

Demand for qualifications and the future labour market in Australia 2010 to 2025

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Executive summary

This report provides an assessment of the requirements for people with qualifications in Australia from 2010 to 2025. The requirements assume the population in 2025 will have a particular qualifications profile which is based on extrapolating past trends.

Context

The Australian Government's interest in developing policies on skills and workforce development is ongoing and stems from a desire to sustain economic growth and to ensure Australia continues to remain globally competitive. Sound development of policies requires up-to-date information on economic changes and their implications for future demand for skills. Such information is of interest to other actors in the labour and education and training markets—individuals making choices on careers and courses and education and training providers planning course offerings.

The Australian economy, like most other economies around the world, experienced the fallout from the global financial crisis. While the impact of the crisis has been rather severe for many countries, Australia has escaped relatively unscathed from the experience. There however are other long-term challenges that Australia faces.

Ageing of the population and climate change pose significant long-term risks for the economy and sustainability of government finances. The ageing of the population will have an effect on future labour supply. With respect to climate change, the Australian Government is committed to a range of policies which will affect the demand for skills.

Australia's population is projected to grow to 27.5 million by 2025 and net overseas migration is expected to average 180,000 per year. Economic growth is projected to slow, with growth in real GDP falling to an average of 2.7 per cent per year until 2025. Growth in real GDP per capita is also projected to decline from 1.9 to 1.5 per cent per year over the same time which is mainly a result of declining labour productivity. Labour force participation rate of those aged 15 years or older is also expected to decline from about 65 per cent in 2010 to 63 per cent in 2025.

With an ageing population, productivity growth is the key driver of future growth prospects. Reforms that reduce barriers to participation will also lift growth and reduce future pressures. Improving educational attainment would be one possible way to lift aggregate labour force participation.

Economic modelling suggests the costs of stabilising and then reducing green house gas emissions are significant but manageable, delaying action, however, would carry higher risk and would be much more costly. Although the employment effects of adopting carbon-abating measures are unlikely to be significant in the long-run, there are inevitable skill implications arising from adaptation and mitigation activities. Additional skill needs could arise as a result of a change in the tasks that are to be performed in an occupation. They could also arise if existing tasks are to be performed differently, with new tools or new materials. Meeting the challenge of climate change has the potential to trigger innovation and a highly skilled workforce will only benefit this process.

Improving the skills base of the workforce is thus emerging as a critical factor if Australia is to meet the economic, environmental and social challenges of the future. Skill migration may provide a short-term solution, but a long-term sustainable solution requires continual improvement of skills of the existing workforce and new entrants with high levels of skill.

Summary of results

The number of people with qualifications in the Australia population has been steadily increasing. In 2008, 53.7 per cent held qualifications, an increase of 6.7 percentage points since 2001. The qualifications profile is shifting towards higher levels. In particular, the number of people holding diplomas as their highest qualification increased more than 10 per cent per year. A declining number held certificate I level qualifications.

Employment forecasts by qualifications

Overall the total *increase* in employment of persons with qualifications can be considered as due to:

- growth in employment
- the shift to employment in high-skill occupations
- skills deepening.

Employment is forecast to be 13.5 million in 2025, which is 25 per cent more than in 2009. If net overseas migration were to continue at the record levels it has reached in recent years or labour force participation rate were to increase then employment is likely to be higher.

Employment is forecast to grow at above average rate in electricity, gas and waste; mining; professional, scientific and technical services; education and training; and arts and recreation services. Occupations with above average growth will be managers, professionals and community and personal services workers.

In 2025, 76.6 per cent of the employed population is projected to have a non-school qualification. Qualifications are expected to increase at a slightly higher rate at the higher education than VET level. In spite of this a higher proportion of people with qualifications are expected to hold VET-level qualifications than higher education qualifications in 2025—58.1 per cent compared to 41.9 per cent.

A significant shift is expected in the qualifications profile towards diploma and certificate IV level qualifications and away from other VET-level qualifications. In 2025, about 3 million people are expected to hold diploma or certificate IV qualifications and almost none are expected to hold certificate I as their highest qualification. Although the proportion holding certificate II is expected to be lower in 2025 than in 2009, about 400,000 persons are expected to hold qualifications at this level in 2025.

