or course by age 19. Despite this, only half of those who took a VETiS course gained a certificate, with the lowest rate for high-SES students<sup>63</sup>. Girls, in particular, do not tend to continue with VETiS subjects after leaving school, suggesting that they might be taken as ‘tasters’ rather than with any intention to pursue them as a long-term pathway<sup>64</sup>.

## Alternative models

The comparability of LSAY data to other international surveys has allowed researchers to compare outcomes from the Australian education system with those of other countries, especially Canada. The Canadian system differs from Australia’s in that it features the college/‘CEGEP’ sector. This is semi-

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55 Coates, Hamish and Sheldon Rothman. Participation in VET in schools. ACER: Melbourne. <http://www.lsay.edu.au/publications/2120.html>. 2009. Accessed November 14, 2019.

56 Nguyen, Nhi. The impact of VET in Schools on the intentions and achievements of young people. NCVER: Adelaide. 2010b. Accessed November 15, 2019. <http://www.lsay.edu.au/publications/2294.html>.

57 Ibid.

58 Liu, Shu-Hui and Nhi Nguyen. Successful youth transitions. NCVER: Adelaide. 2011. Accessed November 14, 2019. <http://www.lsay.edu.au/publications/2414.html>.

59 Gemici, Sinan and David Curtis. “Senior secondary workplace learning and transition success in Australia.” *Education + training* 54(1): 36-49. 2012. Accessed November 12, 2019; Cain Polidano and Domenico Tabasso. 2014. “Making it real: the benefits of workplace learning in upper-secondary vocational education and training courses.” *Economics of education review* 42: 130-146. Accessed December 10, 2019.

60 Coates, Hamish and Sheldon Rothman. Participation in VET in schools. ACER: Melbourne. <http://www.lsay.edu.au/publications/2120.html>. 2009. Accessed November 14, 2019.

61 Polidano, Cain and Domenico Tabasso. “Making it real: the benefits of workplace learning in upper-secondary vocational education and training courses.” *Economics of education review* 42: 130-146. 2014. Accessed December 10, 2019.

62 Nguyen, Nhi. The impact of VET in Schools on the intentions and achievements of young people. NCVER: Adelaide. 2010b. Accessed November 15, 2019. <http://www.lsay.edu.au/publications/2294.html>.

63 Lamb, Stephen, Jen Jackson, Anne Walstab, and Shuyan Huo. Educational opportunity in Australia 2015: who succeeds and who misses out. Mitchell Institute report. Mitchell Institute at Victoria University: Melbourne. 2015. Accessed December 10, 2019.

64 Anlezark, Alison, Tom Karmel, and Koon Ong. “Have school VET programs been successful.” *Journal for vocational and technical education and training* 5(1): 56-65. 2005. Accessed December 9, 2019.

equivalent to Australia's VET system but offers clearer pathways to university<sup>65</sup>. This is an advantage of Canadian college qualifications which may help to explain why college seems to be regarded as a more attractive post-school option for female students in particular<sup>66</sup>. Larger proportions of young Canadians participate in college education than young Australians participate in VET. The comparative lack of competition for places in the Australian VET system may contribute to its lower status, with parents not perceiving positive labour market outcomes for children who achieve a VET qualification<sup>67</sup>.

In Australia, there is a weak relationship between participating in VET and high academic achievement, as well as level of parental education. Females are less likely to participate in VET, and there is no significant difference in the academic achievement of women who pursue VET as compared with those who do not pursue any post-school education. For each of these findings, the reverse is true for Canadian college study. There is a stronger relationship between socioeconomic status and likelihood of enrolment in college study, and high school grades are a strong predictor of college study. Likewise, stronger employment growth for young Canadian women has been attributed to increased college participation.

The characteristics of the Canadian college system which might make it more attractive to high school graduates include the range of educational qualifications offered, the close relationship between secondary education and college education, and the inclusion of programs which facilitate an eventual transition to university. The flexibility and need-orientation of the Canadian college system may also help to keep it responsive to changes in the labour market. However, the Australian VET system may function better as a pathway for disadvantaged and underachieving school students which does not exist in the Canadian system<sup>68</sup>. Socioeconomic differences in university access are also more pronounced in England and Canada than in Australia, and these differences remain even when academic achievement is accounted for<sup>69</sup>.

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65 Austen, Siobhan and Fiona McPhail. Post-school education and labour force participation in Canada and Australia. NCVET: Adelaide. 2010. Accessed November 14, 2019. <http://ncver.edu.au/publications/2286.html>.

66 Austen, Siobhan and Fiona McPhail. "The post-school education choices of young women in Australia and Canada." *Economic and labour relations review* 22(3): 141-157. 2011. Accessed November 12, 2019.

67 Austen, Siobhan and Fiona McPhail. Post-school education and labour force participation in Canada and Australia. NCVET: Adelaide. 2010. Accessed November 14, 2019. <http://ncver.edu.au/publications/2286.html>.

68 Ibid.

69 Jerrim, John and Anna Vignoles. "University access for disadvantaged children: a comparison across countries". *Higher education* 70(6): 903-921. 2015. Accessed November 12, 2019.

## ToR 3

*Investigate barriers to students being able to equitably access all pathways, particularly for students in rural, regional and remote areas, Aboriginal and Torres Strait Islander students, students with disability, those who struggle to make transitions to work, further education and training, and potential early school leavers.*

### Key messages

- Students with highly educated parents and who attend private schools are starting to avoid non-university tertiary education with the expansion in university placements potentially making diplomas a less attractive education pathway for these students.
- The difference in math, reading and science achievement between males and females is greater for Indigenous youth than non-Indigenous youth: with Indigenous males, on average, performing less well than their female counterparts.
- Many young Indigenous Australians opt for VET instead of university study which may, in part, be due to VET being more accessible in non-metropolitan areas. As more than a third of high-achieving Indigenous youth reside in non-metropolitan areas, remoteness rather than indigeneity, may therefore be a more substantial barrier.
- Remoteness appears to affect access to institutions, resources, support networks, and decision making, and has a negative effect on university entry, enrolment at elite institution and expectations of university entry when asked at age 15. However, these differences are not solely due to location but factors such as lower socioeconomic status, less favourable attitudes towards school, fewer students from immigrant backgrounds, and lower aspirations for higher education or professional careers.
- School attributes such as sector, location, single-sex versus co-educational status, class size, student-teacher ratio, and average socioeconomic status were responsible for almost 20% of

The comprehensive amount of questions asking about courses taken and employment entered into means that LSAY is a robust source of information concerning pathways and barriers. In particular, there have been several large studies using LSAY to investigate rural, regional and remote area access to post-school educational opportunities, with many also looking at Indigenous student outcomes. No studies found within the scope of this literature review focused on outcomes for students with disabilities. LSAY does ask respondents whether they have disability or health problems that limits the type of work they can do but very few participants give an affirmative response, which is likely why researchers have not used LSAY to investigate the effects of physical or mental disabilities. Additionally, early school leaving has been studied, but is discussed under “Disrupting traditional ways of thinking”, below.

### Inequalities in access to tertiary education

Czarnecki<sup>70</sup> investigated how barriers to post-school education have changed over time, particularly after domestic university placements were expanded after 2009. When controlling for academic ability, prior to expansion the strongest predictor of enrolling at an elite university was parental education. Following the expansion, coming from ‘higher classes’ and studying in metropolitan schools

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70 Czarnecki, Krzysztof. “Less inequality through universal access?: socioeconomic background of tertiary entrants in Australia after the expansion of university participation.” *Higher education*, first published online 20 December 2017. 2017. Accessed November 12, 2019.

have approached the same level of importance. The effect of attending a private school appears to have decreased, and while the influences of parental education and school sector have weakened, the main beneficiaries appear to have been ‘upper-class’ children. However, lower- and middle-class children continue to have an advantage over working-class children, and socioeconomic differences in regard to admission to elite universities have either remained stable or risen. Privileged economic groups are more likely to ensure that their children will study at elite universities. Having a highly-educated parent, coming from a higher socioeconomic background, and attending school in metropolitan areas have increased effects on likelihood of studying at G08 universities. Conversely, students with highly-educated parents and who attend private schools are starting to avoid non-university tertiary education. The expansion in university placements appears to have made diplomas a less distinctive attribute on the labour market.

