

Smart Australians

Education and innovation in Australia



Australians

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Foreword

When social critic Donald Horne called Australia “The Lucky Country” it wasn’t a compliment. While other countries in the 1960s were growing their wealth through the clever use of technology and innovation, Horne thought Australia showed less enterprise than almost any other prosperous industrial society, instead relying on its natural resources for economic prosperity.

The Australia of today is a very different place as we charge ahead in social and economic development.

What is it about Australia, 16,000 kilometres from Europe, that ranks it the second highest in an international measure of well-being, the Human Development Index? And what is it about this nation, with a 200 year young constitution, that makes it the 12th largest economy in the world?

The answer surely has to, in part, be due to the Australian “spirit” and enterprising nature. Australians have an inherent thirst for knowledge and desire for discovery and the latest AMP.NATSEM Income and Wealth Report *Smart Australians* paints a picture of modern day Australia as a country that values and invests in education.

Australians go the extra mile to make sure their children receive the best possible education which is now one of the top 15 expenditure items for Australian families. Over recent years, family spending on preschool and primary education has increased by 79 per cent and spending on secondary education has increased even more by 101 per cent.

Public and private investment in education is paying off as we raise a generation of children that are more likely to stay in school and more likely to go to university.

Education levels are on the rise with Australians spending an average of 12 years in school. Participation in tertiary education has jumped substantially with more than 44 per cent of 25–34 year olds having a tertiary education, compared to about 30 per cent of 55–64 year olds. One of the founding fathers of the United States, Benjamin Franklin, said it best when he stated that: “An investment in education pays the best interest”.

New arrivals to Australia are further bolstering our education levels. Australia has a highly educated migrant population and younger migrants in particular are far more likely to hold a Bachelor Degree or above than those born in Australia.

A better educated population leads to more innovation. The *Smart Australians* report shows Australia punches well above its weight in this endeavour, being granted more than its share of patents at 10 per cent of the world’s total and making significant increases in research and development funding. We have also seen a strong upward trend in the number of local trademark applications.

It is this innovation that drives our economic growth and marks our nation’s progress.

Australia’s competitive advantage is its lifestyle. A well-resourced education system and a culture of innovation are crucial components of this enviable lifestyle and investing in both will help ensure our nation is indeed a truly lucky country.



Craig Meller
Managing Director
AMP Financial Services

Introduction

Australia's trajectory as a modern developed nation depends on a highly skilled, educated and innovative population and workforce. Successive governments have reiterated this as a key outcome for policies relating to education, training and skills.

The current Australian government has established clear goals aimed at enhancing Australia's competitiveness and productivity in the global market. These goals include the target of a workforce of which 40 per cent of 25 to 34 year olds will hold a Bachelor Degree or higher by 2025, 20 per cent of students from a low socio-economic status will be attending university by 2020 and social inclusiveness will be supported and achieved through education and workforce participation.

Our nation has progressed and prospered with the help of industrious Australians. We are a nation of inventors, born in part through our isolation from the rest of the world. Our indigenous people are among those inventors, carving out ingenious ways to hunt for food and craft musical instruments.

Australians are responsible for some of the most innovative, life-changing and life-saving inventions available to mankind. It was an Australian who allowed the deaf to hear through the invention of the cochlear implant and an Australian who developed spray-on skin for burn victims.

The quality of education and the capacity to innovate are critical to a nation's prosperity. The Australian Federal Government now invests around \$30 billion in the education sector, the third most significant area of budget spending behind social security and health. So how should we assess the state of the Australian education system, and how does our progress as a nation stand up to international comparison? Are we seeing a return on the nation's investment in education?

In this 32nd AMP.NATSEM report, we will look at how educated and innovative Australians are, how this has changed over time and how we compare to other countries around the world. We explore how Australians participate in education, from preschool through to university, achievement in literacy and numeracy, the pathways school leavers take and whether gaining an education pays off in future earnings.

The quality of education and the capacity to innovate are critical to a nation's prosperity.

Investing for the future

Funding for education can no longer be seen as a purely financial matter, but should be considered an investment in the human capital formation of our future. (Gonski, 2011)

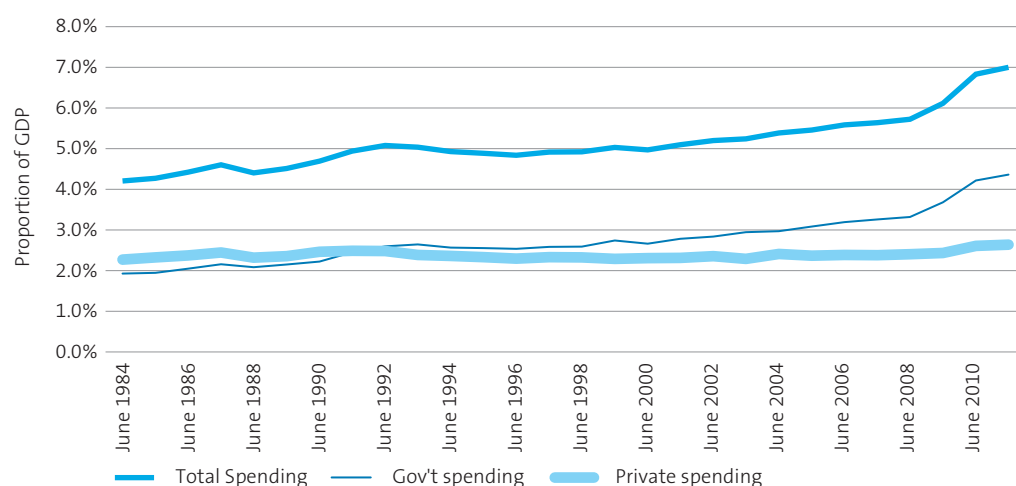
The level of public and private expenditure on education shines a light on the importance that households and governments place on schooling as a vehicle to improve and strengthen Australia's economic and social fabric.

As noted by the Federal Government's Gonski Review, funding for education can no longer be seen as a purely financial matter, but should be considered an investment in the human capital formation of our future (Gonski 2011).

Australian expenditure levels on education are currently at around 7.1 per cent of our Gross Domestic Product (GDP), which includes private as well as government expenditure (Figure 1).

Over the past 30 years, public and private expenditure as a proportion of GDP has been increasing, from around 4 per cent of GDP in 1984 to over 7 per cent in 2012. A closer examination of government versus private spending shows that private expenditure has remained relatively stable, at around 2.5 per cent of GDP. Government expenditure has increased considerably, rising above private spending in 1990, shortly after the Higher Education Contribution Scheme was introduced in 1989.

Figure 1 Public and private expenditure on education as a proportion of GDP, 1984–2010

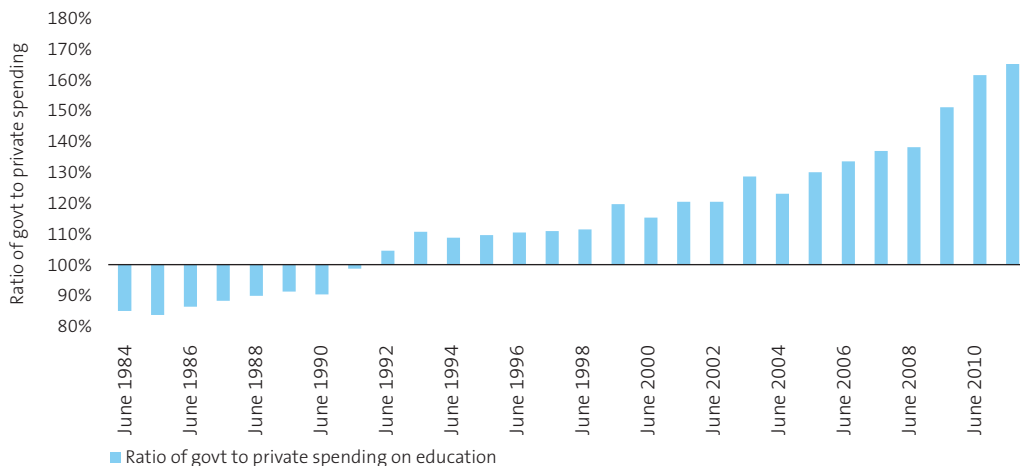


Source: NATSEM calculations from Australian National Accounts ABS Cat No. 5204

Note: Private expenditure on education includes gross fixed capital formation and gross final consumption expenditure from private sources. Government expenditure on education includes gross fixed capital formation and gross final consumption expenditure from government sources.

Changes in the ratio of government to private expenditure are illustrated in Figure 2, with government expenditure 85 per cent of private contributions in 1984, achieving parity in 1991, and rising substantially above private expenditure throughout the latter part of the 2000s. Currently, government expenditure is 65 per cent higher than private contributions.

Figure 2 Ratio of government to private expenditure on education, 1984–2010

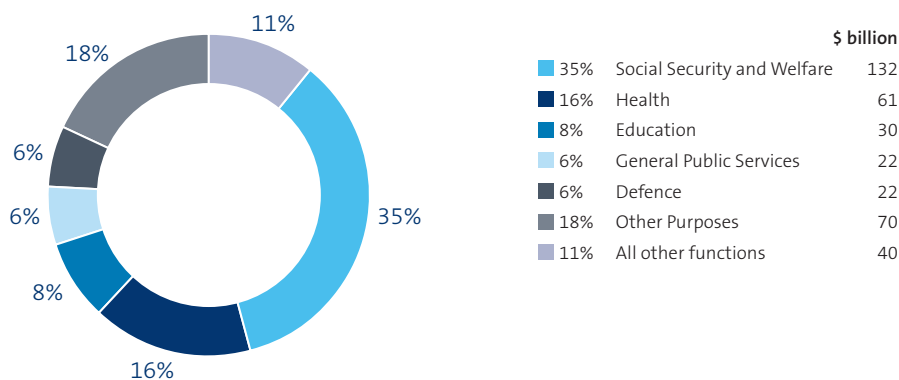


Source: NATSEM calculation from Australian National Accounts ABS Cat No. 5204

Note: Private expenditure on education includes gross fixed capital formation and gross final consumption expenditure from private sources. Government expenditure on education includes gross fixed capital formation and gross final consumption expenditure from government sources.

The proportion of the Federal Budget allocated to education, compared to other issues of national concern, illustrates the priority given to this sector. For the 2012–13 financial year, the government has allocated almost 8 per cent of the budget towards education funding at all levels (Figure 3).

Figure 3 Australian Federal Government Budget 2012–13



Source: Treasury, 2012 Budget Overview 2012–13

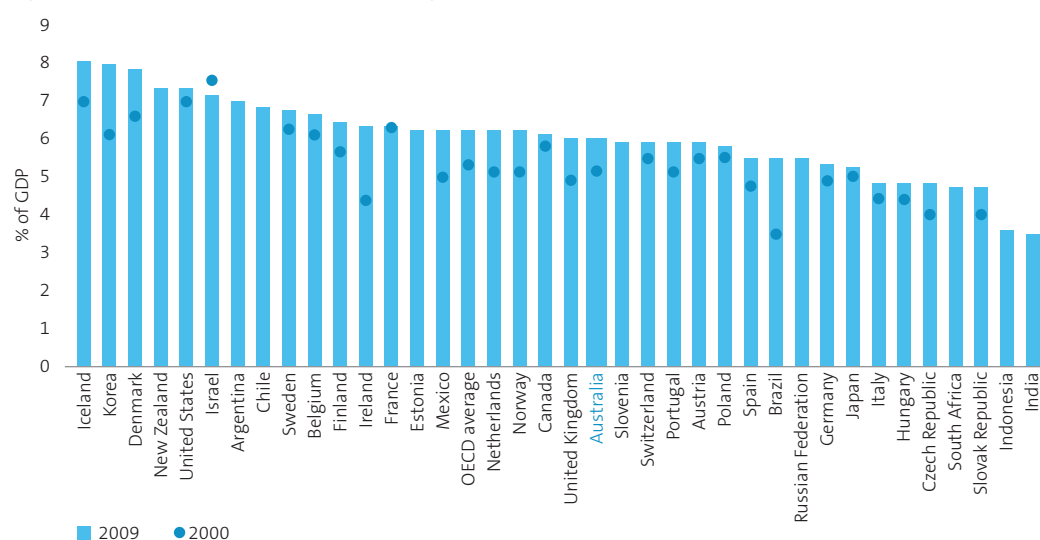
Note: The other purposes function includes expenses incurred in the servicing of public debt interest, and assistance to state, territory and local governments. This function also includes items classified to natural disaster relief, the contingency, and expenses related to the nominal interest on unfunded liabilities for government superannuation benefits.

International standing

When comparing education expenditure internationally, the Australian government (Federal and states) commits around 6 per cent of GDP, slightly below the Organisation for Economic Cooperation and Development (OECD) average of 6.2 per cent (Figure 4).

This places Australia 20th out of 37 in overall OECD country rankings for education expenditure. Iceland, South Korea, Denmark, the United States and Israel, along with our neighbouring New Zealand, commit the largest proportion of public expenditure to education. Expenditure on education has increased in Australia over the past nine years, from 5.2 to almost 6 per cent of GDP.

Figure 4 Estimates of education spending by OECD countries as a proportion of GDP, 2000 and 2009



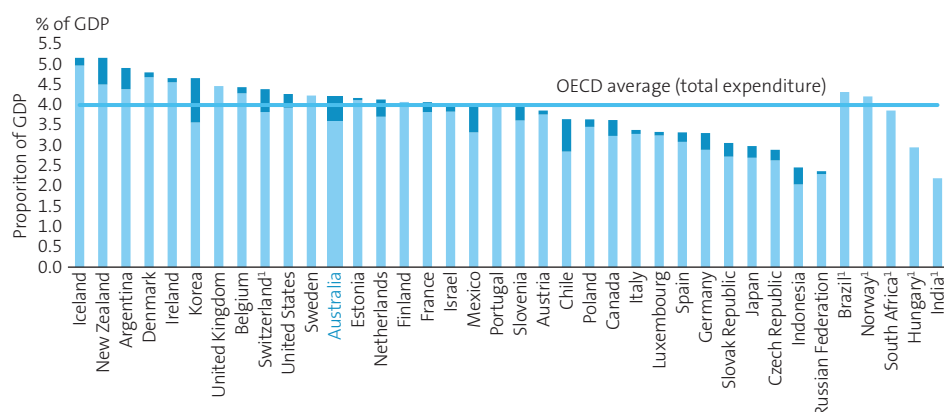
Source: OECD 2012 Education at a Glance, Indicator B2.1 Public Spending on Education

Note: 1. Public expenditure only (for Switzerland, in tertiary education only; for Norway, in primary, secondary and post-secondary non-tertiary education only; for Estonia, New Zealand and the Russian Federation, for 2000 only). Countries are ranked in descending order of expenditure from both public and private sources on educational institutions in 2009.