The proportion with qualifications in 2025 will be well above average among professionals, managers, and community and personal service workers. In the last two groups, the proportion with qualifications is expected to increase nearly 20 percentage points to about 85 per cent.

The number with qualifications among the not employed population is also forecast to increase from 36.3 per cent in 2009 to 56.1 per cent in 2025, with more of them expected to hold higher education than VET qualifications.

Required numbers with qualifications

The actual number required with qualifications and the amount of training to be undertaken will be greater than needed to meet the increase in the numbers of people with qualifications. The need to replace people who leave due to death, ill-health and retirements adds to skill requirements. Occupational turnover also adds to skill requirements.

Qualifications requirements for the employed and the not employed populations are expected to vary over time mainly in line with changes in the size of these two populations.

The total qualifications requirements for the 16 years to 2025 are estimated to be 8.8 million, at an annual average of 552,000. The annual average requirements for higher education qualifications are expected to be 214,000 (38.7 per cent) and those at the VET level 338,000 (61.3 per cent).

Qualifications requirements are expected to increase from about 519,000 in 2010 to 596,000 in 2025. The requirements at the diploma and certificate IV levels are expected to increase sharply each year from 2010 to 2025. They will also increase at the higher education level but only moderately. The requirements are expected to remain generally constant at certificate III level but decline at all other levels.

Of total requirements, 82.1 per cent are expected for the employed population—73.9 per cent of all higher education qualifications and 87.2 per cent of all VET qualifications.

About 62.5 per cent of requirements for the employed population are expected to be met by new entrants and 37.5 per cent by existing workers acquiring new qualifications. New entrants are expected to provide substantially more than half of all requirements at the higher education and certificate I-III levels but only about half of all requirements at the advanced diploma, diploma and certificate IV levels.

More than half the requirements for the not employed population are expected to be at the higher education level. This reflects the significantly higher proportion of females in this population and perhaps also their higher propensity for acquiring higher education qualifications.

Final remarks

This report has provided estimates of the number of people with qualifications that will be required in Australia from 2010 to 2025. It considered population and employment growth, industrial and occupational changes, trends in skills deepening and net replacement needs within occupations in deriving the estimates. The total number of qualifications that would need to be completed in this period is likely to be higher than estimates provided in this report because some people do multiple qualifications. Lower level qualifications are sometimes stepping stones to higher level qualifications.

Historical data since 2001 indicate the growth in the number of people with diplomas to be substantial. No doubt some of this growth is actual demand but there is a possibility that part might be supply-induced demand and not industry demand. With the current data it is impossible to investigate what proportion of the growth might be supply driven. Further research may help provide some answers on this issue.

Economic projections are inherently uncertain, especially over long horizons. It is inevitable that developments that are currently unforeseen will eventually render projections from any model, not just the one used for this report, to be inaccurate. Nevertheless, most organisations and individuals do make plans based on assumptions about the future. It is imperative that these projections are updated on a regular basis to account for new information and improvement in methods.

However economy-wide policy development on future skills demand should not rely solely on ad hoc and partial evaluation of the labour market that fail to take account of interactions between sectors. The starting point for robust development of public policy should be baseline, economy-wide information that is systematic, comprehensive and consistent.

The analysis in this report provides general parameters and a framework within which to approach skills and workforce development. Regular monitoring of conditions in the labour market can provide a basis for ongoing finer adjustment and updating of these parameters. Bottom-up information from other sources, such as employee and employer surveys, can and should be added to the baseline information for further fine tuning of policies.

1 Introduction

The Australian Government's interest in developing policies on skills and workforce development is ongoing and stems from a desire to sustain economic growth and to ensure Australia continues to remain globally competitive. Sound development of policies requires up-to-date information on economic changes and their implications for future demand for skills. Such information is of interest to other actors in the labour and education and training markets—individuals making choices on careers and courses and education and training providers planning course offerings.

This report provides an assessment of the requirements for people with qualifications in Australia from 2010 to 2025. The requirements assume the population in 2025 will have a particular qualifications profile which is based on extrapolating past trends. The profile is based on the highest non-school qualification of a person.¹ Although the primary focus of the analysis is on vocational education and training (VET) qualifications, estimates for higher education qualifications are also included.