## Indigenous status

Although findings regarding Indigenous young people are spread across many of the other topic areas in this literature review, there are several key studies that have focused on outcomes for Indigenous students regarding Year 12, VET, and university outcomes. The gap in Year 12 completion between Indigenous and non-Indigenous youth decreased from 27% in 1999 to 12% in 2007. Higher literacy and numeracy levels are associated with higher Year 12 completion and university study for both groups, however these levels are lower for Indigenous youths<sup>71</sup>. When comparing the Y06 and Y09 there was, again, modest improvement in academic performance, and although the rates of students dropping out decreased, there was still a large gap between the rates of non-Indigenous and Indigenous students who did so (e.g. in Y09 the rate of dropping out was 14.2% for non-Indigenous and 29.4% for Indigenous). The difference in math, reading and science achievement between males and females is also greater for Indigenous youth than non-Indigenous youth even when considering background characteristics like location of school, educational attainment of parents, and age when child started school<sup>72</sup>.

High-achieving Indigenous youth do not participate in university study at the same rate as non-Indigenous youth, despite a large proportion aspiring to university study. Indigenous youth are also much less likely to request an ATAR<sup>73</sup>. Parker and colleagues<sup>74</sup> found a 32% difference in the university entrance rates between Indigenous and non-Indigenous youth. About three-quarters of this difference could be attributed to differences in schooling achievement, but a quarter consisted of ‘secondary effects’ related to individual choice. Instead, many young Indigenous Australians opt for VET. This may, in part, be due to VET being more accessible in non-metropolitan areas where more than a third of high-achieving Indigenous youth reside. Remoteness, rather than indigeneity, may therefore be the more pertinent barrier for these individuals<sup>75</sup>.

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71 Nguyen, Nhi. *Early post-school outcomes of Indigenous youth: the role of literacy and numeracy*. NCVER: Adelaide. 2010. Accessed November 19, 2019. <http://www.lsay.edu.au/publications/2308.html>.

72 Biddle, Nicholas and Anneke Meehl. *The gendered nature of Indigenous education participation and attainment*. Working paper, Australian National University, Centre for Aboriginal Economic Policy Research no. 106/2016. CAEPR: Canberra. 2016. Accessed December 10, 2019.

73 Mahuteau, Stephane, Tom Karmel, Kostas Mavromaras, and Rong Zhu. *Educational outcomes of young Indigenous Australians*. National Centre for Student Equity in Higher Education, Curtin University: Bentley. 2015. Accessed December 10, 2019.

74 Parker, Philip D, Gawaian Bodkin-Andrews, Herbert Marsh, John Jerrim and Ingrid Schoon. “Will closing the achievement gap solve the problem?: an analysis of primary and secondary effects for Indigenous university entry.” *Journal of sociology* 51(4): 1085-1102. 2015. Accessed November 15, 2019.

75 Nguyen, Nhi. *Early post-school outcomes of Indigenous youth: the role of literacy and numeracy*. NCVER: Adelaide. 2010. Accessed November 19, 2019. <http://www.lsay.edu.au/publications/2308.html>.

The work of Mahuteau and colleagues<sup>76</sup> also points to some recent mixed findings. When academic achievement at 15 is controlled for, there was no support for a difference between the educational outcomes of Indigenous and non-Indigenous students suggesting that indigeneity does not exacerbate educational disadvantage.

## Physical barriers – distance/geography

Barriers associated with where young Australians live have typically been represented in terms of socioeconomic disadvantage. In addition to affecting access to institutions and support networks, geography appears to influence decision making. For example, students from regional and remote areas are less likely to intend to study at university than metropolitan students, even after controlling for socioeconomic status<sup>77</sup>.

In addition to the decreased resources available to remote and regional students, geography appears to affect post-school aspirations. Parker and colleagues<sup>78</sup> found that geographic location affected students' aspirations and likelihood of entry to elite universities, with negative effects on university entry, enrolment at elite institutions, and expectations of university education at age 15. It had an added effect for students from low socioeconomic backgrounds. Students with a university campus within a 20 km radius of them had a 50% chance of attending university, compared with 42% of those who did not.

Although there are positive effects of living in a high-income area on employment outcomes for young Australians, these diminish by age 21. However, the negative effects associated with living in a low-income neighbourhood persist. Youth from low-income neighbourhoods may not have access to adult role models who have had positive experiences with education and employment; consequently, they may choose sub-optimal levels of educational attainment or labour market participation. Living in a low-income neighbourhood may also have detrimental effects on young people's access to informal job networks. Policies could be directed towards addressing access to role models as well as these asymmetries in networking opportunities<sup>79</sup>.

Hillman and Rothman<sup>80</sup> found that boys and girls from non-metropolitan areas were more likely to move to metropolitan areas for university study than for apprenticeships, traineeships, or to undertake other study. They were more likely to move if their home location had a limited number of services (including educational facilities) or if they had a parent with a university education and were more likely to stay if they were in full-time employment.

Rowe, Corcoran and Bell<sup>81</sup> focussed on young people in Victoria and found that the labour market outcomes differed between regional Victorians and those living in Melbourne. Regional Victorians had lower participation rates in high skilled managerial and professional occupations as well as clerical, sales and personal service roles, but had higher rates in technical-skilled occupations. This was particularly true for those from a regional area who stayed there, compared to those who moved to

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76 Mahuteau, Stephane, Tom Karmel, Kostas Mavromaras, and Rong Zhu. *Educational outcomes of young Indigenous Australians*. National Centre for Student Equity in Higher Education, Curtin University: Bentley. 2015. Accessed December 10, 2019.

77 Cooper, Grant, Rob Strathdee and James Baglin, "Examining geography as a predictor of students' university intentions: a logistic regression analysis." *Journal of rural society* 27(2): 83-93. 2018. Accessed November 19, 2019.

78 Parker, Philip D, John Jerrim, Jake Anders, and Thomas Astell-Burt. "Does living closer to a university increase educational attainment? a longitudinal study of aspirations, university entry, and elite university enrolment of Australian youth." *Journal of youth and adolescence* 45 (6): 1156-1175. 2016. Accessed November 15, 2019.

79 Andrews, Dan, Colin Green, and John Mangan. *Neighbourhood effects and community spillovers in the Australian youth labour market*. ACER: Melbourne. 2002. Accessed November 13, 2019. <http://www.lsay.edu.au/publications/1867.html>.

80 Hillman, Kylie and Sue Rothman. *Movement of non-metropolitan youth towards the cities*. ACER: Melbourne. 2007. Accessed November 14, 2019. <http://www.lsay.edu.au/publications/1836.html>.

81 Rowe, Francisco, Jonathan Corcoran, and Martin Bell. *Labour market outcomes and educational and occupational pathways of young movers starting off in regional Victoria*. QCPR technical report no. 4. Queensland Centre for Population Research, University of Queensland: Brisbane. 2014. Accessed December 10, 2019.

Melbourne. “Stayers” were more likely to complete certificate qualifications (especially lower levels) and less likely to complete bachelor degrees and were more likely to participate in apprenticeships while “movers” were more likely to undertake bachelor degrees. By the end of the survey the differences between movers and stayers in terms of unemployment, salary, and job satisfaction were modest however movers were more likely to be employed full-time as well as more likely to be out of work. Compared to those from Melbourne, movers were more likely to be in full-time work and less likely to transition to university. Over a third of movers who immediately entered the work force had not undertaken any additional training.