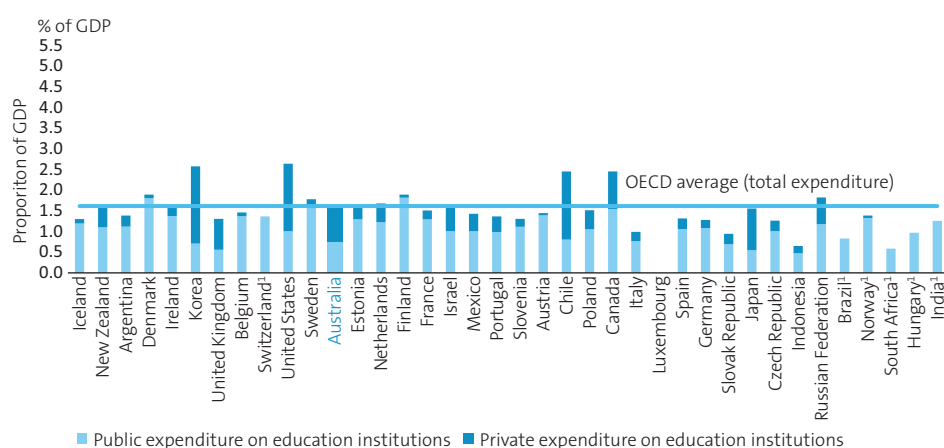
Figure 5 looks further into the breakdown of Australia's education spending between public and private sources. At around 3.6 per cent of GDP, public expenditure in Australia accounts for three quarters of total education spending. However, the balance between public and private spending is different between tertiary and non-tertiary sectors. While Australian government spending on private, secondary and other non-tertiary education accounts for nearly 90 per cent of overall spending, over half of tertiary education spending is private. OECD data reveal some remarkable patterns of private investment in education. In Korea, for example, more than two thirds of spending on tertiary education (nearly 2 per cent of Korean GDP) comes from private sources. Overall, private spending on education in Korea amounts to 3 per cent of GDP, significantly more than in the United States.

The Australian government commits around 6 per cent of GDP to education, slightly below the OECD average of 6.2 per cent.

Figure 5 Public and private education spending by OECD countries as a proportion of GDP (2009)
Primary, secondary and post-secondary non-tertiary education



Tertiary education

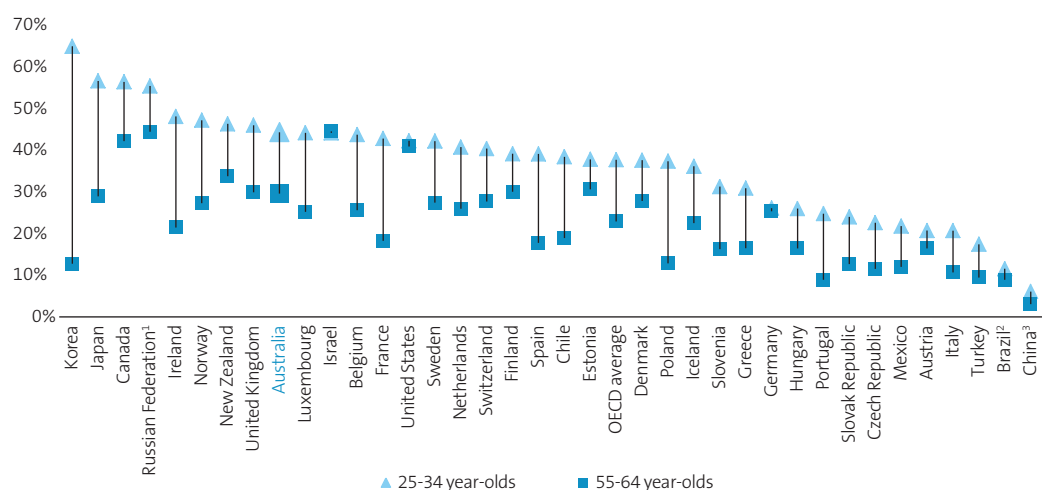


Source: OECD 2012 Education at a Glance, Indicator B2.2 Spending on Education by source
Note: Public expenditure only (for Switzerland, in tertiary education only; for Norway, in primary, secondary and post-secondary non-tertiary education only). Countries are ranked in descending order of expenditure from both public and private sources on educational institutions in primary, secondary and post-secondary non-tertiary education. See technical notes for further information about OECD definitions.

How educated are Australians?

Education participation has increased substantially over the past decades, especially post-school education. While average years of schooling has increased marginally from 11.6 years in 1980 to 12 years in 2011; participation in tertiary education has jumped substantially. This measure includes those that have completed Tertiary-type A and B education, such as a Bachelor or Vocational course. More than 44 per cent of 25–34 year olds have achieved a tertiary education, compared to 29.6 per cent of 55–64 year olds (Figure 6). Compared with OECD countries, Australia ranks 9th in terms of tertiary attainment for the 25–34 year age group. Korea has sky-rocketed ahead over the years, with large generational shifts evident – with only 13 per cent of 55–64 year olds attaining a tertiary degree, compared to two-thirds of all 25–34 year olds (Figure 6).

Figure 6 Population that has attained tertiary education, OECD countries, 2010



Source: OECD (2012), Education at a Glance, Table A1.3a. See Annex 3 of report for additional notes (www.oecd.org/edu/eag2012).

Note: Tertiary education is defined here according to the International Standard Classification of Education (ISCED 1997) classifications. See technical notes for further details. 1. Year of reference 2002. 2. Year of reference 2009. 3. Year of reference 2000. Countries are ranked in descending order of the percentage of 25–34 year-olds who have attained tertiary education.

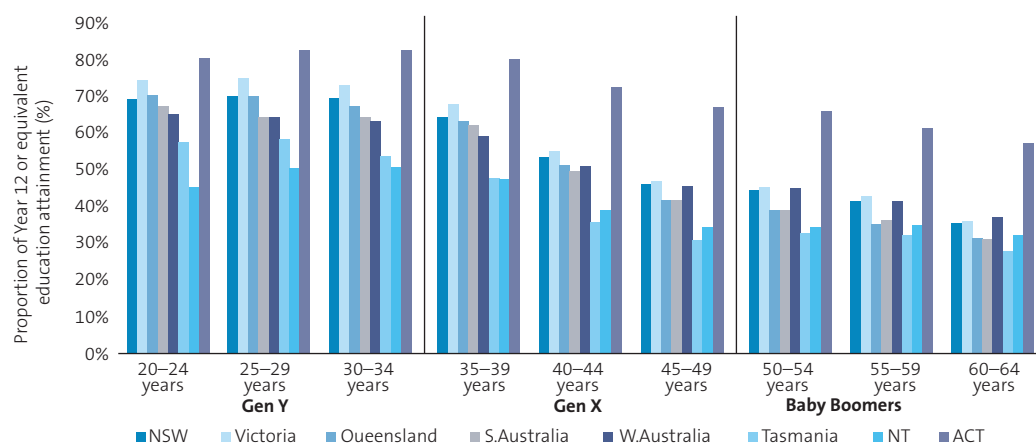
Participation in tertiary education has jumped substantially. More than 44 per cent of 25–34 year olds have achieved a tertiary education, compared to 29.6 per cent of 55–64 year olds.

66 per cent of Gen Y's have completed Year 12, compared to 40 per cent of Baby Boomers.

The increase in educational attainment, particularly completion of Year 12 or equivalent, is noticeable across generations (Figure 7). Using attainment of Year 12 or equivalent qualification, it is clear that Gen Y (those aged 20–34 years) has achieved higher educational outcomes than older Australians, with on average 66 per cent of Gen Y's completing Year 12.

For the Baby Boomer generation, Year 12 attainment was less common, with on average 40 per cent of this generation completing Year 12, whereas around 52 per cent of Gen X have acquired Year 12. Figure 7 also illustrates the high proportion of people living in the ACT, across all generations, who have achieved a Year 12 or equivalent education and the very low proportion of people residing in the Northern Territory who have attained this level of education.

Figure 7 Year 12 or equivalent education attainment across generations, by state and territory, 2011

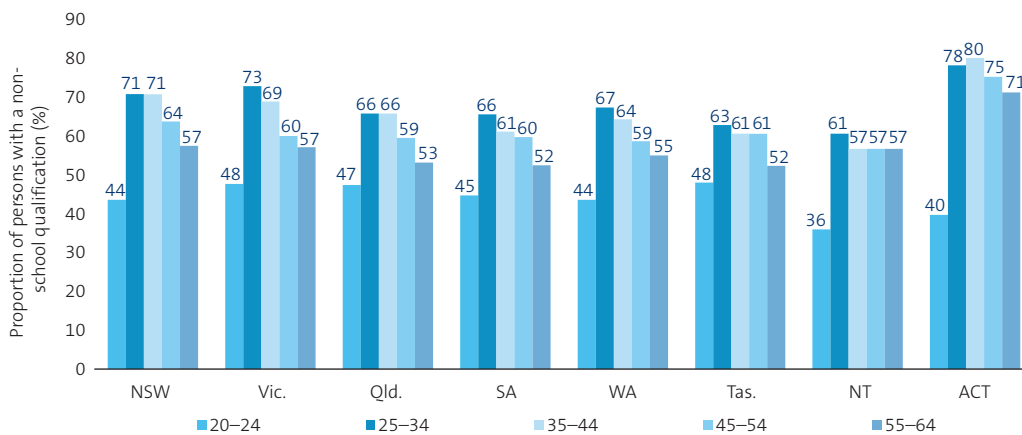


Source: NATSEM calculations from 2011 Census Table Builder

Data from a recent survey of education and work shows that the most highly educated people are located in the Australian Capital Territory, with one quarter of those aged between 15–64 years holding a Bachelor Degree.

On average, those in the ACT are twice as likely to hold a postgraduate qualification – about 9 per cent of the total surveyed population, as opposed to the rest of Australia at 4.5 per cent. Of those aged between 35 and 44 years in the ACT, 80 per cent have a non-school qualification (Figure 8). A non-school qualification refers to higher education such as a Post Graduate Degree, Graduate Diploma, Bachelor Degree, Advanced Diploma or Certificate. NSW comes in a close second with around 71 per cent of those aged 35–44 years having a non-school qualification.

Figure 8 Proportion with non-school qualification by state and territory, 2011



Source: NATSEM calculations from the 2011 ABS Survey of Education and Work, ABS Cat No. 6227.0

Note: Includes all qualifications beyond Year 12 or equivalent.

Level of education varies significantly across age groups and Australian states and territories. One of the largest differences is in the ACT where residents have, on average, about twice the educational attainment of other states. This is likely to be due to the highly organised and formal sector of employment in this area and the presence of highly skilled government and university jobs.

The emphasis on a skilled population can also be seen through Australia’s immigration policy, which reflects a highly educated migrant population, especially those who were born in non-English speaking countries. Results from a previous AMP.NATSEM report – ‘Calling Australia home’, reveal that younger migrants in particular are far more likely to hold a Bachelor Degree or above than those born in Australia – around 46 per cent of 25–34 year olds, compared to 20 per cent of those born in Australia.

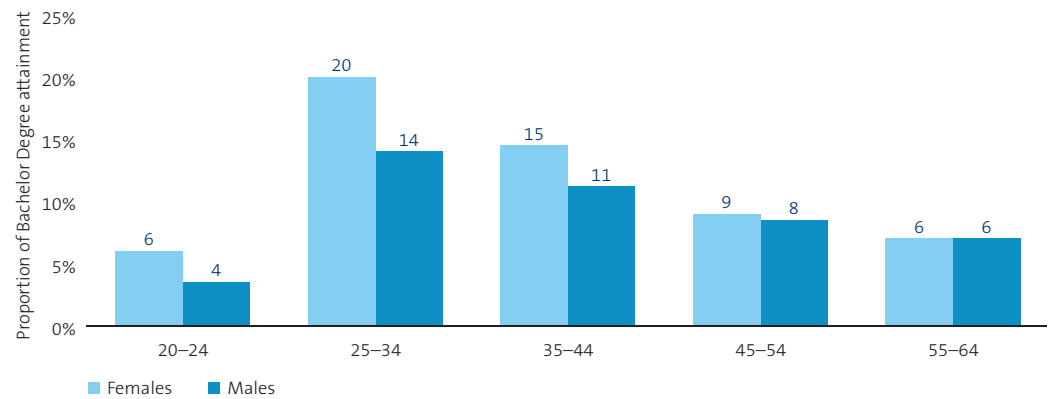
Higher education

The number of people with a university-level degree has increased from 17 per cent to 23.7 per cent over the past decade.

University

The number of people with a university-level degree has increased significantly over time, increasing from 17 per cent to 23.7 per cent over the past decade, with over 3.5 million Australians currently holding a Bachelor Degree or higher. Women, in particular, are far more likely to gain a Bachelor Degree than men – a trend that is seen across all age groups and a gap that continues to widen with about 300,000 more women with this qualification than men. These differences are particularly noticeable in the younger age groups, with many more women obtaining a Bachelor Degree than men (Figure 9). This pattern is not only likely to be influenced by changes in social paradigms, but also educational standards, with fields such as nursing moving into the higher tertiary sector.