1.1 Macroeconomic context

The *Intergenerational Report 2010* (IGR 2010) contains population and macroeconomic projections for Australia to 2025 and beyond (Australian Government 2010). It identifies ageing (particularly the deterioration in the dependency ratio) and climate change as presenting significant long-term risks for the economy and sustainability of government finances.

Economic growth is projected to slow, with growth in real GDP falling to an average of 2.7 per cent per year until 2025 from the 3.3 per cent reported over the last 40 years. Growth in real GDP per capita is also projected to decline from 1.9 to 1.5 per cent per year over the same time which is mainly a result of declining labour productivity. The report expects labour force participation rate of those aged 15 years or older to decline from about 65 per cent in 2010 to 63 per cent in 2025.

The IGR 2010 projects Australia's population to increase to about 27.5 million by 2025. The calculations assume fertility rate of about 1.9, lower mortality rate and net overseas migration running at about 180,000 per year. The relatively higher emphasis on skilled migration in the overall migration programme implies a higher impact on the labour force as skill migrants generally have a much higher participation rate in the labour force than other migrants.

Although the impact of the global financial crisis has largely passed for Australia, and left it relatively unscathed because of the demand for its raw materials from China, Korea, Japan and India, challenges of an ageing population and climate change continue.

According to the Australian Treasury:

Decisions taken in the near term will impact on the wellbeing of future generations. Productivity-enhancing reforms, particularly through nation building infrastructure and improving the skills base, will grow the economy, improve living standards, and partly offset the fiscal pressures of ageing. With an ageing population, productivity growth is the key driver of future growth prospects. Reforms that reduce barriers to participation will also lift growth and reduce future pressures (Australian Government 2010).

Henry (2003) considers the principal economic challenge over the next few decades is likely to be labour force participation rate. Analysis of the relationship between participation rates and educational attainment by (Kennedy and Hedley 2003; Kennedy, Stoney and Vance 2009) indicates a declining trend until 2001 for males without post-school qualifications but between 2001 and

¹ Many people in Australia hold multiple qualifications.

2006 there was a reversal in the trend, probably as a result of a buoyant economy. For females, participation rates have been increasing for all educational attainment groups. The authors, therefore, suggest that improving educational attainment would be one possible way to lift aggregate labour force participation.

Economic modelling reported in two major studies suggest the costs of stabilising and reducing green house gas emissions are significant but manageable, delaying action, however, would carry higher risk and would be much more costly (Stern 2006; Garnaut 2008; Australian Government 2008). Employment effects of adopting carbon-abating measures are unlikely to be significant in the long-run. Although some studies indicate some distributional effects arising from such measures, with employment in renewable energy, transport and construction increasing faster than in other sectors (Hatfield-Dodds et al. 2007; Hatfield-Dodds et al. 2008; Australian Government 2008), recent results using the MONASH model suggest the effects are likely to be minimal, at least under the proposed Carbon Pollution Reduction Scheme (CPRS).

This however does not mean that there are no implications for skills development and knowledge diffusion arising from introducing greenhouse gases reduction policies. Such implications will also arise as a result of policies on adaptation as it is already too late to avoid some degree of climate change. Additional skill needs may arise as a result of a change in the tasks that are to be performed in an occupation. They may also arise if existing tasks are performed differently, with new tools or new materials. The main signal that will herald changes will be a price on carbon. The challenge to become more efficient in the consumption of carbon would then trigger innovation within firms. With appropriate dissemination of information, incentives and leadership from management, all innovative capacity of all workers could be mobilised to meet the challenge. Some of the new knowledge generated will also help influence workers' behaviour outside the workplace. In this way the new knowledge will diffuse into the general population.

Improving the skills base of the workforce is thus emerging as a critical factor if Australia is to meet the economic, environmental and social challenges of the future. Skill migration may provide a short-term solution, but a long-term sustainable solution requires continual improvement of skills of the existing workforce and new entrants with higher levels of skill.

1.2 Factors affecting the demand for qualified people

The skill levels and associated qualification levels of Australia's population have been rising with the rate of increase higher among the employed than the unemployed populations (Shah 2009b).

Overall the total *increase* in employment of persons with qualifications can be considered as due to:

- growth in employment
- the shift to employment in high-skill occupations
- skills deepening.