Curtis and colleagues<sup>82</sup> have argued that although there are considerable differences in the rates at which metropolitan and regional or rural young people participate in higher education, the difference cannot solely be attributed to location. Rather, it is factors such as the lower socioeconomic status of rural youth, less favourable attitudes towards school, that there are fewer students from immigrant backgrounds, and the lower aspirations for higher education or professional careers that lead to differences in higher education participation. However, while there is relatively high Indigenous participation in VET they are less likely to participate once background characteristics and the school attended are accounted for.

## School effects

School socioeconomic status is an important predictor of academic achievement and likelihood of enrolment in university. Students from low socioeconomic backgrounds who attend high socioeconomic schools perform better on achievement tests and are more likely to enrol at university, as compared with similar students who attend low socioeconomic schools<sup>83</sup>.

Gemici, Lim and Karmel<sup>84</sup> found significant school effects on tertiary entrance rank and the probability of going to university. School attributes such as sector, location, single-sex versus co-educational status, class size, student-teacher ratio, and average socioeconomic status were responsible for almost 20% of variance in tertiary entrance ranks. The highest performing schools were from all three sectors, but the lowest performing schools were almost all government schools. However, Curtis and McMillan<sup>85</sup> found that sector effects are mediated by other school-related factors, such as the behaviour of students, the quality of student-teacher relations, and teacher morale. Attending to these ‘school climate’ variables may contribute to enhanced retention to Year 12, or to greater participation in vocational alternatives.

## Other barriers

While not explicitly mentioned within the terms of reference, there are several other demographic factors that may impact on young people’s equitable access to all pathways.

Subject choice in Year 12 tends to correspond to fields of education that students pursue in both university and VET. Subject choice, in turn, is influenced by gender, socioeconomic status, type of school, and students’ language backgrounds. Certain demographics may therefore face barriers to following their preferred pathways<sup>86</sup>.

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82 Curtis, David, Aaron Drummond, John Halsey, and Michael Lawson. *Peer mentoring of students in rural and low SES schools: increasing aspiration for higher education*. NCVER: Adelaide. 2012. Accessed December 10, 2019.

83 Chesters, Jenny. “Alleviating or exacerbating disadvantage: Does school attended mediate the association between family background and educational attainment?”. *Journal of education policy*, first published online 25 June 2018. 2018. Accessed November 19, 2019.

84 Gemici, Sinan, Patrick Lim, and Tom Karmel. *The impact of schools on young people’s transition to university*. NCVER: Adelaide. 2013. Accessed November 14, 2019. <http://www.ncver.edu.au/publications/2541.html>.

85 Curtis, David and Julie McMillan. *School non-completers: profiles and initial destinations*. ACER: Melbourne. 2008. Accessed November 14, 2019. <http://www.lsay.edu.au/publications/2088.html>.

86 Ainley, John. *Year 12 subjects and further study*. ACER: Melbourne. 2005. Accessed November 13, 2019. <http://www.lsay.edu.au/publications/1900.html>.

Childs and Chesters<sup>87</sup> looked at students from refugee and migrant backgrounds and found that students with an immigrant background were less likely to leave school early than those from an Australian background. Students from a refugee background were also *much* less likely to do so, despite having the lowest mean achievement score at age 15. However, 1<sup>st</sup> and 2<sup>nd</sup> generation immigrants were less likely to be employed than those from an Australian background at ages 19 and 20, and those who were employed were more likely to be in part-time rather than full-time employment. Young persons from refugee source countries were five times more likely to not be in paid employment. This suggests that refugee students in particular show educational persistence but have difficulty transitioning to paid, full time employment.

Financial stress does not appear to be a significant barrier to tertiary education. About a quarter of LSAY participants report moderate to high levels of financial stress at age 20, but there is no strong link between a student's financial position and their study outcomes<sup>88</sup>. In addition, the majority of students who consider withdrawing do not attribute this to financial stress, instead citing issues such as a lack of interest, work pressures, and other personal matters.

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87 Childs, Alison and Jenny Chesters. "Negotiating pathways through secondary school: Do humanitarian entrants and refugees risk disengagement." Paper presented at the *24th National Vocational Education and Training Research Conference 'No Frills'*. 2015. Accessed November 10, 2019. <http://hdl.voced.edu.au/10707/368880>.

88 Halliday-Wyens, Sian and Nhi Nguyen. *Does financial stress impact on young people in tertiary study?*. NCVER: Adelaide. 2014. Accessed November 14, 2019. <http://www.ncver.edu.au/publications/2732.html>.

## ToR 4

*Identify best practice in flexible delivery options, transition and engagement support arrangements for students transitioning from Year 10 to Year 11, as well as from Year 12 to post-school destinations including:*

- a. career education and awareness that supports inclusion and includes information linked to labour market outcomes for all pathways, to support students to make informed decisions about their study, training and career options, as well as develop career management skills*
- b. the role and impact of teachers, school leaders, and different models of schooling, such as alternate education settings for disengaged students, distance education and/or home education, in successful transitions*
- c. vocational education and training delivered to secondary students that leads to strong transitions*
- d. work-based learning and industry partnerships*
- e. higher education*
- f. the role of student wellbeing on their ability to engage in different types of learning, including VET, academic and work-based learning, to facilitate completion of year 12 and transition to successful pathways.*

### Key messages

- Well-informed and appropriate careers advice is particularly important for students with lower academic ability and those who are unsure about completing year 12.
- Interventions involving post-school pathway decisions should occur during secondary school, potentially much earlier than when students need to decide whether to enrol in university or not.
- The most common form of career activity may be distributing written hand outs or talks from school career advisors, however students rated individual conversations with career advisors as the most useful activity. Receiving different forms of career advice lead to increased likelihood of enrolling at university. For equity groups, in-school career advice and guidance and school experiences were important factors in guiding university enrolment.
- School attributes have limited ability to increase engagement levels of 15-year-olds. Emotional and cognitive engagement is driven by individual background characteristics.

With regard to best practices for transition and engagement, LSAY can provide data on the types of career advice received by participants and how engaged they are with school, and how these two factors affect long-term outcomes.

### Career advice

Several studies emphasise the importance of career advice for the decisions that young people make about their post-school pathways. Having a career or strategic plan is important for determining success in later life<sup>89</sup>. Poor career advice can have an adverse effect on students' post-school

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89 Thomson, Sue and Kylie Hillman. Against the odds: influences on the post-school success of 'low performers'. NCVET: Adelaide. 2010. Accessed November 15, 2019. <http://www.lsay.edu.au/publications/2285.html>.

outcomes<sup>90</sup>, and careers advisors can inappropriately steer students into or away from mathematics and science careers<sup>91</sup>.

Students find well-informed and appropriate careers advice as useful, regardless of background characteristics. It is especially helpful for those who have lower academic ability or who are unsure about completing year 12<sup>92</sup>. Hillman and Rothman<sup>93</sup> found that all students participated in at least one type of career advice activity from Year 10 to Year 12. The proportion of government school students accessing at least one career activity was significantly lower in Year 11. The most common type of activity was the distribution of written material and handouts (95% of students in Year 10), followed by talks from school career advisors (87%). Fifty-four per cent of Year 10 students had a talk from a representative of a TAFE institution or university, compared with 76% of Year 12 students. Employer representatives spoke to 54% of Year 10 students and 50% of Year 12 students.

Although students are generally positive about the value of the career advice they receive, individual conversations with career advisors were regarded as the most useful activity. Group discussion was viewed as the least useful activity across all three senior secondary year levels. Young people found career advice overall to be more useful as they participated in more activities<sup>94</sup>.