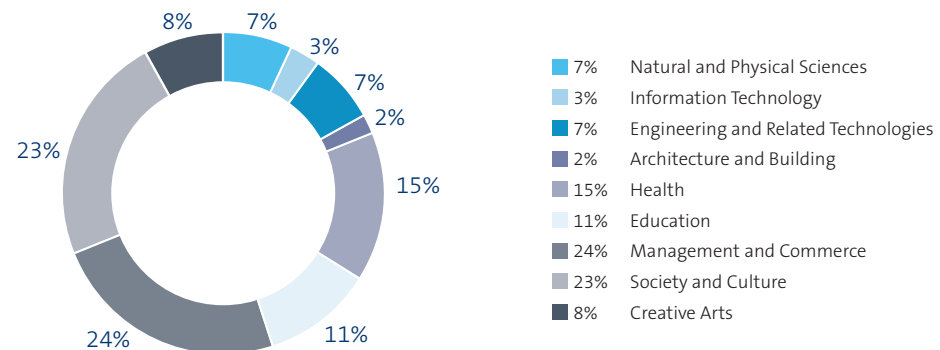
Figure 9 Bachelor Degree attainment across gender, 2011



Source: NATSEM calculations from the 2011 ABS Survey of Education and Work, ABS Cat No. 6227.0

The most popular courses at university, as gauged by current enrolments in a Bachelor Degree, are Management and Commerce and Society and Culture – comprising of 24 and 23 per cent respectively of all enrolments (Figure 10). Management and Commerce, includes courses such as accounting, business and human resource management and tourism; whereas Society and Culture incorporates courses such as history, politics, sociology, geography and languages.

Figure 10 Bachelor Degree enrolments by field of study, 2011



Source: NATSEM calculations from the 2011 ABS Survey of Education and Work, ABS Cat No. 6227.0

Note: Food, hospitality and personal services and agriculture, environmental and related studies have been excluded from this analysis due to small sample sizes. Please see technical notes for more information about field of study classifications.

Vocational education training

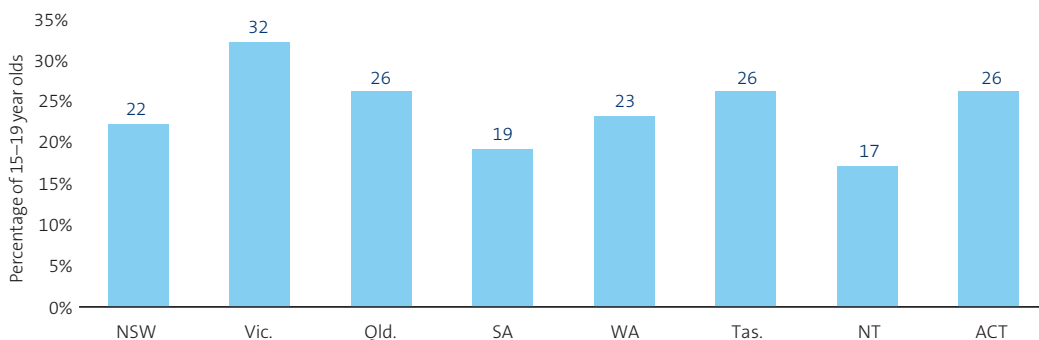
Vocational or technical education has played an important role in preparing people for the workforce and the specific vocation they wish to pursue. The level of vocational education training (VET) has significantly increased over the years to current enrolment levels of approximately 2 million students.

There has also been an increasing trend to combine schooling with VET training, reflecting shifts in delivery and demand from our education systems.

One of the key indicators of VET engagement is the proportion of those aged between 15–19 years who have successfully completed a unit of competency in a VET qualification at AQF (Australian Qualification Framework) Certificate II and above. This figure is at about 25 per cent across Australia.

A comparison by state and territory shows that 15–19 year old Victorians are more likely to hold a VET qualification than other states, with almost a third of this age group possessing this type of training (Figure 11). Around a quarter of 15–19 year olds in Queensland, Western Australia, Tasmania and the ACT have VET training, whereas only 17 per cent of those in the Northern Territory and 19 per cent in South Australia hold similar qualifications.

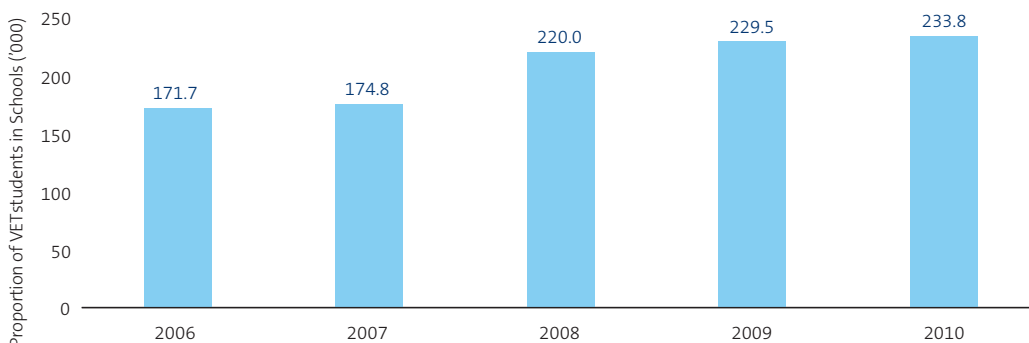
Figure 11 Proportion of 15 to 19 year olds successfully completing at least one unit of competency at AQF II or above by state and territory



Source: Australian Curriculum Assessment and Reporting Authority (ACARA), 2012

We are now seeing a growing trend of students combining high school education with VET training to provide a more holistic learning environment and access to increased pathways to further education or work. As of 2010, there were about 234,000 students enrolled in VET training in schools, which accounted for about 55 per cent of total VET students aged 15–19 years (Figure 12). A strong increase in VET enrolments in schools is observed between 2007 and 2008, as national and state high school curriculums embarked upon more flexible education programs.

Figure 12 VET participation in schools



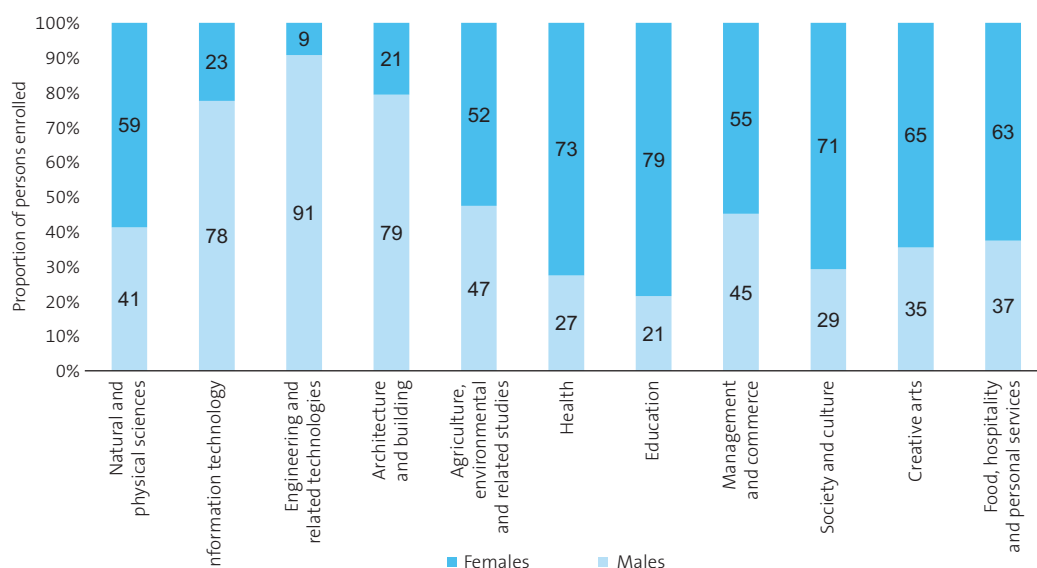
Source: NCVET, 2010

What they're studying

Significant gender divisions in enrolment rates for non-school qualifications are evident in the Australian tertiary education system and throughout the world. These differences often give rise to occupational and industrial segregation, which can in turn contribute to gender pay gaps.

Figure 13 illustrates these stark gender differences, with information technology, engineering, architecture and building courses all heavily skewed toward male student enrolments. Between 78 and 91 per cent of all students in these courses are men. Women, on the other hand, are much more likely to be enrolled in fields of study such as health, education, society and culture, hospitality and creative arts, with between 63 and 79 per cent of all enrolments women. A slightly higher proportion of women are also currently enrolled in management and commerce courses than men at 55 per cent of all enrolments.

Figure 13 Proportion of persons enrolled in non-school qualification by field of study and gender, 2011

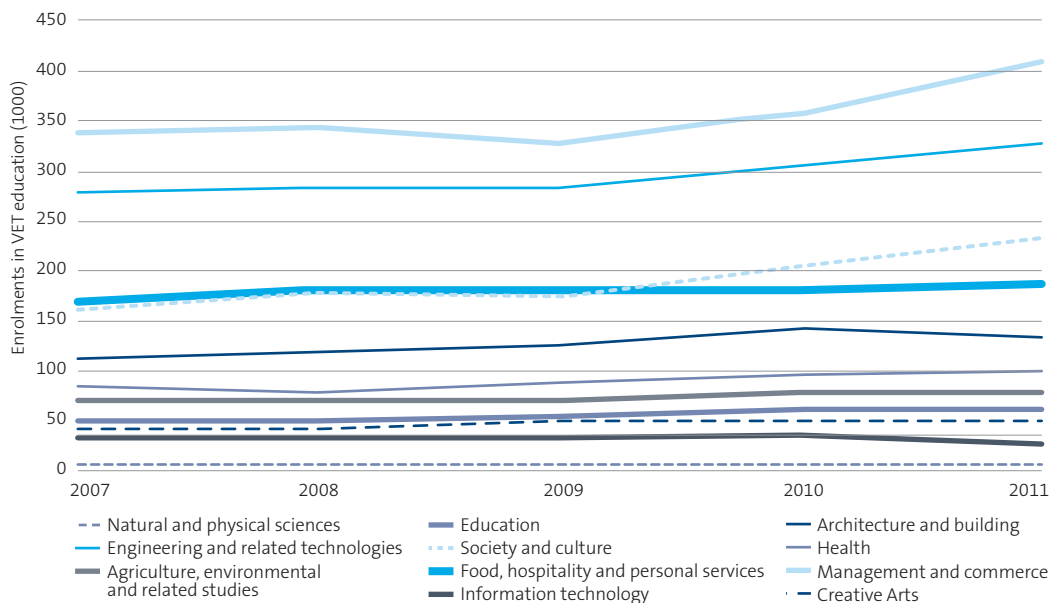


Source: NATSEM calculations from the 2011 ABS Survey of Education and Work, ABS Cat No. 6227.0

Note: Population is persons aged 20–64 years.

An analysis of VET student enrolments shows that the majority of students are studying in the field of management and commerce, which since 2009 has experienced a 25 per cent rise in enrolments (Figure 14). Enrolments in other areas such as agriculture, education, health and information technology have flat lined.

Figure 14 VET field of study, 2007 to 2010

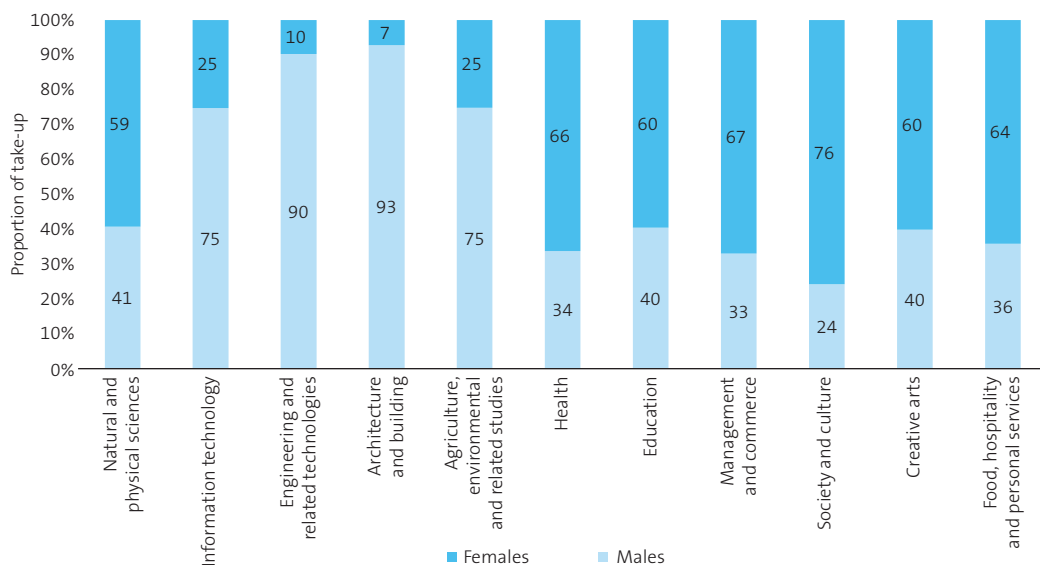


Source: NCVER, National VET in Schools Collection, 2006–10

Note: Figures are estimates because of relatively small sample sizes. Mixed field programmes and subject only – no field of education removed because of low relevance to topic.

Gender differences

Figure 15 Trade and apprenticeship take-ups by field of study and gender



Source: NCVER, 2010

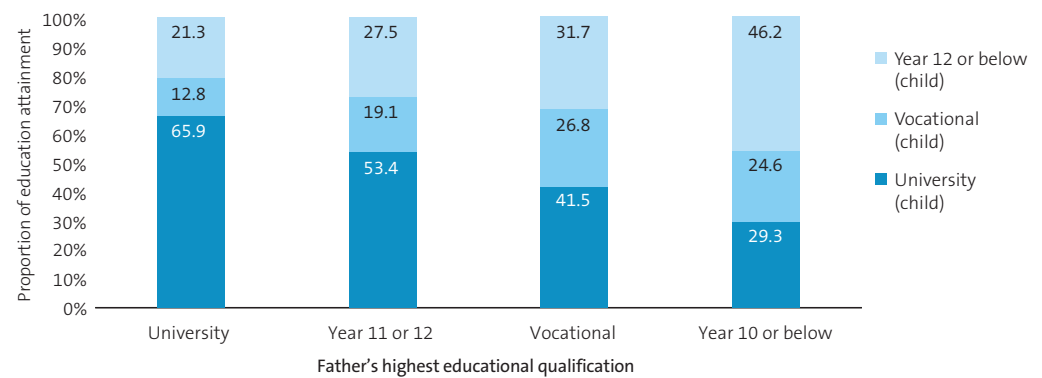
Note: Field of education is as per the Australian Standard Classification of Education, ABS cat no. 1272.0, July 2001.