Additional people with qualifications are also required to replace those who leave due to occupational turnover.

Employment growth

Employment growth generally leads to an increase in the demand for skills, although the extent to which this happens depends on the occupations that grow the most. In the last decade employment in Australia has been increasing at more than two per cent per year.

Shift to high-skill occupations

Exposure to international competition and new technologies are affecting the distribution of employment across a wide range of industries. The effects vary according to the extent to which a particular industry is vulnerable to, positively exposed to, or insulated from global competition.²

² See Maglen and Shah (1999), Maglen (2001) and Shah and Burke (2003).

Australian jobs in low-skill manufacturing industries were initially most vulnerable, but service and high-skill production jobs are increasingly becoming exposed to competition. While the general effect of technological change is known to increase demand for employees with higher skills, its net effect on demand for all skill types can be mixed if new technologies lead to de-skilling in some occupations.

The trend however has generally been towards employment in industries requiring higher level skills; although job opportunities also increased in some insulated industries such as aged care in which a high proportion of jobs are relatively low-skill.

While only about a third of all people employed were in managerial and professional occupations in 2008, about half of all job growth in Australia over the last decade has been in these occupations.

Skills deepening

Within many occupations, the number of people with qualifications has increased faster than total employment. This is referred to as *skills deepening*. It is the result of a number of factors:

- An overall rise in the level of skill and qualification requirements within occupations due to technological and organisational changes³
- The significant returns to training in the labour market for those who invest in education, as well as reforms to education systems broadening access. Long and Shah (2008) show higher-level VET qualifications generally yield reasonably large private rates of return. Higher rates of employment are also associated with people who hold qualifications although higher *incomes* are more likely only for higher-level qualifications (Burke et al. 2003; Ryan 2002).
- Removing skills gaps, where workers have been under-skilled for the occupation in which they are employed.

Replacement needs

The actual number required with qualifications and the amount of training to be undertaken, however, will be greater than needed to meet the increase in the numbers of people with qualifications. Additional requirements will be from the need to replace those who leave occupations for a range of reasons. While in some occupations (e.g. sales workers) the main reason for replacement is because of net outflows to other occupations, in other occupations (e.g. doctors) the main reason is due to death, ill-health and retirements. In some occupations, the number of workers retiring will rise in coming years due to the ageing of Australia's baby boomers. The appropriate measure to assess the qualifications requirements in each occupation due to turnover is net occupational replacement demand (Bureau of Labor Statistics 2006; Shah and Burke 2001).

1.3 Scope of this report

Chapter 2 describes the trends in non-school qualifications of Australia's population from 2001 to 2008. These trends are described separately for the employed, the unemployed and not in the labour force populations.

³ DEET (1995) summarised the different effects behind the increased demand for people with qualifications. These effects are: (1) an output or aggregate employment effect, which arises from a general increase in the size of the workforce and operates similarly across workers with qualifications and those without qualifications; (2) a net industry structure effect, which arises as a result of the changing industry structure and productivity; (3) an occupational share effect, which results from the occupational mix within an industry; (4) an hours effect, which arises from a shift to part-time work (if part-time work becomes more prevalent for people with a given qualification then more people with that qualification will be required to produce the same quantity of a product or level of service); and (5) a qualifications share effect, a residual effect after the above structural effects are removed from the total increase in the proportion of people with qualifications.

Chapter 3 contains projections of employment by industry, occupation and qualification from 2010 to 2025.

Chapter 4 contains the projections of qualifications for the not employed population.

Chapter 5 contains estimates of the requirements for people with qualifications from 2009 to 2025 to achieve the projected qualifications profile for Australia in 2025.

Finally, chapter 6 contains some concluding comments.

2 Qualification trends in Australia 2001–2008

This chapter describes the trends in the numbers of people in Australia with non-school qualifications from 2001 to 2008. It uses data from the ABS *Survey of Education and Work* (Cat. no. 6227.0)⁴. The descriptions of the trends provide a context within which to view the projections of the number of people with qualifications that Australia will require to 2025.

Previous work has shown the proportion of people in Australia with qualifications rising (Shah 2009b, Shah and Burke 2006). In particular, the number with higher level qualifications has been rising faster than the number with lower level qualifications. The growth rates in qualifications were found to vary across occupations.