Students who receive different forms of career advice are more likely to enrol at university and at earlier ages. However, not all forms of career advice are equally associated with university enrolment. The strongest positive effects were for talks by TAFE or university representatives and from school career advisors. Employer representative talks and group discussions about careers actually had negative effects on university enrolment. Talks by school career advisors were more strongly associated with university enrolment amongst young people from lower socioeconomic backgrounds, while career group discussions were bigger influences for young people from regional and remote areas. There is also evidence that in-school career advice and guidance and school experiences are important in shaping university enrolment, particularly from equity groups. These findings offer further evidence that interventions involving post-school pathway decisions need to occur during secondary school, with the researchers suggesting there is a need for much earlier “interventions” before students need to face the decision whether to apply to university or not<sup>95</sup>.

## Student engagement

As part of the PISA questions asked while they are 15, students are asked questions about their relationships with teachers and their life at school. Gemici and Lu<sup>96</sup> looked at the extent to which student engagement can be influenced by the way schools are organised and run, given that the link between young people’s engagement with school and their education and labour market outcomes has been well established. The evidence suggests that the ability of school attributes to raise engagement levels of 15-year-olds is limited. However, it cannot be ruled out that these factors influence student engagement levels at a younger age.

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90 Liu, Shu-Hui and Nhi Nguyen. Successful youth transitions. NCVER: Adelaide. 2011. Accessed November 14, 2019. <http://www.lsay.edu.au/publications/2414.html>.

91 Anlezark, Alison, Patrick Lim, Ronnie Semo, and Nhi Nguyen. From STEM to leaf: where are Australia’s science, mathematics, engineering and technology (STEM) students heading?, NCVER: Adelaide. 2008. Accessed December 12, 2019. <http://hdl.voced.edu.au/10707/155212>.

92 Liu, Shu-Hui and Nhi Nguyen. Successful youth transitions. NCVER: Adelaide. 2011. Accessed November 14, 2019. <http://www.lsay.edu.au/publications/2414.html>.

93 Hillman, Kylie and Sue Rothman. Career advice in Australian secondary schools: use and usefulness. ACER: Melbourne. 2008. Accessed November 14, 2019. <http://www.lsay.edu.au/publications/2080.html>.

94 Ibid.

95 Tomaszewski, Wojtek, Francisco Perales, and Ning Xiang. “Career guidance, school experiences and the university participation of young people from low socio-economic backgrounds.” *International journal of educational research* 85(supplement C): 11-23. 2017. Accessed December 10, 2019.

96 Gemici, Sinan and Tham Lu. Do schools influence student engagement in the high school years?. NCVER: Adelaide. 2014. Accessed November 14, 2019. <http://www.ncver.edu.au/publications/2745.html>.

At age 15, students' emotional and cognitive engagement with school is overwhelmingly driven by individual background characteristics. Important predictors of higher engagement levels include: intention to complete Year 12, strong academic performance, high self-concept of ability, being foreign-born, high socioeconomic status background, speaking a language other than English at home, working only relatively few hours outside school, and coming from a traditional nuclear family. Male students show significantly lower cognitive engagement levels than females.

School attributes, such as school sector and demographics, resourcing, competition and academic orientation, school leadership and teacher quality, and overall school climate, have little impact on emotional engagement (4.3%) or cognitive engagement (7.5%) levels of 15-year-olds once individual background factors are controlled for. Schools matter even less for 15-year-olds who are at risk of early school leaving, with school characteristics accounting for 1.4% of emotional engagement, and 4.4% of cognitive engagement.

## Poorly informed post-school choices

This section has been guided by the first of the two provocative propositions identified in the Review of senior secondary pathways into work, further education and training Discussion Paper:

*Too many young people are making poorly-informed post-school choices (through no fault of their own) that do not align with their skills, interests, and career aspirations; that involve unnecessary cost and time; and which may align poorly with Australia's future workforce needs.*

### Key messages

- Intentions to complete high school or to enrol in university makes students much more likely to do so, but parental and peer expectations are also particularly influential on aspirations and pathway decisions. Educational aspirations measured at age 15 do not change markedly as students grow older, suggesting that interventions later in senior secondary schooling may be too late to influence aspirations.
- Parental expectations may be based on prestige and are not necessarily aligned with future workforce needs suggesting that careers advice should extend to parents.
- Very few students aspire to clerical or labouring jobs, relative to the number of available opportunities. Throughout adolescence and young adulthood, females tend to aim for higher status occupations than males, particularly in the professions.
- Relative to a high-skill job, starting in a low-skill job attracts a wage penalty that still exists after five years, although this diminishes over time. However, not taking any job is still worse.

Why do young people make “poor choices”? Researchers have used LSAY's longitudinal capacity to investigate the reasons driving young people towards education, training, and employment options that may have substantial, negative long-term impacts on various wellbeing and labour market outcomes. Several researchers have looked at how the ambitions and hopes of achievement can affect education and employment, with many finding that aspirations at age 15 have far reaching impact. Asking participants what their parents or caregivers want them to do after school, as well as what their friends want to do, has provided a rich source of information in combination with asking participants what they want to do. Finally, LSAY has allowed researchers to look at the effects of taking low-skill jobs immediately after leaving school.

## Aspirations

Educational aspirations have a substantial effect on educational outcomes. Students who plan to complete Year 12 are 20-25% more likely to do so, and individuals who intend to go to university are 15-20% more likely to do so. These effects are similar across demographic backgrounds, including socioeconomic status and indigeneity, although high-achieving individuals are more likely to realise their aspirations<sup>97</sup>. Ainley and colleagues<sup>98</sup> found that intentions to complete Year 12 influenced the relationship between attainment background characteristics and achievement, such that the effect of factors like gender, location, language spoken at home can influence educational intentions at 15, and after forming these intentions in turn influenced completion or non-completion.

However, students' employment aspirations at age 15 tend to be somewhat unrealistic. Aspirations tend to be skewed towards higher-status jobs<sup>99</sup>, with about two-thirds of young people expecting to be in a professional or paraprofessional occupation by age 30 despite such occupations representing about one-third of opportunities. Comparatively few have aspirations for clerical or labouring jobs, relative to the number of available opportunities<sup>100</sup>. While educational plans tend to be consistent with career aspirations, some young people enter university who expect to obtain less than a professional level occupation. About one in five have education plans that are below the levels required for their intended occupations, including a third of intending tradespersons.

Throughout adolescence and young adulthood, females tend to aim for higher status occupations than males, particularly in the professions<sup>101</sup>. Osborne and Circelli<sup>102</sup> found that in 2016, 10% of the 16-year-old female students surveyed indicated that they wished to enrol in some form of VET study compared to 15% of males but the biggest difference was in the percentages who wanted to undertake an apprenticeship, with only 2% of females indicating interest in this path compared to 11% of males.

Females are also more likely to hold high-status jobs at age 25, although there is only a moderate relationship between aspirations and achieved occupation<sup>103</sup>. Sikora<sup>104</sup> found that 59% of females and 71% of males who wanted to pursue biological and health sciences at age 16 switched to a non-science career by age 23. For computing, engineering, physics and mathematical sciences, it was 68% (females) versus 63% (males). However, 12% of females who did not plan to enter a science-related occupation at age 16 ultimately pursued a career in biological and health sciences and 4% decided to enter computing, engineering, physics or mathematical science. This cautions against 'pipeline' arguments that overstate the importance of early occupational plan and may imply that small changes can be achieved by encouraging young people to alter their career expectations through all stages of education.