Figure 15 reflects similar gender distinctions to those observed enrolled in non-school qualifications shown above. A large proportion of males are enrolled in education fields like Architecture and Building, Engineering and IT, relative to women. Women are more likely to be enrolled in courses under the umbrellas of Management and Commerce, Health, Education and Society and Culture.

Education for all?

While it is clear that educational attainment in Australia and throughout the world has been increasing, there still remains substantial differences in terms of access to higher education – particularly university education, with those from more lower socio-economic backgrounds unlikely to attain higher education. These differences have been uncovered in a previous report co-funded by the AMP Foundation, where it was found that a person whose father had achieved a university degree was much more likely to go on to university – 66 per cent, compared to those whose father only obtained Year 10 or below – 29.3 per cent (Figure 16).

Figure 16 Highest educational attainment of persons aged 30–44 years, by highest educational attainment of father



Source: Cassells et al (2011)

Note: Educational attainment of father is the educational attainment of the father when the child was aged 14 years. Where the father was not living in the household at age 14, the mother's education level has been used.

While it is clear that educational attainment in Australia and throughout the world has been increasing, there still remains substantial differences in terms of access to higher education.

School days

Preschool

Preschool covers the year before formal school and has the potential to provide a strong foundation for a child's development. Currently, preschool in Australia is relatively unregulated and is not compulsory.

The Federal Government is working towards a 2013 goalpost for every child to have access to quality early childhood education in the year before formal school and providing preschool access to all Australian four year olds for 15 hours per week, 40 weeks a year. Preschool education is separate from primary school in all states and territories, except Western Australia and Queensland where preschool education is provided as part of the primary school system.

Attendance numbers vary widely between the states, but 85.7 per cent of children attend preschool the year before school (ABS 2011c). In the three largest states – NSW, Victoria and Queensland – non-government preschools provide the greater part of preschool education (from 45 to 64 per cent), while in the other states and territories, the reverse holds with government preschools providing from 73 up to 90 per cent of total preschool episodes (Table 1).

Table 1 Episodes of preschool program attendance, Australia, 2011

	NSW	Vic.	Qld.	SA	Tas.	NT	ACT	Total
Total no. of episodes	66,041	65,026	35,527	17,042	6,658	2,931	5,082	198,307
Per cent to total	33.3	32.8	17.9	8.6	3.4	1.5	2.6	100.0
Preschool	%	%	%	%	%	%	%	%
Government	6.4	17.7	1.9	81.9	72.7	90.2	79.9	21.2
Non-government								
Community	50.2	58.7	41.1	2.7	0.0	0.0	0.0	43.5
Private for profit	0.0	1.5	1.4	0.0	0.0	0.0	0.0	0.8
Independent schools	0.0	3.9	2.1	0.0	8.1	3.1	0.0	2.0
Catholic schools	0.0	0.0	0.1	1.9	15.4	1.8	0.0	0.7
Total non-govt.	50.2	64.1	44.7	4.6	23.5	5.0	0.0	47.0
Total episodes of preschool only	56.6	81.8	46.7	86.5	96.2	95.2	79.9	68.1
Long day care with preschool	43.4	18.2	53.3	13.5	3.8	4.8	20.1	31.9
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: ABS Experimental Estimates of Preschool Education, Australia, 2011, ABS Cat No. 424.0

Note: The estimates do not represent a complete national picture of the early childhood education sector and have thus been labelled 'experimental'. Western Australia has not been included due to insufficient data.

*Estimates for non-government enrolment in the ACT are not yet available.

Care should be taken when interpreting these estimates.

Australian students rank amongst the top performers in the world.

The three R's

Australian schooling has transformed over the past century and will continue to evolve as we learn more about what contributes to a good education and how education can translate to a stronger society and economy.

In the 1870s, compulsory schooling was introduced in Australia for primary school children, with curriculum focussing on reading, writing and arithmetic and lessons were typically differentiated for girls and boys.

Girls traditionally learnt to sew and knit and boys were given more time to practice geometry and geography. These days, the importance of the three R's remains. However compulsory schooling has been extended for children aged up to 17 and the national curriculum now includes study of social relationships, the environment and information technology and classes are delivered around smart boards and laptop computers.

School participation and achievement has become increasingly important to parents, government and the broader society. National curriculum standards focus on keeping children in school for longer and bringing Australian kids up to an internationally competitive level.

Australia's international standing

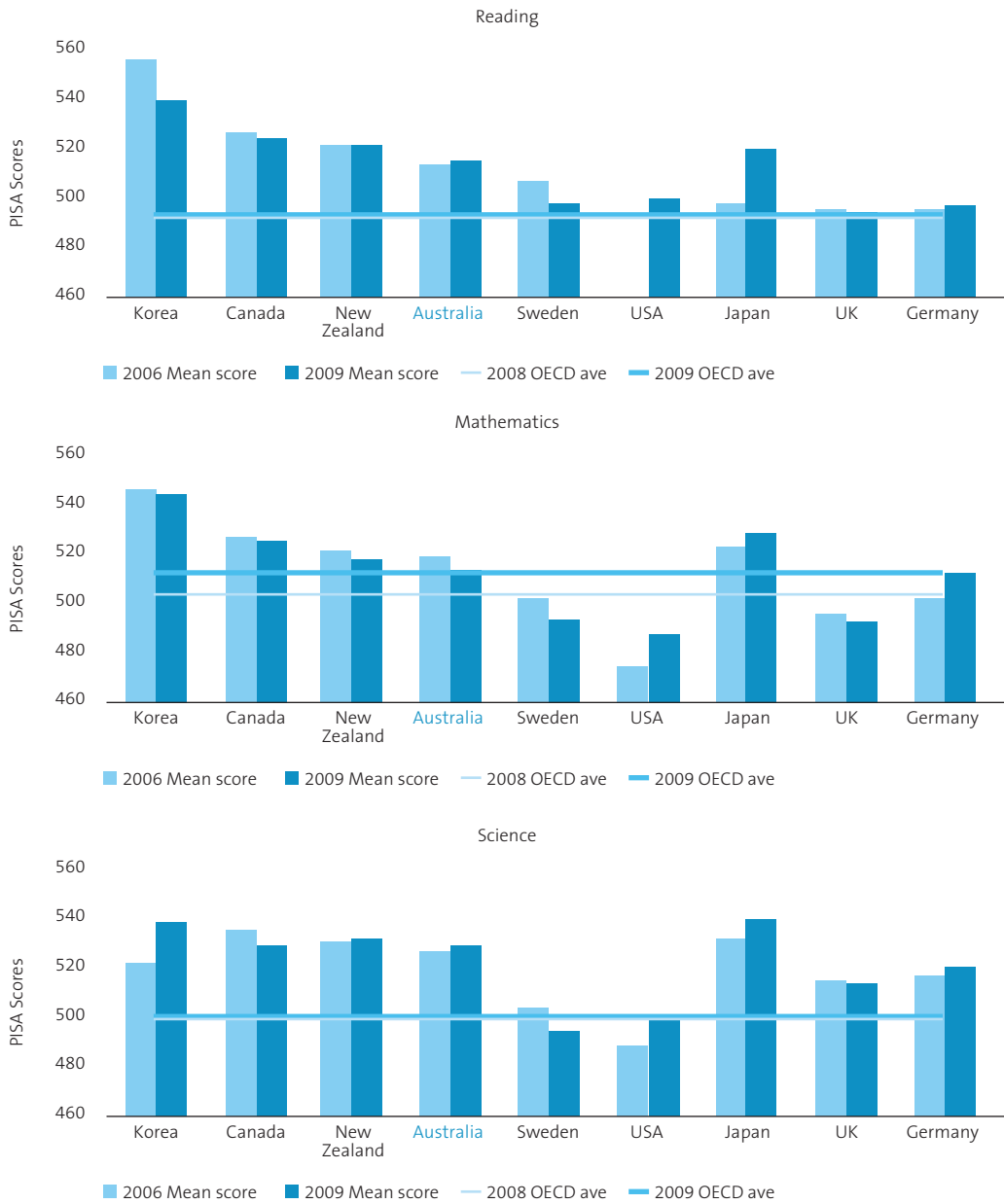
Has our substantial investment in education and the changing ways in which school days are organised impacted how our students stack up against their international peers? Is Australia's education system keeping up with the rest of the world?

The Programme for International Student Assessment (PISA) provides internationally comparable measures of student achievement at age 15 for over 70 countries. It measures how well young adults nearing the end of compulsory schooling are prepared to enter the workforce.

Australian students rank among the top performers in the latest PISA round (2009), ranking 6th in both reading and science literacy and 9th in mathematical literacy. Figure 17 shows the average score of selected OECD countries, comparing the most current PISA results and those for 2006.

We seem to be losing ground in mathematics, with the average score achieved by Australian students lower relative to previous years. Reading improved slightly and achievement in science remained unchanged from 2006 levels (Figure 17).

Figure 17 PISA average score in reading, mathematics and science across selected OECD countries, 2006 and 2009



Source: Programme for International Student Assessment (PISA) 2006 and 2009

Note: Students tested in these key subject areas are 15 years old.

Victoria, the ACT and NSW were ahead in 2009 – with their average Year 5 scores being above the national average for all subject tests.

Achievement across Australia

An increasing need to monitor and compare basic education skills led the Federal Government, in 2008, to introduce the National Assessment Program – Literacy and Numeracy (NAPLAN) as an annual assessment tool for students in Years 3, 5, 7 and 9. NAPLAN tests basic skills in reading, writing, spelling, grammar and numeracy and the assessments are undertaken annually across the nation.

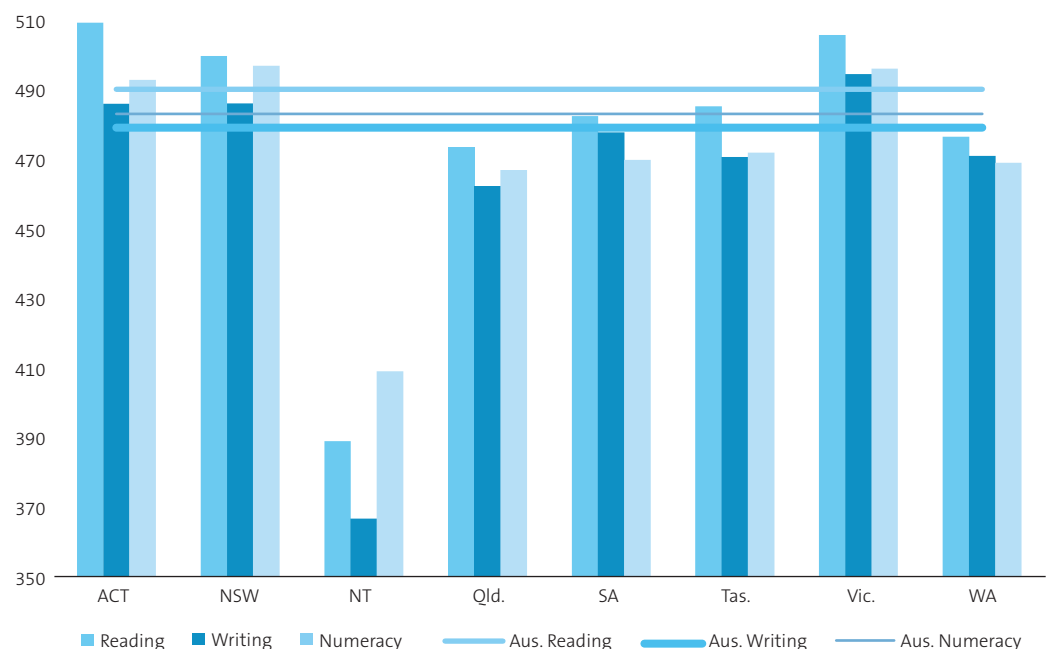
Since NAPLAN's introduction there has been a great deal of debate about the test's appropriateness, nevertheless this benchmark testing of students is valuable as it provides comparable information on student's literacy and numeracy performance nationally.

A snapshot of NAPLAN results for Year 5 students in 2009 is summarised in Figure 18 by state and territory. The NAPLAN results for every school were averaged for each state.

The average NAPLAN score for all five subject tests was 485. Victoria, the ACT and NSW were ahead in 2009 – with their average Year 5 scores being above the national average for all subject tests at 499, 497 and 496 respectively.

South Australia and Tasmania (at 478 and 477) were both slightly below the national average on nearly all subjects, followed closely by Western Australia and Queensland (473 and 469). The Northern Territory was the furthest behind all other states and territories, across reading, writing and numeracy.

Figure 18 Average Year 5 NAPLAN score, by state and territory, 2009



Source: NATSEM calculations from unpublished data, ACARA

Note: Schools where only five students or less took the test were excluded from analysis.

Which school?

Many parents grapple with the decision of whether to send their child to a public or private school. This decision is based on a number of factors including a preference for their child to receive a religious education, a wish for their child to go to the same school they did and beliefs about public and private schools having an inherent benefit to either the child or society.

In 2011 total enrolment in primary and secondary schools was about 3.5 million (Table 2). Government enrolments constitute the largest share although there is a noticeable difference between primary and secondary school — with 69 per cent of students in government schools at the primary level compared to 60 per cent at the secondary level.

Over the past decade, student enrolments in Catholic and independent schools have grown at a faster rate than government school enrolments and now account for 22 and 18 per cent respectively of secondary school enrolments.