The trends in qualifications are driven by supply and demand factors. More people are acquiring qualifications because the rates of return in the labour market are generally higher for those with qualifications than for those without qualifications. Having a qualification also increases a person's socio-economic status in the community. People with qualifications generally have a lower probability of leaving the labour force after separation from a job than those who do not have a qualification. Furthermore, males with qualifications are also less likely to be unemployed after separation from a job (Shah 2009a).

From the demand side, jobs requiring higher level skills have increased faster than those requiring lower level skills. All else being equal, those with qualifications are generally more likely to be selected by employers for jobs than those without qualifications. This is because qualifications provide one of the most important signals of an individual's potential to employers. They embody the knowledge and skills a person has acquired during formal education and training, some of which could have been acquired on-the-job. Employers use qualifications to screen and match applicants to jobs. Qualifications are particularly important for young workers and new entrants to the labour market (e.g. recent migrants) who may be lacking significant history of work experience and employer references. Incidentally, this group also tends to have relatively high rates of job turnover (job-to-job and job-to-joblessness) (Shah 2009a).

This report uses the *Australian Standard Classification of Education* (ASCED)⁵ for qualifications. Two dimensions of education—level and field—define a qualification under ASCED. The analyses in this report will mainly be in terms of the level of the highest non-school qualification attained by a person.⁶ The focus will be on those who hold advanced diploma, diploma or certificate I to IV. In this report, these qualifications will be collectively referred to as VET qualifications even though diploma and advanced diploma can be accredited in the higher education sector. For sake of simplicity, no distinction is made between those who hold associate degrees and those who hold advanced diplomas.

⁴ This is a supplementary survey to the monthly *Labour Force Survey* and is conducted in May each year. The supplementary questions asked in the survey relate to a person's education and qualifications.

⁵ ABS (2001)

⁶ The levels under ASCED generally align to the *Australian Qualifications Framework* (AQF). Under AQF some qualification levels can be accredited in more than one sector. In particular, advanced diploma/associate degree and diploma qualifications are accredited in the VET and higher education sectors. Similarly, graduate certificate and graduate diploma also are dual sector accredited. However in the ABS data collections, the sectoral distinction of these qualifications is not made.

Key findings

Civilian population

The period 2001 to 2008 has seen a steady expansion of the labour market in Australia. While the population increase (year-on-year growth) was a modest one per cent per year, employment increased at more than two per cent per year and unemployment declined by nearly five per cent per year. Although part-time employment increased faster than full-time employment, its share of total employment declined by one percentage point. This period has also seen strong growth in net migration to Australia, particularly skilled migration.

The number of people with qualifications in the Australia population has been steadily increasing. In 2008, 53.7 per cent held qualifications, an increase of 6.7 percentage points since 2001.

The qualifications profile is shifting towards higher levels. There were almost a million more people with higher education qualifications in 2008 than in 2001, an increase of 4.9 per cent per year. Although the overall number with VET qualifications increased at only less than half this rate, more people had a VET than a higher education qualification in 2008. The shift to higher level qualifications is also evident among those with VET qualifications, with the number holding diplomas increasing at more than 11 per cent per year and the number holding certificate I shrinking by more than 13 per cent per year.

The state with the highest proportion with qualifications in 2008 was NSW (55.6 per cent), followed by Victoria (54.2 per cent).

Employed population

The employment of people with and without qualifications increased from 2001 to 2008, but rate of growth has been faster for those with qualifications. The proportion with qualifications increased from 54.2 per cent in 2001 to 59.8 per cent in 2008.

However the rate of growth varied significantly by the level of qualification. It increased at a higher rate for those holding higher education qualifications (4.9 per cent per year) than for those with VET qualifications (2.7 per cent per year).

The fastest employment growth has been among those holding diplomas. An additional 43,000 people with diplomas were employed each year, which translates to a rate of more than 11 per cent per year. Part of the growth is likely to have been fuelled by migration, and in particular through international students completing courses in Australia.

More than four out of every ten people with qualifications were graduates in engineering or management and commerce. The fastest growth in employment has been for IT and arts graduates and slowest for engineering graduates.

Female employment has been increasing at faster rate than male employment, and most of this increase has been due to more females with qualifications being employed. In 2008, females made up 45.4 per cent of the total number employed.