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97 Homel, Jacqueline and Chris Ryan. *Educational outcomes: the impact of aspirations and the role of student background characteristics*. NCVER: Adelaide. 2014. Accessed November 14, 2019. <http://www.lsay.edu.au/publications/2669.html>.

98 Ainley, John, Sarah Buckley, Adrian Beavis, Sheldon Rothman, and Alice Tovey. *Analysis of Year 12 or Certificate II attainment of Indigenous young people - stage 1: a report prepared for the Council of Australian Governments Reform Council*. COAG Reform Council: Sydney. 2011. Accessed December 10, 2019.

99 Gemici, Sinan, Alice Bednarz, Tom Karmel and Patrick Lim. *The factors affecting the educational and occupational aspirations of young Australians*. NCVER: Adelaide. 2014. Accessed November 14, 2019. <http://www.lsay.edu.au/publications/2711.html>.

100 Curtis, David and Julie McMillan. *School non-completers: profiles and initial destinations*. ACER: Melbourne. 2008. Accessed November 14, 2019. <http://www.lsay.edu.au/publications/2088.html>.

101 Sikora, Joanna. "Aimless or flexible? Does uncertainty in adolescent occupational expectations matter in young adulthood?". *Australian journal of education* 62(2): 154-168. 2018. Accessed November 15, 2019.

102 Osborne, Kristen and Michelle Circelli. *From school to VET: choices, experiences and outcomes*. NCVER: Adelaide. 2018. Accessed December 10, 2019.

103 Gemici, Sinan, Alice Bednarz, Tom Karmel and Patrick Lim. *The factors affecting the educational and occupational aspirations of young Australians*. NCVER: Adelaide. 2014. Accessed November 14, 2019. <http://www.lsay.edu.au/publications/2711.html>.

104 Sikora, Joanna. "Is it all about early occupational expectations? How the gender gap in two science domains reproduces itself at subsequent stages of education: evidence from longitudinal PISA in Australia." *International journal of science education*, [preprint]. 2019. Accessed November 15, 2019.

Educational aspirations measured at age 15 do not change markedly as students grow older, suggesting that interventions later in senior secondary schooling may be too late to influence aspirations<sup>105</sup>. Interventions need to occur before students decide on their post-school pathway<sup>106</sup>.

Sikora<sup>107</sup> investigated the consequences of occupational uncertainty. There was evidence that occupational uncertainty persisted: respondents who had no occupational expectations in 2006 had 1.6 times higher odds of remaining uncertain in 2013. Females were more occupationally certain than males at the earlier time point but there was no difference seven years later, however at both time points females were more likely to indicate orientation towards professional employment. Males who were initially uncertain had less academic success, enjoyed school less, and were less likely to be first- or second-generation migrants than those males who were certain. Indigenous males were even more likely to be uncertain in 2006 and by 2013 were almost three times as likely as non-Indigenous males to be uncertain, although Indigenous females were no less likely than non-Indigenous women to be occupationally certain or uncertain at either time.

Young persons who have aims and aspirations that align with a non-professional occupation can more easily move between uncertainty and aiming for a non-professional job, with relatively little impact on educational or occupational attainment.

## Parental and peer influence

Parental expectations and peer plans are particularly influential on students' aspirations and pathway decisions<sup>108</sup>. The socioeconomic status of a student body in a given school is more important in determining an individual's standardised test scores than individual socioeconomic status<sup>109</sup>.

Gemici and colleagues<sup>110</sup> found that parental expectations were the second biggest influence on students' intentions to complete Year 12, after academic achievement. Students whose parents wanted them to attend university were four times more likely to intend to complete Year 12, about 11 times more likely to plan to attend university and aspired to higher-status occupations. Students whose friends intended to go to university were four times more likely to intend to do so.

The combination of these social influences can explain a large amount of variance in intended pathways. Parental and peer influence almost entirely mediate the effects of gender, indigeneity, socioeconomic status, location, family structure, and immigration status. In Gemici and colleagues' study, students whose parents expected them to go to university, whose friends intended to go to university, and who reported very positive relations with their teachers had a 90% probability of intending to go to university. Conversely, students without these parental or peer influences and low academic achievement only had a 4% probability of intending to go to university.

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105 Nguyen, Nhi and Davinia Blomberg. The role of aspirations in the educational and occupational choices of young people. NCVET: Adelaide. 2014. Accessed November 15, 2019. <http://www.lsay.edu.au/publications/2710.html>.

106 Tomaszewski, Wojtek, Francisco Perales, and Ning Xiang. "Career guidance, school experiences and the university participation of young people from low socio-economic backgrounds." *International journal of educational research* 85(supplement C): 11-23. 2017. Accessed December 10, 2019.

107 Sikora, Joanna. "Aimless or flexible? Does uncertainty in adolescent occupational expectations matter in young adulthood?" *Australian journal of education* 62(2): 154-168. 2018. Accessed November 15, 2019.

108 Nguyen, Nhi and Davinia Blomberg. The role of aspirations in the educational and occupational choices of young people. NCVET: Adelaide. 2014. Accessed November 15, 2019. <http://www.lsay.edu.au/publications/2710.html>.

109 Mahuteau, Stephane and Kostas Mavromaras. "An analysis of the impact of socio-economic disadvantage and school quality on the probability of school dropout." *Education economics* 22(4): 389-411. 2014. Accessed November 15, 2019.

110 Gemici, Sinan, Alice Bednarz, Tom Karmel and Patrick Lim. *The factors affecting the educational and occupational aspirations of young Australians*. NCVET: Adelaide. 2014. Accessed November 14, 2019. <http://www.lsay.edu.au/publications/2711.html>.

Parental expectations in particular may be based on prestige and are not necessarily aligned with Australia's future workforce needs. It may be beneficial for career advice to be extended to the parents of students<sup>111</sup>.

## Policy and economic influences

Relatively few studies have used LSAY data to examine the effects of policy changes directly, although Karmel, Roberts and Lim<sup>112</sup> investigated the government action of uncapping university places in terms of flow-on effects to the quality of apprenticeships. The study demonstrated that both university and apprenticeship participation increased; growth in university participation was driven by academically lower-performing males from higher socioeconomic backgrounds. Growth in apprenticeships was driven by academically lower-performing males from lower socioeconomic backgrounds.

Several studies have examined the role of youth allowance in student pathways. Ryan<sup>113</sup> found that youth allowance prior to 2010 increased course completion rates by between 4% and 10%. Liu and Nguyen<sup>114</sup> likewise found that income support was positively associated with completion of university and full-time VET courses, although young people rely more on paid work due to ineligibility for income support.

The coincidence of the Global Financial Crisis with several of the LSAY cohorts allowed researchers to observe the impact that a severe economic downturn has on young peoples' decisions. In 2008 and 2009, young people bore almost the entire brunt of the full-time job decline and a disproportionate share of the increase in unemployment. Duration of unemployment increased in addition to rates of unemployment. There was a decline in full-time employment opportunities, including apprenticeships, but increased availability of part-time employment. The downturn saw an increase in the proportion of young people returning to, or continuing, full-time study, and available work was often not in areas where young people wanted to work. Some young people turned to study because of the poor labour market conditions, while others changed the courses they were studying to improve their employability. It was particularly difficult to get an apprenticeship or traineeship<sup>115</sup>. The downturn may have also increased the proportions of young females in home and caring duties, as well as increasing rates of long-term disengagement from education and employment<sup>116</sup>.

## 'Holding out' for higher skill jobs

Karmel, Lu and Oliver<sup>117</sup> investigated whether starting out in a low-skill job has a 'scarring' effect on young people, and whether it is worth them waiting for a higher-skill job before commencing employment. The majority of young people in low-skill jobs have no post-school qualifications. Relative to a high-skill job, starting in a low-skill job attracts a wage penalty that still exists after five years, although this diminishes over time. However, not taking any job (i.e. 'holding out') is still worse, with a wage penalty remaining after five years as compared with starting in a low-skill job.