Table 2 School enrolment^a by type of school and level, 1997, 2001 and 2011

		Year			Difference
		1997 %	2001 %	2011 %	1997 & 2011 %
Primary	Government	73.7	72.4	68.9	-4.8
	Catholic ^b	18.9	18.9	19.4	0.5
	Independent	7.4	8.7	11.7	4.3
	Subtotal	58.3	58.3	57.8	-0.6
Total	%	100.0	100.0	100.0	
Secondary	Government	65.8	64.0	60.3	-5.5
	Catholic ^b	20.5	21.0	22.0	1.5
	Independent	13.7	15.0	17.7	4.0
	Subtotal	41.7	41.7	42.2	0.6
Total	%	100.0	100.0	100.0	
	Number	3,182,955	3,280,949	3,529,519	346,564

a Based on full-time equivalent (FTE) students. The FTE of a part-time student is calculated by dividing the student's workload into that which is considered to be the minimum full workload for a full-time student by that state or territory (ABS, 2011b).

b Includes Catholic-affiliated independent schools.

Source: ABS National Schools Statistics Collection, ABS Cat No. 4221.0

Keeping kids at school

A good education is key to equipping young people with the skills they need to succeed in life, however not everyone in Australia has equal access to education. Of all university students, only 15 per cent are from a low socio-economic background (Cassells et al, 2011).

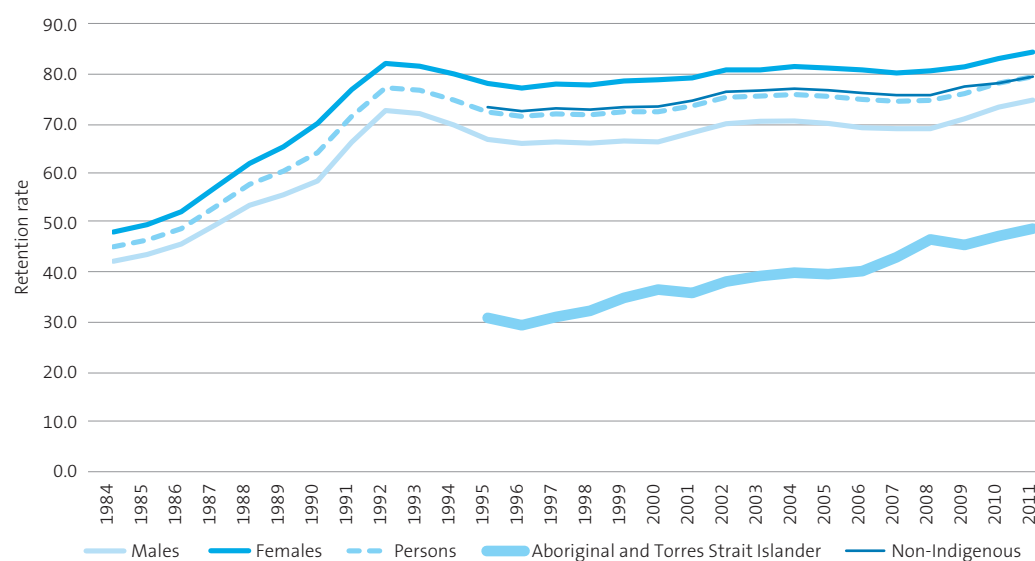
Raising the school leaving age is one way to keep young people in school longer and increase their chance to continue their education and succeed in the workforce. Over the past decade, various state governments have raised the minimum school leaving age to 17, reflecting the Australian government's overall initiative to increase education.

Completing Year 12 is regarded as a key factor in the formal development of a person's skills. Students who gain a secondary school education have a greater likelihood of continuing with further study or gaining employment (ABS, 2011a).

The Year 7/8 to Year 12 Apparent Retention Rate measures the proportion of Australian students continuing their secondary school education. Figure 19 provides a breakdown of the retention rate by gender and indigenous status. Between 1984 and 1992, the proportion of students continuing through to Year 12 increased rapidly, reaching 77 per cent in 1992 – from an initial 45 per cent in 1984. Retention rates peaking in the early 1990s are likely to be a result of the economic climate, with Australia entering into an economic downturn, leaving youth with very little labour market options, but to instead remain in school.

The overall retention rate since has remained relatively stable for both women and men although female students are more likely than males to continue through to Year 12. Indigenous Australians have much lower rates of Year 12 attainment when compared to non-indigenous Australians. Pleasingly, over the period 1995 to 2011, the indigenous Apparent Retention Rate increased strongly, reaching 49 per cent in 2011, from an initial 30 per cent.

Figure 19 Apparent Retention Rate — Year 7/8 to 12, 1984–2011



Source: ABS National Schools Statistics Collection, 2011

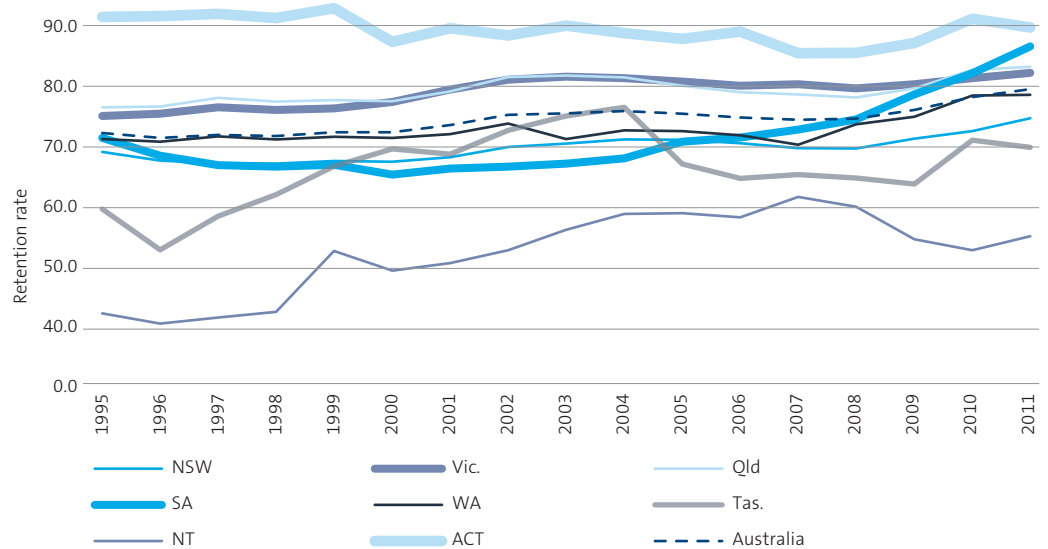
Note: See technical notes for further information about calculation of the apparent retention rate.

Of all university students, only 15 per cent are from a low socio-economic background.

As our state and territories operate relatively autonomous education systems, an analysis of retention rates for each state makes sense. The ACT, Queensland and Victoria's retention rates are above the national average. However, while Queensland and Victoria registered improvements over the period, the retention rate of the ACT declined from 91.1 in 1995 to 85.2 in 2008 (Figure 20).

The remainder of the states and territories observed retention rates below the national average. All registered improvements in retention rates over the period 1995 to 2011, although Tasmania has fluctuated from a high of 76.4 per cent in 2004 to 69.8 per cent in 2011.

Figure 20 Apparent Retention Rate — Year 7/8 to 12, by state/territory, 1995–2011



Source: ABS National Schools Statistics Collection, 2011

Note: See technical notes for further information about calculation of the apparent retention rate.

Average retention rates are highest for independent schools, followed by Catholic schools (see Table 3). Government schools have shown steady improvement over time, registering a 13.7 per cent improvement from 1997 to 2011.

Table 3 Apparent Retention Rate — Year 7/8 to 12, by school sector

	Year				% change
	1997 %	2001 %	2010 %	2011 %	1997 – 2011
Government	65.7	67.8	73.1	74.7	13.7%
Catholic	76.8	78.0	79.8	81.3	5.8%
Independent	98.8	94.5	94.2	93.7	-5.2%

Source: ABS National Schools Statistics Collection, 2011

Note: See technical notes for further information about calculation of the Apparent Retention Rate.

Transitions – where to from high school?

Young people leaving school have a big decision to make – will they head straight into the workforce, take a gap year, go on to tertiary or vocational study or juggle a combination of both?

About a decade ago (2001), 60 per cent of all school students aged 15–24 who had left school the previous year went on to further study – 28.9 per cent to University, 25.3 per cent to TAFE (diploma or certificate III/IV) courses and 5.9 per cent to Year 12 or below. In 2011, there was a slight decline in school leavers taking on further studies, with 57.5 per cent going on to higher education, TAFE or other study. While participation in university increased over the period, enrolments in lower level studies (particularly certificate III/IV decreased) decreased.

The proportion of all school leavers who were not enrolled increased from 39.8 per cent in 2001 to 42.5 per cent in 2011. Those that did not go on to further studies in the year following leaving school, were marginally more likely to be employed, than they were ten years ago – an increase from 25.1 to 25.8 per cent.

The greatest change in the composition of those ‘not enrolled’ school leavers was the increase in those not in the labour force (NILF) from 5.8 per cent in 2001 to 8.5 per cent in 2011 (see Table 4). This could be partly due to young Australians taking a gap year before going to university, which has become increasingly popular. A recent study by the National Centre for Vocation Education Research (NCVER) has estimated that the incidence of taking a gap year has increased from 10 per cent in 1999–2000 to 24 per cent in 2009–10 (NCVER 2012). Most go on to work, but 6 per cent are estimated to travel the world.

Table 4 School leavers^a aged 15–24 year olds by labour force status, 2001 and 2011

	2001 '000	2011 '000	2001 %	2011 %
Total	271.6	319.9	100.0	100.0
Whether enrolled and level of education of study in May				
Enrolled^b	163.6	184.0	60.2	57.5
Bachelor Degree or above	78.6	93.5	28.9	29.2
Advanced diploma & diploma	20.5	15.9	7.5	5.0
Certificate III/IV	48.4	47.2	17.8	14.8
Certificate I/II or Year 12 elsewhere ^c	16.1	17.4	5.9	5.4
Employed	91.6	101.1	33.7	31.6
Unemployed	15.1	13.9	5.6	4.3
Not in the labour force	57.0	59.1	21.0	18.5
Not enrolled	108.0	135.8	39.8	42.5
Employed	68.3	82.4	25.1	25.8
Unemployed	23.9	26.3	8.8	8.2
Not in the labour force	15.7	27.2	5.8	8.5
Highest year of school completed				
Year 12	185.5	229.4	68.3	71.7
Year 11 or lower	86.1	90.5	31.7	28.3

a School leavers are those persons enrolled in secondary school in 2010 (or 2000) but not enrolled in secondary school in May 2011 (or 2001) aged 15–24 years. The age group is expanded to accommodate differences in school leaving ages across states and territories.

b Includes formal and non-formal learning and ‘Level not determined’.

c Includes Certificate Level I and II and Certificate ‘not further defined’; persons enrolled in a school qualification at a non-school institution.

Source: NATSEM calculations from the ABS Survey of Education and Work, 2001 and 2011

Cost of education

The cost of education, both private and public, has received much attention of late, with a large review into school funding (Gonski 2011) and the introduction of the Education Tax Refund in 2008–09 in recognition of the additional pressure on families in meeting education expenses.

Costs of education can be a considerable component of the household budget, with many families having to pay for school fees, home tuition, text books and stationery, uniforms, school excursions, internet access, lunch orders, bus fares and 'voluntary contributions'. These costs typically continue for parents as their children go on to higher education, with many parents continuing to provide financial support after high school.

While attendance in Australian government schools is free, Catholic and independent schools charge tuition fees and many parents provide voluntary contributions to the public school their child is attending. These tuition fees vary widely. Estimates of the average cost of school tuition, levies and charges for the first year of primary and secondary school are provided in the next table. Tuition and associated costs in non-government schools (particularly independent schools) are noticeably higher than costs in government schools.

Across the states and territories at the primary level, tuition and associated costs in government and independent schools appear to be lowest in the ACT and WA, followed by NT, Queensland, SA and Tasmania where average schooling costs are below the national estimates (Table 5). New South Wales recorded the highest average costs in the independent primary school sector (\$11,565 on average), while Victoria had the highest average government tuition fees (\$535 on average). The estimated cost for Catholic schools appears to be more similar across the various states and territories.

Table 5 Estimated cost of school tuition, levies and charges, by level and sector, 2012

	ACT \$	NSW \$	NT \$	Qld. \$	SA \$	Tas. \$	Vic. \$	WA \$	Natl. \$
Primary									
Government	259	496	408	408	408	408	535	306	454
Independent	7,238	11,565	7,224	8,000	7,224	7,224	10,589	6,480	9,516
Catholic	3,077	3,140	3,669	3,385	3,669	3,669	2,314	3,098	3,043
Secondary									
Government	513	866	759	755	759	759	1,068	899	878
Independent	13,588	19,648	12,141	11,953	12,141	12,141	18,620	13,549	16,246
Catholic	7,769	7,895	7,318	8,645	7,318	7,318	7,830	7,884	7,973

Source: Australian Scholarships Group (ASG) schooling costs calculator: www.asg.com.au/calculator

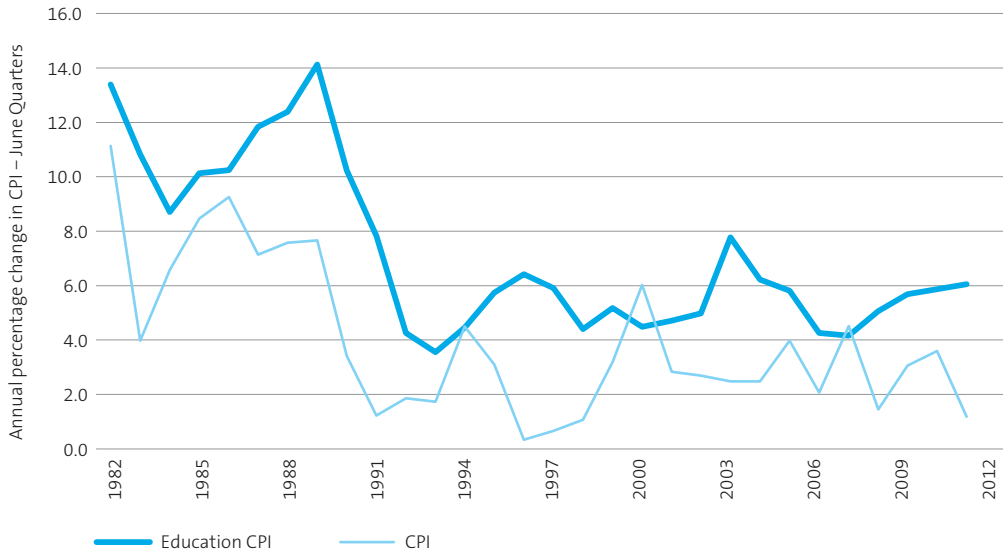
Notes: The above average cost estimates are for schools in metropolitan areas, for the first year of school at the primary/secondary level. The cost in regional schools is about 60 to 80 per cent lower than the cost in metropolitan schools.