Almost the same proportion females as males had qualifications, but there are substantial differences in the profiles of the two groups. Relatively more females had higher education qualifications and relatively fewer had VET qualifications. In particular, significantly less number of females than males held qualifications at the certificate III level.

Employment increased at a much higher rate among workers aged 45–64 years than among any other age group. Their share of total employment increased from 31.5 per cent in 2001 to 36 per cent in 2008. The increase has been among those with and without qualifications. While employment generally declined among those holding lower level VET qualifications, among the 45–64 year-olds it actually increased. The age group which saw its share of total employment decline was that aged 25–34 years.

Part-time employment in Australia has been steadily increasing—2.8 per cent per year. In 2008, 28.4 per cent of the employed population worked part-time compared to 27.2 per cent in 2001.

While a much smaller proportion of them than full-time workers hold qualifications, relatively more of them had lower level VET qualifications. Partly this is because part-time workers include many students who are in the process of acquiring new qualifications or upgrading to higher levels.

The correspondence between occupation, skill level and qualification level are only approximate. Mismatches between occupation and qualification are common. In most occupations, some people do not have any formal qualifications. The mismatches are more prevalent among the young who engage in intensive job search at the time of transition from education and training to work and among newly arrived immigrants. Such turnover is part of a dynamic labour market which is continually adjusting to optimally allocate resources.

Employment of people with qualifications has generally increased faster than overall employment in most occupations. This has however varied by level of qualification and occupation. The results indicate skills deepening within occupations.

Professionals had the highest share of total employment and also the highest proportion of workers with qualifications, most of which are at the higher education level.

More than a third of all managers did not hold any formal qualification. Among those with qualifications, more than half held VET qualifications.

About a third of technicians and tradespeople also did not have a qualification, some of whom are likely to be apprentices but others may have been employed during the boom times when certain sectors experienced skills shortages. The predominant level of qualification in these occupations is certificate III.

About 38 per cent of community and personal services workers did not have qualifications. Of the qualifications held, 22 per cent were at the higher education level and 25 per cent at the advanced diploma or diploma levels.

About half of all clerical and administration workers held qualifications, and a substantial number (31 per cent) of the qualifications were at the higher education level. About 16 per cent of the qualifications were at certificate I/II level.

Only about a third of all sales workers, machine operators and drivers and labourers held qualifications. The qualifications profiles in these three groups are generally similar, although sales workers were relatively more likely to hold higher level qualifications (higher education, advanced diploma and diploma).

The data also shows a strong clustering of graduates of some disciplines into particular occupation groups. More than half of all people holding science, health or education qualifications were employed in professional occupations. While these occupations were also the most common destinations of IT and arts graduates, occupations in the trades were the most common destinations of engineering, architecture or building graduates.

While a certain amount of mismatch between qualifications and occupations can be normally expected in a dynamic labour market, the number of IT graduates working as sales workers, machine operators and drivers or labourers seems to be unusually high. This is despite quite rapid growth in employment of IT graduates. This could mean that there is an excess supply of IT graduates. Over the last decade the sources of IT graduates has included temporary and permanent migration and international students acquiring qualifications in Australia, particularly with private providers. This could be an indication of a variable quality of supply which could be a reason for the high dispersion of IT graduates across occupations.

The occupational employment in the Australian labour market is highly segregated by sex. Strong differences exist in the male to female ratio in most occupations, except professionals. The male to female ratio has generally remained stable in all occupation groups, except managers, professionals and technicians and trades in which there has been shifts in varying amounts towards employment

of more women. The biggest shift has been in managerial and administration occupations in which the proportion that is women increased by 4.1 percentage points.

Technicians, trades, machine operators and drivers are predominantly male occupations. In contrast, a large majority employed in community and personal services, clerical and administration and sales were women.

Unemployed population

Unemployment fell 4.7 per cent per year from 2001 to 2008. Surprisingly, unemployment fell faster for those who did not have qualifications than for those who had. There were still more people without qualifications who were unemployed in 2008.

Male unemployment fell more than female unemployment but there were still more unemployed males in 2008. However a higher percentage of the females had qualifications.

The 15–24 years age group is over represented among the unemployed population with about 39 per cent of all unemployed of this age in 2008. While unemployment has fallen among all age groups, it has fallen least among the 45–64 year-olds who made up 23 per cent of the unemployed population in 2008.