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111 Ibid.

112 Karmel, Tom, David Roberts, and Patrick Lim. The impact of increasing university participation on the pool of apprentices. NCVER: Adelaide. 2014. Accessed November 14, 2019. <http://www.lsay.edu.au/publications/2720.html>.

113 Ryan, Chris. Student income support and education and training participation in Australia. NCVER: Adelaide. 2013. Accessed November 15, 2019. <http://www.ncver.edu.au/publications/2611.html>.

114 Liu, Shu-Hui and Nhi Nguyen. Successful youth transitions. NCVER: Adelaide. 2011. Accessed November 14, 2019. <http://www.lsay.edu.au/publications/2414.html>.

115 Anlezark, Alison. Young people in an economic downturn. NCVER: Adelaide. 2011. Accessed November 13, 2019. <http://www.ncver.edu.au/publications/2350.html>.

116 Stanwick, John, Cameron Forrest and Peta Skujins. Who are the persistently NEET young people?, NCVER: Adelaide. 2017. Accessed December 10, 2019. <http://hdl.voced.edu.au/10707/441208>.

117 Karmel, Tom, Tham Lu, Damian Oliver. Starting out in low-skill jobs. NCVER: Adelaide. 2013. Accessed November 14, 2019. <http://www.lsay.edu.au/publications/24649.html>.

This is partially explained by the finding that after five years, about one-third of young people who began in a low-skill job have moved to a high-skill job. Males and young people with high human capital (education, ability, and experience) are more likely to make this transition, whereas part-time workers are more likely to remain in low-skilled jobs. However, part-time and casual low-skill work can be a viable pathway to full-time or permanent positions.

## Disrupting traditional ways of thinking

This section has been guided by the second of the two provocative propositions identified in the Review of senior secondary pathways into work, further education and training Discussion Paper:

*Traditional ways of thinking about pathways need to be disrupted, with young people's choices no longer being unnecessarily constrained by the institutional perceptions of what they can and should do after school, and the certification that they require.*

### Key messages

- Providing trade-related experiences and advice early in schooling, and curriculum provision for technological studies and VET in Schools programs in senior years, may increase participation in apprenticeships.
- Positive attitudes towards school, including supportive relationships with teachers, interest in learning, and valuing the opportunities to apply learning outside school, are in turn strong influences on intentions to continue studying.
- Interventions directed at providing information on curriculum options in senior school, vocational alternatives, labour market opportunities and requirements may help those most at risk of early leaving.
- Persistently NEET status was associated with non-completion of Year 12, having a child, and somewhat associated with coming from a disadvantaged background. Being persistently NEET between ages 15 and 19 was associated with further persistent NEET periods between ages 20 and 24 and was associated with poorer education outcomes at age 24.

This section includes research that could guide thinking around pathways that have not previously been discussed. Apprenticeships are considered a good pathway, but this brief section considers why students would choose one. LSAY has also been used to uncover drivers of early school leaving and ways that this may be prevented. Questions about gap-year taking have also received attention – with researchers looking at both the benefits and potential costs of this “disruption” on further education and employment. Finally, we consider the effect of periods of time spent not in education, employment or training (NEET).

## Apprenticeships

Gender, home language, and father's occupation all influence apprenticeship participation, but rates are also higher among students who study VET subject(s) in year 11 or 12, or who come from schools with strong levels of enrolment in technology subjects<sup>118</sup>. Fostering trade-related interests and providing opportunity for students to engage in technology subjects may increase participation in apprenticeships. This could be approached by experiences and advice provided to students in earlier

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118 Ainley, John and Matthew Corrigan. Participation in and progress through New Apprenticeships. ACER: Melbourne. 2005. Accessed November 13, 2019. <http://www.lsay.edu.au/publications/1842.html>.

schooling, and curriculum provision in senior years through technological studies and VET in Schools programs<sup>119</sup>.

## Early school leaving

Many studies have used LSAY data to demonstrate the value of completing senior secondary school for youth transitions. Consequently, researchers have sought strategies that might be used to prevent or deter students from leaving school early, as well as re-engaging those who have left. Several studies, however, have investigated whether there are equivalents to Year 12 completion and questioned whether it is necessary for all individuals to complete schooling to optimise their longer-term pathways.

### *Preventing early school leaving*

The main predictors of Year 12 completion are cultural factors, including poor school experiences, participation in risky activities such as smoking and alcohol consumption, and aspirations. Material factors, such as family income, have only a small effect on Year 12 completion. Parental education and occupational status are also less impactful<sup>120</sup>. Other identified predictors have included academic achievement, parental socioeconomic status, school quality, the size of an individual's town or city, and their state of residence<sup>121</sup>.

Improving student attitudes towards and engagement with school during the formative years may improve participation in the later years of school and post-compulsory schooling<sup>122</sup>. Positive attitudes towards school, including supportive relationships with teachers, interest in learning, and valuing the opportunities to apply learning outside school, are in turn strong influences on intentions to continue studying. School academic quality has a substantial effect on school completion for students from the lowest socioeconomic and academic achievement backgrounds in particular<sup>123</sup>. Students' behavioural engagement with school, such as participation in extracurricular activities, is also related to positive attitudes towards school and learning. Levels of engagement are higher in schools where students believe they have high quality teachers, effective discipline, high levels of student learning, and a positive school spirit. Differences in student attitudes and engagement with school are not strongly related to earlier achievement or student background characteristics<sup>124</sup>.

The strongest independent predictors of early school leaving are being male, not intending to complete school, coming from a non-nuclear family, being a below average academic achiever, having an unfavourable attitude towards school, and perceiving student-teacher relations as unsympathetic<sup>125</sup>. Although males are more likely to leave school early, they are also more likely to obtain full-time employment and apprenticeships.

Interventions directed at providing information on curriculum options in senior school, vocational alternatives, labour market opportunities and requirements may help those most at risk of early

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119 Ainley, John, Steve Holden and Sheldon Rothman. Apprenticeships and traineeships: participation, progress and completion. ACER: Melbourne. 2010. Accessed November 13, 2019. <http://www.ncver.edu.au/publications/2317.html>.

120 Homel, Jacqueline, Astghik Mavisakalyan, Ha Trong Nguyen, and Chris Ryan. School completion: what we learn from different measures of family background. NCVER: Adelaide. 2012. Accessed November 14, 2019. <http://www.lsay.edu.au/publications/2503.html>.

121 Mahuteau, Stephane and Kostas Mavromaras. "An analysis of the impact of socio-economic disadvantage and school quality on the probability of school dropout". *Education economics* 22(4): 389-411. 2014. Accessed November 15, 2019.

122 Hillman, Kylie. Attitudes, intentions and participation in education: Year 12 and beyond. ACER: Melbourne. 2010. Accessed November 14, 2019. <http://www.ncver.edu.au/publications/2316.html>.

123 Lim, Patrick, Sinan Gemici, and Tom Karmel. "The impact of school academic quality on low socioeconomic status students." *Australian economic review* 47(1): 100-106. 2014. Accessed November 12, 2019.

124 Hillman, Kylie. Attitudes, intentions and participation in education: Year 12 and beyond. ACER: Melbourne. 2010. Accessed November 14, 2019. <http://www.ncver.edu.au/publications/2316.html>.

125 Curtis, David and Julie McMillan. School non-completers: profiles and initial destinations. ACER: Melbourne. 2008. Accessed November 14, 2019. <http://www.lsay.edu.au/publications/2088.html>.

leaving. Advice would likely need to be targeted at girls and boys separately due to differences in opportunities and consequences. Focusing on literacy and numeracy would also likely improve outcomes for low achievers who leave early<sup>126</sup>. However, students' education intentions, as articulated relatively early in their secondary school years, are strong predictors of Year 12 completion<sup>127</sup>. Policies or interventions aimed at improving student attitudes and engagement during the formative years of schooling may therefore benefit all students<sup>128</sup>.