Price movements in education compared to all consumer price movements over an extended period of time can be visualised in Figure 21. These prices incorporate school fees paid by households for primary (including preschool), secondary and tertiary education. Over the past 30 years, education prices have primarily remained above that of total prices.

A sharp decrease in the price of education was experienced in 1989 with the introduction of the Higher Education Contribution Scheme (HECS) – a system designed to make university education more accessible through waiving fees until a time where people were able to afford them.

Cost of education is amongst the top 15 expenditure items for Australian families.

Figure 21 Education and total price movements, 1982–2012



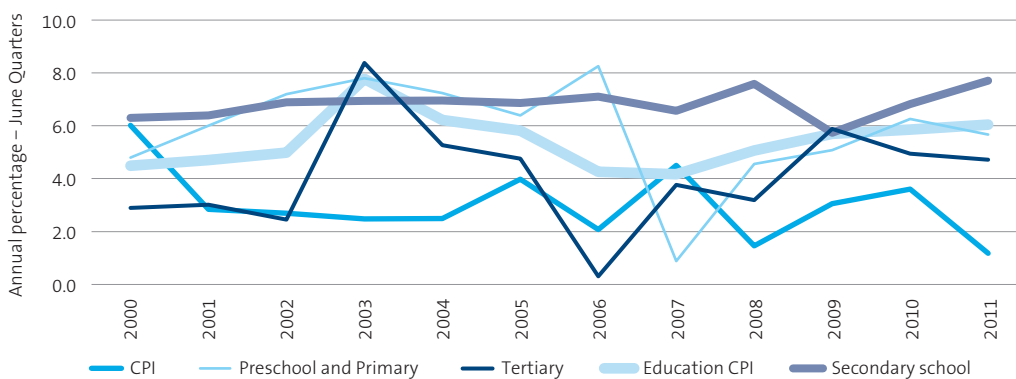
Source: NATSEM calculations from ABS Cat No. 6401.0, Table 11.

Note: The education group includes all expenditure on primary, secondary and tertiary education and preschool services.

Disaggregating education prices further by primary, secondary and tertiary sectors, the impact of significant policy changes and drivers of overall education price movements can be seen (Figure 22).

The peak in education prices shown in Figure 21 in 2003 is driven by a large increase in tertiary prices between 2002 and 2003 (Figure 22). Secondary school price movements have remained relatively flat over the period, falling between 2008 and 2009 and have since been rising between 2009 and 2012. Preschool and primary school price movements experienced a large drop between 2006 and 2007 – a product of the Child Care Tax Rebate, which covers many preschool students.

Figure 22 Price movements by education sector, 2000–2012



Source: NATSEM calculations from ABS Cat No. 6401.0, Table 11.

Note: Disaggregation by school sector is only available from 2000 onwards.

The recent AMP.NATSEM Cost of Living report showed spending on education is one of the top 15 expenditure items for Australian families, with total household expenditure on education increasing from around 2 to 4 per cent of all household budgets (Phillips et al. 2012). Over the period 2003–04 to 2009–10, average family spending on preschool/primary education increased by 79 per cent, while family spending on secondary education increased even more by 101 per cent.

Returns to education

The social and monetary value of education is considerable.

Does higher education pay off? Our everyday experience suggests education contributes positively to our life in many ways. Research around the world has long emphasised the social and monetary value of education to individuals as well as their families and societies in general.

Education provides greater labour market opportunities and other flow on positive impacts such as better health and social outcomes. This section looks at the difference a good qualification can make to a person's financial prospects by considering potential lifetime earnings.

The lifetime earnings figures are synthetic estimates based on annual employee income by five-year age groups for people aged 25–59 years and are expressed in 2011–12 dollar terms (see Technical Notes for further information).

It is important to note that while educational attainment is one of the primary drivers of earnings, other factors are also influential, including years of experience, the type of occupation and industry of work and other individual and environmental characteristics.

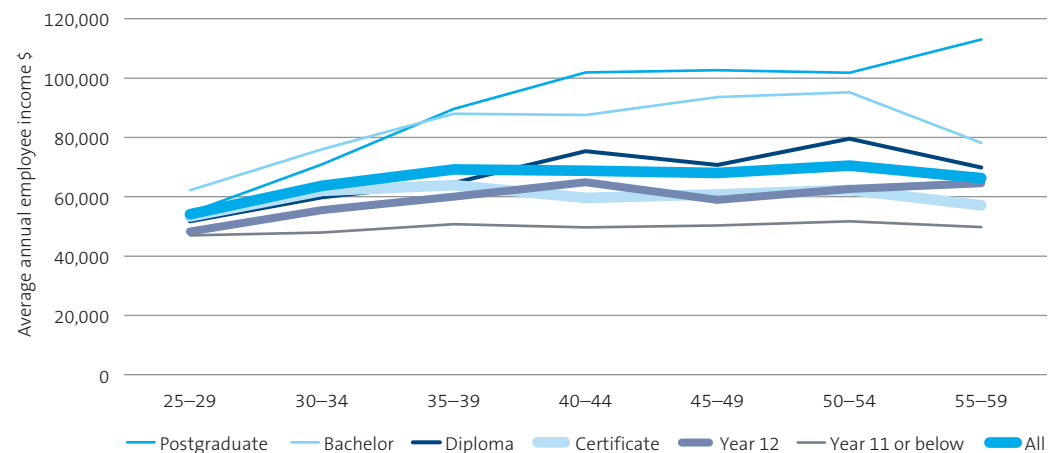
Average annual income

We begin by looking at patterns of average annual income from wages and salaries for 25 to 59 year-olds. In early working life, average annual income across educational levels ranges between \$48,000 and \$62,000, with those obtaining a Bachelor Degree earning more annually than all other education categories (Figure 23).

The gap between those with a higher education and those with lower education continues to widen across the life cycle, with people holding a Postgraduate Degree surpassing those with a Bachelor Degree at around age 35–39 years.

The earnings gap tends to be wider in the 40s and early 50s, with more educated people experiencing a steep income growth trajectory as they climb through their professional careers. Average salaries of their peers with lower educational attainment only marginally increase, largely remaining flat over their working life.

Figure 23 Average annual employee income for persons of working age 25–59 years, 2011–12



Source: NATSEM calculations from 2009–10 Survey of Income and Housing Basic Confidentialised Unit Record. For more details see Table 7 in the Appendix.

Note: Post Graduate includes Post Graduate Degree, Graduate Diploma and Graduate Certificate. Diploma includes Advanced Diploma.

The level of a person's educational qualification also has a great influence over what type of occupations they have. A vast majority of those with a postgraduate qualification or Bachelor Degree work as managers and professionals, which usually attract higher wages and salaries. In contrast, people with low educational qualifications fill lower paid jobs such as in sales and manual labour roles.

As Table 6 shows, more than four in five postgraduates (83.7 per cent) and three in four Bachelor Degree holders (74.4 per cent) work as managers and professionals compared to only two in five diploma trained (42.5 per cent) and one in seven early school leavers. Over two-thirds of people who do not complete school and receive no vocational training work as clerks, sales persons and manual labourers.

Table 6 Per cent distribution of persons aged 25–59 years by occupation in main job by education level

	Managers and Professionals %	Technicians and Trade workers %	Community and Personal Service Workers %	Clerical and Sales %	Machinery Operators and Labourers %
Postgraduate	83.7	1.6	2.9	9.7	2.1
Bachelor	74.4	4.9	5.1	12.3	3.1
Diploma	42.5	9.7	16.0	24.4	7.4
Certificate	16.6	33.2	13.2	18.3	18.3
Year 12	28.5	9.3	8.4	35.2	18.6
Year 11 or below	13.7	9.9	7.6	31.4	37.2
All	39.4	12.9	8.8	22.2	16.4

Source: NATSEM calculation from 2009–10 Survey of Income and Housing Basic Confidentialised Unit Record File (CURF).

Note: Post Graduate includes Post Graduate Degree, Graduate Diploma and Graduate Certificate. Diploma includes Advanced Diploma.

A postgraduate woman aged 25 years can expect to earn \$2.49 million, just two-thirds of her male counterpart's lifetime earnings (\$3.78 million).

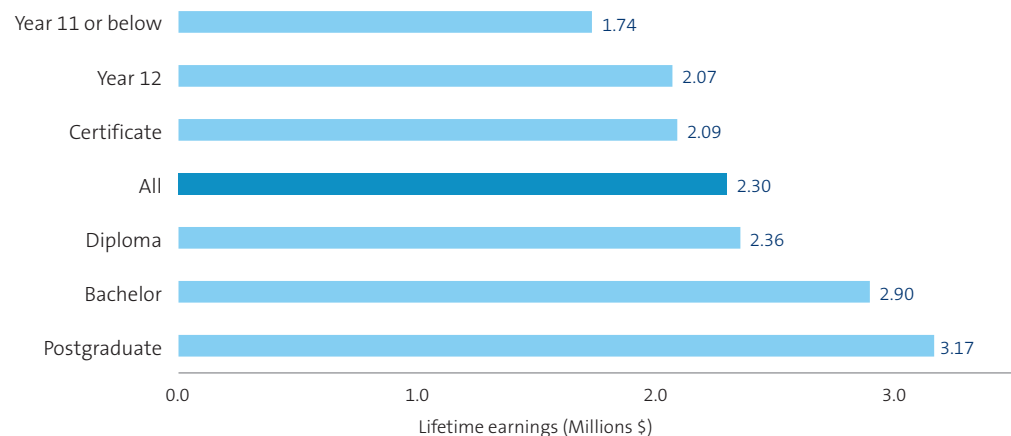
Lifetime earnings

Assuming that people aged 25 years now will experience the earning patterns shown in Table 4, we can project potential total lifetime earnings (Figure 24). The value of education is clear – a person with a Postgraduate Degree will earn more than \$3.17 million over their lifetime, almost 1.8 times the projected lifetime earnings (\$1.74 million) of a person with just Year 11 or less education.

A person with a Bachelor Degree will also have a high return on education, earning around \$2.9 million over their lifetime, or almost 1.7 times someone with Year 11 or below.

People with a Postgraduate Degree are those who have already obtained a Bachelor Degree and include individuals who have gone on to further studies, acquiring a PhD, Masters or Graduate Diploma/Certificate.

Figure 24 Lifetime employee income of persons at age 25 years, highest educational attainment



Source: NATSEM calculation from 2009–10 Survey of Income and Housing Basic Confidentialised Unit Record File.

Note: Values are in 2011–12 dollars. Post Graduate includes Post Graduate Degree, Graduate Diploma and Graduate Certificate. Diploma includes Advanced Diploma. Lifetime earnings estimates are derived from all employees, including those working part-time.

While level of education is an important factor in a person's lifetime earnings prospects, men and women tend to have different outcomes.

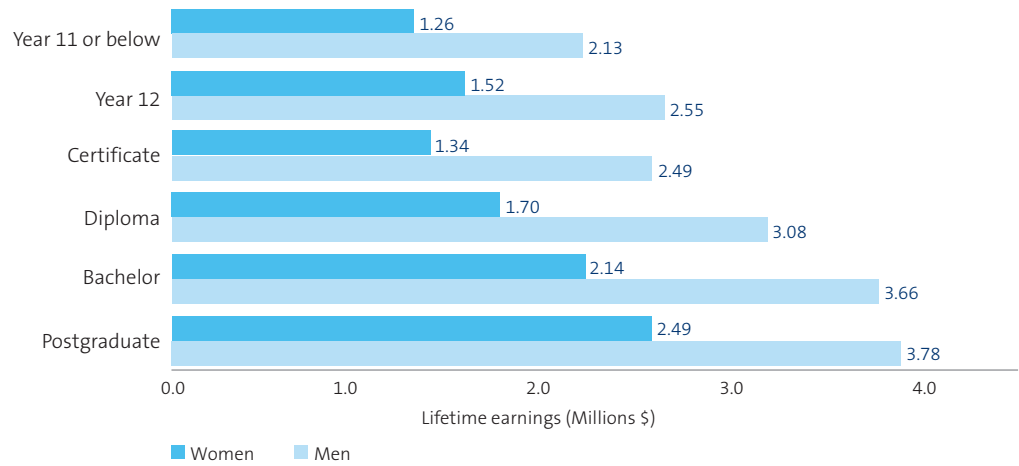
Employment and earnings patterns of women are often disrupted through childbirth, childcare and other caring responsibilities, and women are more likely to work part rather than full-time.

These differences are eventually reflected in lifetime earnings prospects. As Figure 25 shows, within each educational level, women tend to fare more poorly than men when it comes to lifetime earnings. If the current age patterns of earnings prevail into the future, a postgraduate woman aged 25 years can expect to earn \$2.49 million, just two-thirds of her male counterpart's lifetime earnings (\$3.78 million).

More striking is the fact that women with post-graduate qualifications would earn only as much on average over their lifetime as men with a certificate or Year 12.

A person with a Postgraduate Degree will earn more than \$3.17 million over their lifetime, almost 1.8 times the projected lifetime earnings (\$1.74 million) of a person with just Year 11 or less education.