### *Re-engagement and outcomes*

Although it is well documented that school non-completers experience poorer labour market outcomes, Curtis and McMillan<sup>129</sup> found that there was considerable variability in the pathways that early school leavers follow. By the time that their peers were nearing the completion of their schooling, more than 70% of early school leavers were fully engaged in employment, education, or training. Those who left school in order to accept a job or apprenticeship were especially likely to be in full-time employment. This may indicate an awareness of alternative pathways among early school leavers. Additionally, more than half of early school leavers were engaged in some form of education or training, such as apprenticeships, traineeships, or VET courses. The sample used in that study did leave school at a time of low unemployment however, and the authors anticipated that early school leavers would experience more problematic transitions during periods of economic downturn.

Polidano, Tabasso and Tseng<sup>130</sup> likewise found that the most popular route back into education for early school leavers was enrolling in a VET course (91%), as opposed to continuing secondary school (9%). About half of those who enrolled in a VET course did so as part of an apprenticeship or traineeship. The most popular VET courses unrelated to apprenticeships or traineeships were business, tourism, information technology, hospitality, and community services. There was no evidence that improving school academic outcomes, including improving numeracy and literacy or delaying exit from school, helped early school leavers to re-engage in education. There was limited evidence that enrolling in upper-secondary VET courses improved chances of re-engaging, and no evidence where the course was unrelated to an apprenticeship or traineeship. There was also no evidence that re-engagement was affected by labour market status, although those who were employed on a casual, part-time basis were 22% more likely to re-engage than those who were unemployed. Females were 20% more likely to re-engage in any given month, and this may be because VET is associated with preparation for historically male-dominated jobs. Conversely, having dependent children reduced chances of re-engagement among females by 48%.

The most important factor in re-engagement, however, is time out of school. Former students who had been out of school for one year were 65% less likely to return to school than those who had left only recently, with peak re-engagement occurring in the third month. After 24 months, there was little to no effect of duration. The 20 to 24-month period may be the 'tipping point' for those school leavers who intend to re-engage, where the pressure finally brings their delays to an end. These findings suggest that schools can play an important role in preparing early school leavers for post-school education. The early leavers who cited employment reasons for leaving, or who said that school did not offer adequate training, were much more likely to re-engage than those who left for other reasons. High-quality career counselling may help youth to find suitable careers and post-school

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126 Ibid.

127 Nguyen, Nhi and Davinia Blomberg. The role of aspirations in the educational and occupational choices of young people. NCVER: Adelaide. 2014. Accessed November 15, 2019. <http://www.lsay.edu.au/publications/2710.html>.

128 Hillman, Kylie. Attitudes, intentions and participation in education: Year 12 and beyond. ACER: Melbourne. 2010. Accessed November 14, 2019. <http://www.ncver.edu.au/publications/2316.html>.

129 Curtis, David and Julie McMillan. School non-completers: profiles and initial destinations. ACER: Melbourne. 2008. Accessed November 14, 2019. <http://www.lsay.edu.au/publications/2088.html>.

130 Polidano, Cain, Domenico Tabasso and Yi-Ping Tseng. "A second chance at education for early school leavers", *Education economics* 23 (3): 358-375. 2012. Accessed December 10, 2019.

courses, and it should be incorporated earlier into the school curriculum so as to not occur after early leavers have already left<sup>131</sup>.

### *Vocational equivalents to Year 12 completion?*

Lim and Karmel<sup>132</sup> investigated whether any vocational pathway could be considered 'equivalent' to Year 12. In terms of labour market outcomes, all pathways, including early school leaving with no further VET study, could be considered equivalent to Year 12 completion. For females, certificate III completion, but not certificate II, could be considered equivalent in terms of full-time employment or being in full-time employment or study. However, in terms of academic outcomes, no vocational equivalent to completing senior secondary schooling could be identified. The authors concluded that the pathway to further education may be hindered by leaving school early. The importance of completing secondary schooling may therefore be magnified if higher education is regarded as necessary for equipping young people with the skills necessary to meet Australia's future workplace demands.

### *Early school leaving as a viable pathway*

Dockery<sup>133</sup> has argued that it is 'dangerous' to categorise all young people in the same way, and that some are simply not well suited to the schooling environment either due to individual preferences or the anticipated benefits of completing schooling. He took issue with the assumption that because those who complete school achieve superior outcomes, those who do not complete school would have achieved better outcomes had they remained. Although additional years of schooling increase future earnings, they seem to have a detrimental effect on full-time weekly wages and incidence of unemployment. He suggested that time spent in full-time work may be more beneficial during early years of labour force participation than further time in schooling.

Importantly, there was no significant gain from additional years of school for less academically-inclined students. Even putting aside the possible detrimental effects of further years of schooling for some young people, the general efficiency of the labour market may also suffer from mandated increases in schooling attainment, particularly if years of education are used as a signal to employment for academic ability, or for allocating youth to pathways. This is not to say that these young people should leave school early, but alternatives such as 'reasonable' job openings and apprenticeships should not be ignored for the sake of simply accumulating additional years of schooling. Crucially, Dockery argued that policy should not be to increase levels of education per se, but to ensure that pathways are available to meet the varying needs, abilities and preferences of young people and to better provide the information they require to make an informed and optimal decision.

Curtis and McMillan<sup>134</sup> have argued that the decision to leave school might be based on an awareness of alternative opportunities, and that some groups may have a greater awareness of these opportunities than others. They suggested that high quality career advice could help to increase the awareness of students and their families of the pathways that are available, especially in regard to the implications of early school leaving.

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131 Ibid.

132 Lim, Patrick and Tom Karmel. The vocational equivalent to Year 12. NCVET: Adelaide. 2011. Accessed November 14, 2019. <http://www.lsayy.edu.au/publications/2416.html>.

133 Dockery, Alfred Michael. Education and happiness in the school-to-work transition. NCVET: Adelaide. 2010. Accessed November 14, 2019. <http://www.ncver.edu.au/publications/2239.html>.

134 Curtis, David and Julie McMillan. School non-completers: profiles and initial destinations. ACER: Melbourne. 2008. Accessed November 14, 2019. <http://www.lsay.edu.au/publications/2088.html>.

## Gap years

In their research, Curtis, Mlotkowski and Lumsden<sup>135</sup> have defined a “gap year” as “a period of time taken out of formal education or between completing a qualification and seeking work” (p. 9). They also note that while the concept is associated with deferral it is different; not all gap-year takers have deferred a university offer, and some may decide to enrol after or because of time spent travelling or working.

The most commonly cited reasons for taking a gap year found by Curtis and colleagues<sup>136</sup> were to ‘take a break’ or to work. Although travel was often cited, only about 3% ultimately did so with the most common activities being work (40%) and study or training (33%). However, time away from study delays graduation and transition to the workforce, and there is some evidence to suggest that gap year takers become less engaged in tertiary education. Parker, Thoemmes, Duineveld and Salmela-Aro<sup>137</sup> found that students who were on a gap year were more likely to have dropped out of university, less likely to be enrolled in university four years afterwards, and almost 20% reported never having commenced a degree despite being offered a university place, however Curtis et al.<sup>138</sup> found no difference in the likelihood of changing courses or dropping out between gap year takers and non-takers.