Figure 25 Lifetime employee income of persons at age 25 years, by gender



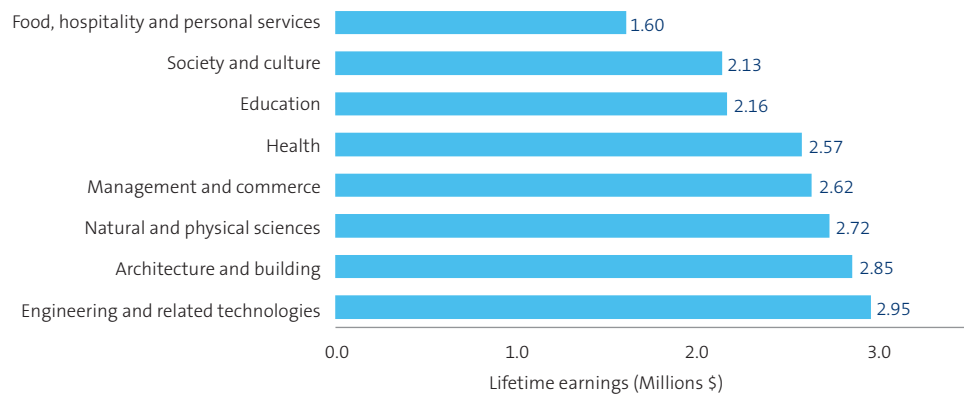
Source: NATSEM calculation from 2009–10 Survey of Income and Housing Basic Confidentialised Unit Record.

Note: Values are in 2011–12 dollars. Post Graduate includes Post Graduate Degree, Graduate Diploma and Graduate Certificate. Diploma includes Advanced Diploma. Lifetime earnings estimates are derived from all employees, including those working part-time.

Different types of industries tend to attract people with particular qualifications and skills. This influences the current pay cheque as well as the lifetime financial prospects of people working in those sectors.

For example, the hospitality industry is a sector dominated by low skilled, female workers. If a 25 year old person continued to work in this sector for the rest of their working life, they would earn a mere \$1.6 million on average. In contrast, their peers employed in high-skill industries such as engineering would earn nearly \$3 million over their working life (Figure 26).

Figure 26 Lifetime employee income of persons at age 25 years, by field of study



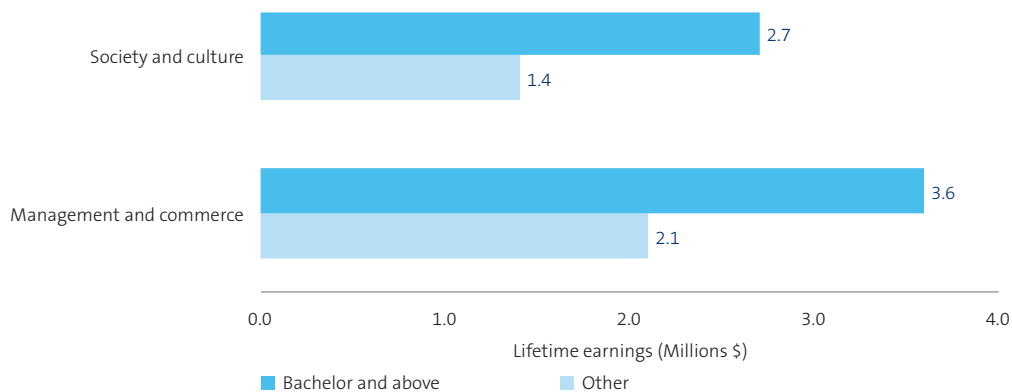
Source: NATSEM calculation from 2009–10 Survey of Income and Housing Basic Confidentialised Unit Record File.

Note: Values are in 2011–12 dollars. Lifetime earnings estimates are derived from all employees, including those working part-time. Some fields of study have not been shown due to small sample sizes.

The difference education can make to the financial prospects of a person is further illustrated in Figure 27 which breaks down income by education within the same industry. For example, looking at people working in management and commerce and society and culture, we can see that those with university degrees are likely to earn almost twice their peers with no university degrees over their lifetime.

In 2011–12 dollar terms, a 25 year old person working in the management and commerce sector would earn \$3.6 million if they hold a Bachelor or Postgraduate Degree, but would earn only \$2.1 million if they have no university degree.

Figure 27 Lifetime employee earnings over the working life persons at age 25 years, 2011–12 dollars



Source: NATSEM calculation from 2009–10 Survey of Income and Housing Basic Confidentialised Unit Record File.

Note: Values are in 2011–12 dollars. Lifetime earnings estimates are derived from all employees, including those working part-time.

A nation of innovation

Innovation is an important driver of economic growth and marker of a nation's progress.

Innovation is an important driver of economic growth and marker of a nation's progress. Advancements and investment in innovation and research and development (R&D), gauge how nations use the skills of its people to come up with new and innovative ways of living, transforming the welfare of its people and maintaining a competitive edge against other nations.

Australia abounds with examples of truly exemplary discoveries and inventions that are largely subsidised by government and funded by the private sector. An Australian has allowed people to be safe in the water with the invention of the surf lifesaving reel and Australians have made our lives healthier through the development of ultrasound and microsurgery technology and we cannot look past the iconic Australian inventions – the ute and hills hoist.

Other inventions include CRC Mining's Smart Cap which monitors and manages drowsiness and fatigue among mining drivers and The University of Technology Sydney's thought controlled wheelchair, which transmits brainwave activity as commands, allowing impaired individuals movement and independence not previously achievable.

Australians are collaborators. Combining creative talents has led to the development of a new prawn by CSIRO and Gold Coast Marine Aquaculture under the Food Futures National Research Flagship project. The project has produced "record yields and can be sustainably farmed" (DIISR, 2011).

A prominent economist – William Baumol – noted that "virtually all of the economic growth that has occurred since the eighteenth century is ultimately attributable to innovation". How does Australia fare in this important area? Are we keeping up with the rest of the world or lagging behind?

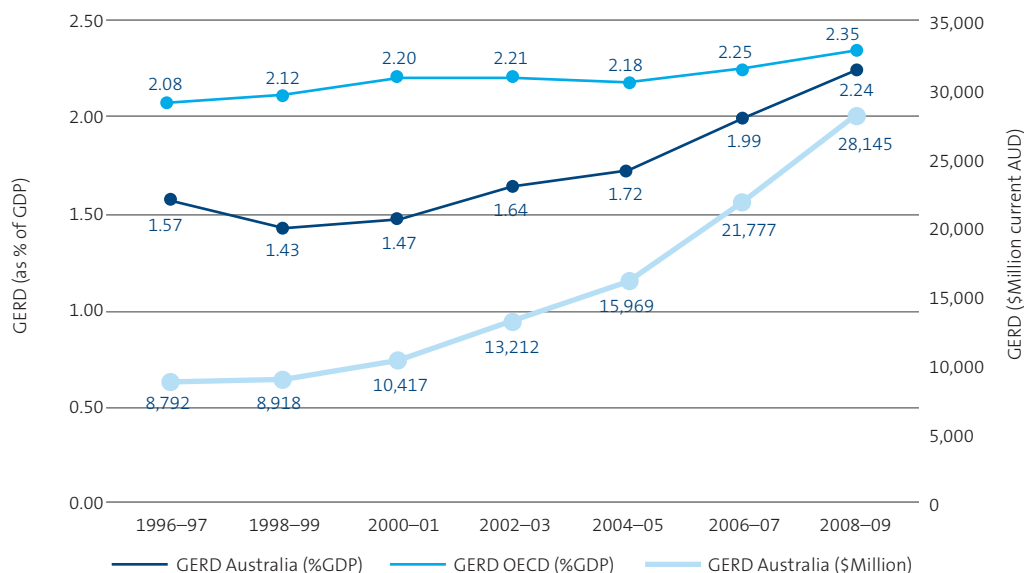
Measuring innovation across countries depends on a number of factors, including the governing and legislative environment, which can differ considerably. Research and innovation generally have long lead times and the impacts of private and public investment are not always immediately realised. In this section, we analyse indicators that are consistent with contemporary global standards in measuring innovation.

Research investment and capacity

Gross expenditure on research and development (GERD) as a proportion of GDP captures the level of public and private investment Australia is making in this area. GERD currently stands at about 2.2 per cent of GDP, which is only a fraction lower than the OECD average and places Australia at 12th place (Figure 28). When factoring in GERD per capita, Australia ranks 14th with \$867 per capita going towards research.

There have been noticeably significant increases in R&D funding since 2004, from around \$16 billion, to current levels of just over \$28 billion dollars (Figure 28). Government contributions to research funding at all levels accounts for about 0.77 per cent of GDP, placing it 6th among OECD countries.

Figure 28 Gross expenditure on research and development, 1996–97 to 2008–09



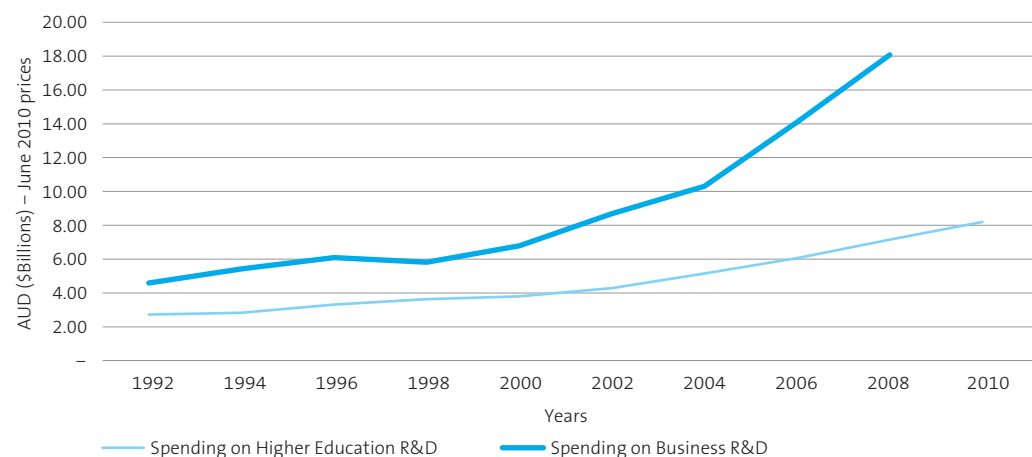
Source: DIISRTE (2012)

Note: This measure includes spending on research and development from all categories including business, government, higher education and private non-profit sectors. Research and Development is defined in accordance with the Organisation for Economic Co-operation and Development (OECD) standard as 'creative work undertaken on a systematic basis in order to increase the stock of knowledge, including knowledge of man, culture and society, and the use of this stock of knowledge to devise new applications'.

In comparing business and higher education expenditure in R&D, it becomes clear that the business sector contributes a substantially larger proportion of expenditure – approximately \$18 billion, compared to around \$8 billion from the higher education sector (Figure 29).

Business expenditure in R&D has climbed at a much higher rate since 2000–01, with a sharp rise noticeable from 2004–05. This large increase in the business sector has largely stemmed from investment in the mining states – with Western Australia recording a dramatic increase of 283 per cent in an eight year time period and Queensland an increase of 116 per cent (Figure 30) in real terms.

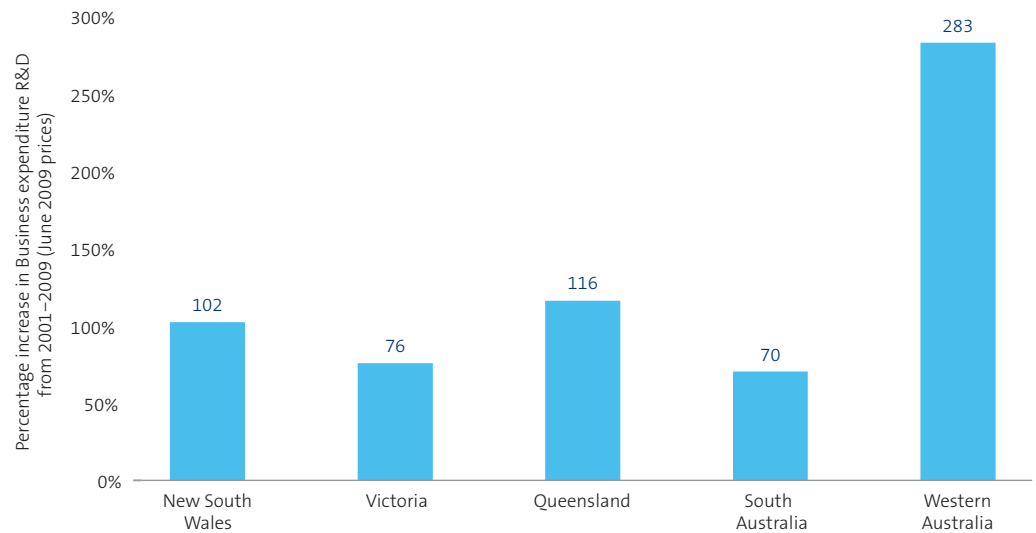
Figure 29 Australian higher education and business research and development expenditure, 1992–2010



Source: ABS (2010a) and ABS (2010b)

Note: Business expenditure and higher education expenditure on research and development are included.

Figure 30 Increase in business R&D from 2001–2009, by state



Source: Research and Experimental Development, All Sector Summary, Australia, ABS Cat No. 81120DO001_200809

Note: Tasmania, ACT and Northern Territory have not been included due to missing data or small sample sizes.

There are currently over 136,000 Australians devoted solely to research and development activities. These Australians are busy conceptualising new ideas and methodologies and researching ways to improve all aspects of our lives from health to education, agriculture to information technology and economic and social policy.

Many of these research developments and projects stem from the higher education sector, with peer reviewed journal publications representing a key indicator of esteem and advancement.

Australian academic publications accounted for about 3.24 per cent of the world's publications (in 2009), whereas 28.6 per cent of the world's publications are produced in the United States, placing Australia 9th among OECD countries. When taking into account the size of the research community, Australia produces 402 publications per 1,000 researchers annually, placing Australia 7th among OECD countries.

Patents and trademarks

Patents are an important indicator of a nation's level of innovation. Without appropriate patent protections and intellectual property (IP) rights, it can be difficult to foster innovation.

In Australia, IP Australia, a government agency under the Department of Industry, Innovation Science, Research and Tertiary Education is responsible for administering and protecting IP.

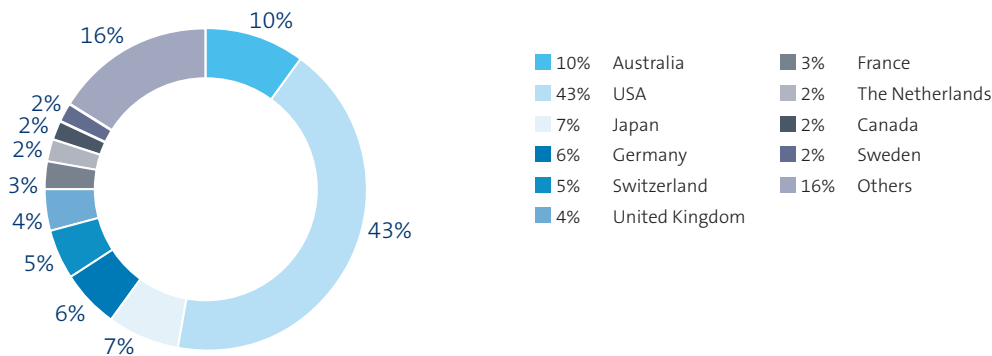
There are two main types of patents granted in Australia – standard and innovation patents. These can only be granted following submission of a complete patent application. Provisional applications enable the inventor to prioritise their invention over those of their competitors. It is not a protection in itself and a complete application must be filed within 12 months of submission of the provisional application.

Within this framework, we can now analyse the proportion of patents granted to innovations within Australia compared to the rest of the world. Patents granted to Australian inventions accounted for about 10 per cent (approximately 2,400 in total) of the total complete applications filed worldwide in 2010 (Figure 31).

Patents granted to Australian inventions accounted for about 10 per cent of the total complete applications filed worldwide in 2010.

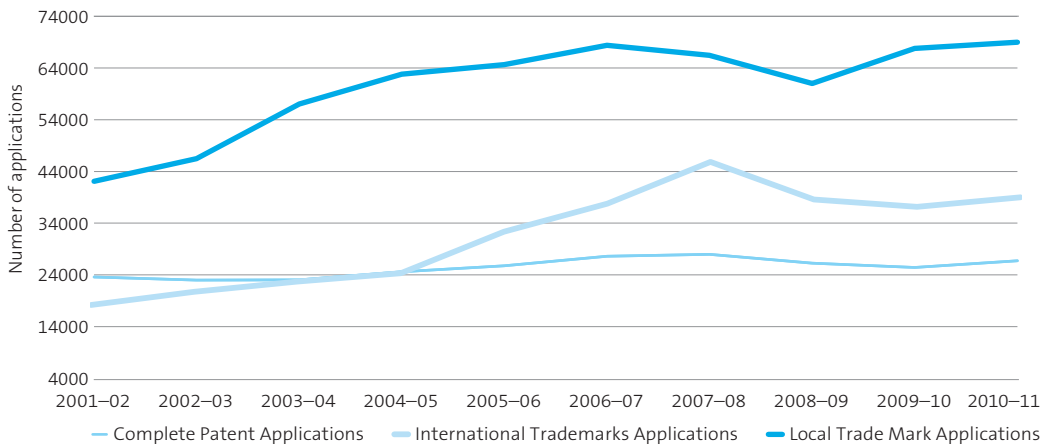
Trademarks allow businesses the exclusive right to distribute goods and services under the registered name, further protecting intellectual and property rights. Recent data shows that there were 68,241 trademark applications in 2010, accounting for nearly 70 per cent of the local applications filed in countries.

Figure 31 International complete patent applications, 2010



Source: DIISTRE (2011) IP Stats Australia

Figure 32 Australian patent applications, international and local trademarks



Source: DIISTRE (2011) IP Stats Australia

Figure 32 shows the number of local trademark applications compared to the number of international trademarks with both following a similar increasing trend between 2001-02 and 2007-08.

A noticeable peak in Australian international trademark applications can be seen in 2007-08, a time when the Australian and world economies were steaming ahead. A sharp decline in both international and local trademark applications is observed; coinciding with the 2008-09 Global Financial Crisis. Local trademark applications recovered quickly, whereas international applications continued to plateau, with these patterns likely to be due to the resilience of the Australian economy and the more problematic international economic environment.

Conclusion

The fruits of increased investment in education can be judged in a number of ways – through student retention, achievement, transitions to employment or the tertiary education sector, and through advancements in research and development.

Australians now spend around 12 years in school – up from 11.6 years in 1980 – with more than four in ten young adults completing some form of tertiary education. There has been a huge generational shift in educational attainment, with Gen Y Australians (aged 20 to 34 years) around twice as likely as the Baby Boomer (50 plus) generation to complete Year 12 or equivalent.

The returns to education are high – with those completing Bachelor Degrees earning \$1.2 million more over the course of their working lives than someone who left school by Year 11.

Gender stereotypes remain strongly embedded in our young adults' choice of fields of education and impact substantially on future work and life opportunities. These skill imbalances follow through into adult work choices and reinforce existing gender pay gaps. Breaking gender stereotypes in education, and moving towards equality of opportunity, becomes a question for us all – governments, parents, schools and business.

One of the stories to emerge from this report is the quality of the Australian education system and the efficiency of Australia's educators. Australia increased spending on education to around 6 per cent of GDP by 2009, fractionally below the OECD average of 6.2 per cent and ranking Australia twentieth overall across OECD countries. However, on internationally comparable (PISA) measures of student performance, Australia ranks sixth, ninth and sixth respectively in reading, mathematics and science. These achievement scores are substantially higher than other countries in the OECD who commit the same (United Kingdom) or indeed higher proportions of GDP (United States) towards education, and marks Australia as a country that delivers quality education.

This begs the question: how might Australia fare with further spending on education?

Australia's gross expenditure on research and development (R&D) increased consistently over the last decade, reaching just over \$28 billion on latest figures – now virtually level with average R&D spending across OECD countries. However, differences in business R&D spending across Australian states and territories suggest something of a two-speed R&D economy, especially between mining and non-mining states. Australia punches well above its weight in global innovation, with a remarkable 10 per cent of completed patent applications worldwide filed by Australian inventors – second only to the United States and exceptional for a country of only 23 million people. A strong positive trend in the number of local trademark applications after the global financial crisis gives every indication that Australia is set to continue as one of the world's leaders in research and development.

On the evidence of this report, Australia compares strongly with other countries in terms of education achievement and appears to provide education efficiently. There are still gaps to be narrowed, however, in terms of access to education, differences in educational achievement across states and territories, and equality of opportunity.

James Madison, the fourth US President and Father of the Constitution, regarded 'the advancement and diffusion of knowledge [as] the only guardian of true liberty'. On this metric, Australia should be proud of its contribution to global education and innovation.

Technical notes

OECD Definitions

Public expenditure: Public expenditure refers to spending of public authorities at all levels. Expenditure that is not directly related to education (e.g., culture, sports, youth activities, etc.) is, in principle, not included unless the activities are provided as ancillary services by educational institutions. Expenditure on education by other ministries or equivalent institutions, for example Health and Agriculture, is included.

Private expenditure: Private expenditure refers to expenditure funded by private sources, i.e., households and other private entities. 'Households' means students and their families. 'Other private entities' include private business firms and non-profit organisations, including religious organisations, charitable organisations, and business and labour associations. Private expenditure comprises school fees; materials such as textbooks and teaching equipment; transport to school (if organised by the school); meals (if provided by the school); boarding fees; and expenditure by employers on initial vocational training. Note that private educational institutions are considered service providers, not funding sources.

Primary education (ISCED 1): Primary education (ISCED 1) usually begins at ages five, six or seven and lasts for four to six years (the mode of the OECD countries being six years). Programmes at the primary level generally require no previous formal education, although it is becoming increasingly common for children to have attended a pre-primary programme before entering primary education. The boundary between pre-primary and primary education is typically the beginning of systematic studies characteristic of primary education, e.g., reading, writing and mathematics. It is common, however, for children to begin learning basic literacy and numeracy skills at the pre-primary level. See also *International Standard Classification of Education (ISCED)*.

Lower secondary education (ISCED 2): Lower secondary education (ISCED 2) generally continues the basic programmes of the primary level, although teaching is typically more subject-focused, often employing more specialised teachers who conduct classes in their field of specialisation. Lower secondary education may either be 'terminal' (i.e., preparing students for entry directly into working life) and/or 'preparatory' (i.e., preparing students for upper secondary education). This level usually consists of two to six years of schooling (the mode of OECD countries is three years). See also *International Standard Classification of Education (ISCED)*.

Upper secondary education (ISCED 3): Upper secondary education (ISCED 3) corresponds to the final stage of secondary education in most OECD countries. Instruction is often more organised along subject-matter lines than at ISCED level 2 and teachers usually need to have a higher level, or more subject-specific, qualifications than at ISCED 2. The entrance age to this level is typically 15 or 16 years. There are substantial differences in the typical duration of ISCED 3 programmes both across and between

countries, typically ranging from two to five years of schooling. ISCED 3 may either be 'terminal' (i.e., preparing the students for entry directly into working life) and/or 'preparatory' (i.e., preparing students for tertiary education). Programmes at level 3 can also be subdivided into three categories based on the degree to which the programme is specifically oriented towards a specific class of occupations or trades and leads to a labour-market relevant qualification: General, Pre-vocational or pre-technical, and Vocational or technical programmes. See also *General programmes, International Standard Classification of Education (ISCED), Pre-vocational programmes and Vocational programmes*.

Post-secondary non-tertiary level of education (ISCED 4):

Post-secondary non-tertiary education straddles the boundary between upper secondary and post-secondary education from an international point of view, even though it might clearly be considered upper secondary or post-secondary programmes in a national context. Although their content may not be significantly more advanced than upper secondary programmes, they serve to broaden the knowledge of participants who have already gained an upper secondary qualification. The students tend to be older than those enrolled at the upper secondary level. See also *International Standard Classification of Education (ISCED)*.

Tertiary-type A education (ISCED 5A): Tertiary-type A programmes (ISCED 5A) are largely theory-based and are designed to provide sufficient qualifications for entry to advanced research programmes and professions with high skill requirements, such as medicine, dentistry or architecture. Tertiary-type A programmes have a minimum cumulative theoretical duration (at tertiary level) of three years full-time equivalent, although they typically last four or more years. These programmes are not exclusively offered at universities. Conversely, not all programmes nationally recognised as university programmes fulfil the criteria to be classified as tertiary-type A. Tertiary-type A programmes include second degree programmes like the American Master. First and second programmes are sub-classified by the cumulative duration of the programmes, i.e., the total study time needed at the tertiary level to complete the degree. See also *International Standard Classification of Education (ISCED) and Tertiary-type B education (ISCED 5B)*.

Tertiary-type B education (ISCED 5B): Tertiary-type B programmes (ISCED 5B) are typically shorter than those of tertiary-type A and focus on practical, technical or occupational skills for direct entry into the labour market, although some theoretical foundations may be covered in the respective programmes. They have a minimum duration of two years full-time equivalent at the tertiary level. See also *International Standard Classification of Education (ISCED) and Tertiary-type A education (ISCED 5A)*.

Field of study classifications are derived from Australian Standard Classification of Education. (ASCED), see ABS Cat No. 1272.0.

Research and Development is as collected by the ABS, is defined in accordance with the Organisation for Economic Co-operation and Development (OECD) standard as ‘creative work undertaken on a systematic basis in order to increase the stock of knowledge, including knowledge of man, culture and society, and the use of this stock of knowledge to devise new applications’.

Year 7/8 to Year 12 Apparent Retention Rate is calculated by dividing the number of full-time students in Year 12 by the number of full-time students in the base year, expressed as a proportion. The base year is Year 7 in New South Wales, Victoria, Tasmania and the Australian Capital Territory and Year 8 in Queensland, South Australia, Western Australia and the Northern Territory. These years represent the commencement of secondary school in the respective state or territory (ABS 2011a).

Apparent Retention Rates are derived from school enrolment information so this does not include young people undertaking secondary senior studies in non-school locations such as TAFE colleges or the Centre for Adult Education. Retention rates do not track individual students, nor do they take into account changes due to students repeating year levels, interstate and overseas migration, transfer of students between schools and returning students. Nevertheless, these rates are a commonly used indicator of underlying progression rates in schools.

School leavers refer to people aged 15–24 who attended school in a certain year but were not attending school by May of the following year. School leavers can be categorised into two groups:

- Year 12 leavers are those who last attended Year 12 of school
- Year 11 or below – early school leavers.

Calculation of lifetime earnings over the working life between 25 and 59 years

In this report, the lifetime earnings figures refer to the synthetic estimates derived by summing up the age-specific average annual employee income for people aged 25 to 59 years. The resulting total suggests what an average individual could expect to earn in 2011–12 dollars, during a 35-year working life. This analysis focused on people aged 25–59 years assuming that this age segment best represents the working life. People below 25 years of age are excluded as many of them would still be studying and those aged 60–64 years are excluded owing to insufficient sample size. The data are sourced from the primary analysis of the 2009–10 ABS Survey of Income and Housing. The annual income refers to the previous financial year employee income and is uprated to 2011–12 financial year dollars by using ABS indices on average weekly total earnings for adults working full time between 2008–09 and 2011–12. The individuals reporting zero income and those out of scope for the previous financial year income data item are excluded from the analysis.

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Appendix

Table 7 Average annual employee income persons of working age 25–59 years, 2011–12 dollars

	Postgraduate \$	Bachelor \$	Diploma \$	Certificate \$	Year 12 \$	Year 11 or below \$	All \$
25–29	54581	62221	51755	53385	48244	46962	54128
30–34	70950	76044	59830	62013	55497	47939	63693
35–39	89564	88010	64689	63868	60017	50797	69196
40–44	101914	87502	75328	59559	64907	49611	68752
45–49	102616	93574	70683	60761	58957	50321	68053
50–54	101818	95179	79568	62280	62634	51669	70542
55–59	113060	78181	69899	57064	64601	49776	66337

Source: NATSEM calculation from 2009–10 Survey of Income and Housing Basic Confidentialised Unit Record File.

Note: Values are in 2011–12 dollars. Lifetime earnings estimates are derived from all employees, including those working part-time.

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