Gap year takers are more likely to have lower-than-average TER scores, lower mathematics achievement, be from regional locations, and unfavourable attitudes towards schooling<sup>139</sup>, and therefore are likely to be more disengaged from education, either due to burnout from senior secondary schooling or lower academic inclinations. These individuals are those most likely to be disadvantaged from being pressured into continuing education immediately after leaving school, particularly if they lack clear career goals or strategic plans, which, as mentioned above, is related to future successes. Taking a gap year may allow additional consideration of whether continuing study will be of sufficient benefit to them to justify the time away from employment and cost of a qualification – and, if so, identify the industry in which they hope to ultimately seek employment. Deferring after having been offered a university placement is much less common than taking a gap year and then applying for university entry during that gap, suggesting that gap years may position some young people to make a more informed choice regarding the pathways they should take and the qualifications they should need.

At age 23, non-takers are more likely to have completed their first course, have higher earnings, and work for more hours per week than gap year takers. About 90% of both gap year takers and non-takers are employed by age 23, but non-takers were more likely to be employed full-time (65% vs. 53%). Gap year takers are more likely to be continuing study, but this is consistent with a delayed labour market transition pathway. Once more, there is also a pressing need to consider outcomes in terms of satisfaction and wellbeing rather than purely labour market returns by age 25 and a gap year which is spent productively – that is, obtaining work experience and attempting to refine one’s longer-term goals – may be worth the trade-off of delaying one’s eventual pathway by a year.

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135 Curtis, David, Peter Mlotkowski, and Marilyn Lumsden. Bridging the gap: who takes a gap year and why?. NCVER: Adelaide. 2012. Accessed November 14, 2019. <http://www.isay.edu.au/publications/2494.html>.

136 Ibid.

137 Parker, Philip D, Felix Thoemmes, Jasper Duineveld, and Katariina Salmela-Aro. “I wish I had (not) taken a gap-year?: the psychological and attainment outcomes of different post-school pathways.” *Developmental psychology* 51(3): 323-333. 2015. Accessed November 15, 2019.

138 Curtis, David, Peter Mlotkowski, and Marilyn Lumsden. Bridging the gap: who takes a gap year and why?. NCVER: Adelaide. 2012. Accessed November 14, 2019. <http://www.isay.edu.au/publications/2494.html>.

139 Ibid.

## Not in education, employment or training (NEET)

Young people who are NEET are used as a key indicator of youth disengagement. Stanwick, Forrest and Skujins<sup>140</sup> chose to focus on those who were persistently NEET, that is, who were NEET for six months or more continuously, as this is argued to be a risk factor for poor long-term outcomes. Persistently NEET status was associated with non-completion of Year 12, having a child, and somewhat associated with coming from a disadvantaged background. The most common activity for females who were persistently NEET were home duties or caring for children while males had a variety of activities. Being persistently NEET between ages 15 and 19 was associated with further persistent NEET periods between 20 and 24 and was associated with poorer education outcomes at age 24. The authors do note that the Global Financial Crisis may have affected chances of being persistently NEET.

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140 Stanwick, John, Cameron Forrest and Peta Skujins. Who are the persistently NEET young people?, NCVET: Adelaide. 2017. Accessed December 10, 2019. <http://hdl.voced.edu.au/10707/441208>.

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# Appendix 1: Terms of Reference

1. Explore the efficacy of senior secondary education in preparing young people for diverse pathways to further learning and work, including:
  - a. identifying from existing curriculum frameworks and relevant research, the essential knowledge, skills and values needed for diverse pathways to life long learning, work and effective participation in civic life.
  - b. identifying the skills and knowledge students, employers, vocational education and training (VET) providers, and higher education institutions perceive are essential for successful post school transitions.
  - c. clarifying the roles and responsibilities of key stakeholders, such as schools, students, parents, VET providers, higher education institutions, and employers, in supporting inclusion and preparing school leavers for life beyond school, whatever pathway they choose.
2. Investigate whether current certification and university entry requirements, including other credentials such as the International Baccalaureate, assist in allowing students to make the study choices that are right for them to develop the skills and knowledge they need to access the most appropriate pathway into work, further education and/or training.
3. Investigate barriers to students being able to equitably access all pathways, particularly for students in rural, regional and remote areas, Aboriginal and Torres Strait Islander students, students with disability, those who struggle to make transitions to work, further education and training, and potential early school leavers.
4. Identify best practice in flexible delivery options, transition and engagement support arrangements for students transitioning from Year 10 to Year 11, as well as from Year 12 to post-school destinations including:
  - a. career education and awareness that supports inclusion and includes information linked to labour market outcomes for all pathways, to support students to make informed decisions about their study, training and career options, as well as develop career management skills
  - b. the role and impact of teachers, school leaders, and different models of schooling, such as alternate education settings for disengaged students, distance education and/or home education, in successful transitions
  - c. vocational education and training delivered to secondary students that leads to strong transitions
  - d. work-based learning and industry partnerships
  - e. higher education
  - f. the role of student wellbeing on their ability to engage in different types of learning, including VET, academic and work-based learning, to facilitate completion of year 12 and transition to successful pathways.
5. Investigate what, when and how data should be collected to capture experiences, identify pathways and measure the impact of delivery options, subject choice (including academic and VET) on student outcomes and destinations, to ensure continuous improvement

# Appendix 2: Acronyms

The following provides an explanation of acronyms referenced in the LSAY Literature Review report. Acronym explanations sourced from the VOCEDplus VET Knowledge Bank Glossary of VET (<https://www.voced.edu.au/vet-knowledge-bank-glossary-vet>) or relevant organisations website if not listed in the Glossary of VET.

ACER: Australian Council for Educational Research, an independent, not-for-profit research organisation that undertakes educational research and development.

ASQA: Australian Skills Quality Authority, the national VET regulator.

ATAR: Australian Tertiary Admission Rank, the main criteria used for entry into most undergraduate entry university programs in Australia.

CEGEP: Collège d'Enseignement Général et Professionnel, a Canadian publicly funded post-secondary education pre-university, collegiate technical college exclusive to the province of Quebec's education system.

LSAY: Longitudinal Surveys of Australian Youth, a study that follows young Australians over 10 years, from their mid-teens to mid-twenties, as they move through school to further study, work and beyond.

OECD: Organisation for Economic Co-operation and Development, an international organisation that works to build better policies for better lives, with the goal of shaping policies that foster prosperity, equality, opportunity and well-being.

PISA: Programme for International Student Assessment, a worldwide study by the Organisation for Economic Co-operation and Development in member and non-member nations intended to evaluate educational systems by measuring 15-year-old school students performance on maths, science, and reading.

RIEF: Research Innovation and Expansion Fund, a once off injection of research funding during the 2000's which increased research output at the time, including published reports and scholarly articles.

RTO: Registered Training Organisation, training providers registered by the Australian Skills Quality Authority (ASQA) or in some cases, a state or territory registering and accrediting body to deliver training and/or conduct assessments and issue national recognised qualifications in accordance with the Australian Quality Training Framework or the VET Quality Framework.

STEM: Science, Technology, Engineering and Mathematics, an approach to learning and development that integrates the areas of science, technology, engineering and mathematics.

TAFE: Technical and Further Education, a government training provider which provides a range of technical and vocational education and training (TVET) courses and other programs (e.g. entry and bridging courses, language and literacy courses, adult basic education courses, Senior Secondary Certificate of Education courses, personal enrichment courses, and small business courses).

ToR: Terms of Reference used to guide the Review of senior secondary pathways into work, further education and training, sourced from <https://www.pathwaysreview.edu.au/terms>

VET: Vocational Education and Training, post-compulsory education and training, excluding degree and higher-level programs delivered by further education institutions, which provides people with occupational or work-related knowledge and skills.

VETiS: Vocational and Educational Training in Schools, providing senior school students with the opportunity to acquire skills in the workplace and knowledge through nationally recognised

qualifications from industry-developed training packages or accredited courses while they are still at school.



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