Not in the labour force population

The population not in the labour force fell 0.7 per cent per year from 2001 to 2008, despite a strong growth in employment and substantial fall in unemployment, and an increasing number among them have qualifications.

In 2008, for every one male there were two females outside the labour force. Partly this is because more women than men leave the labour force for raising families and also to look after elderly parents. It is therefore not surprising that a higher percentage of them have qualifications. While the number of women with qualifications increased by 2.9 per cent per year, the number without qualifications fell 2.4 per cent per year. The number of men without qualifications also fell but at a much lower rate.

In 2008, the 15–24 year-olds comprised the smallest proportion of the population not in the labour force. Their numbers have however been increasing. Only a small minority among them had qualifications. The number with qualifications in the group has been increasing rapidly, albeit from a small base. This group is likely to include a large number of people in the process of acquiring qualifications.

2.1 Qualifications—civilian population

This section describes the trends in the qualifications held by the civilian population from 2001 to 2008. The analysis is restricted to the population aged 15–64 years. Later sections include detailed analyses of the employed, the unemployed and the not in the labour force populations.

Table 1 shows the civilian population by labour force status from 2001 to 2008. It shows:

- The labour force participation rate increased from 75 per cent in 2001 to 78.1 per cent in 2008. This is due to stronger employment growth (2.1 per cent per year) compared to population growth (1.1 per cent per year) during this period. Unemployment declined 4.7 per cent per year. The more significant component contributing to the growth in of the 15–64 years cohort during this period has been skilled migration (both temporary and permanent). Note that the scope of the *Survey of Education and Work* is different to that of the *Labour Force Survey*, and therefore the rates calculated using data from the first survey may not be comparable those calculated using data from the second.⁷

⁷ The *Labour Force Survey* includes all persons aged 15 years and over except members of the permanent defence forces, certain diplomatic personnel of overseas governments customarily excluded from census and estimated population counts, overseas residents in Australia, and members of non-Australian defence forces (and their

- Part-time employment grew faster than full-time employment. In 2008, 28 per cent of all people employed were working part-time. This ratio has not changed much since 2001. In reaction to the global financial crisis, rather than reducing their workforce many employers chose to reduce the hours of work of employees. The impact of this is evident from the labour force statistics for the past few months, which shows little change in the unemployment rate but quite significant change the aggregate hours worked particularly by males (ABS 2009).

Table 1 Persons in civilian population by labour force status, Australia, 2001–08 ('000)

Labour force status	2001	2002	2003	2004	2005	2006	2007	2008	Change 2001–08 (%)	
									Average year-on-year	Total
Employed	8,927	9,066	9,281	9,392	9,707	9,847	10,121	10,340	2.1	15.8
<i>Full-time</i>	6,502	6,532	6,604	6,719	6,921	7,041	7,298	7,407	1.9	13.9
<i>Part-time</i>	2,425	2,534	2,677	2,673	2,786	2,806	2,823	2,934	2.8	21.0
Unemployed	666	622	615	558	539	516	459	473	-4.7	-29.1
Not in the labour force	3,195	3,239	3,179	3,224	3,051	3,031	3,050	3,038	-0.7	-4.9
All	12,788	12,927	13,075	13,173	13,296	13,395	13,630	13,851	1.1	8.3

Source: Unpublished ABS *Education and Work Survey*, 2001–08 (Cat. no. 6227.0). Scope: persons aged 15–64 years. As estimates have been rounded, discrepancies may occur between sums of the component items and total. Small numbers have large associated standard errors and should be used with caution.

a. Includes associate degree.

Table 2 shows the highest non-school qualifications⁸ held by civilians. The main points from the table are:

- The number of people with qualifications has steadily increased. While the number with qualifications increased, on average, 3.1 per cent per year, the number without qualifications declined 0.8 per cent per year. Consequently, the proportion of the population with qualifications increased from 47 per cent in 2001 to 53.7 per cent in 2008.
- The qualifications profile of the population has shifted towards higher level qualifications. There were almost a million more people with higher education qualifications in 2008 than in 2001, an increase of 4.9 per cent per year. The overall number with VET qualifications increased at only less than half this rate, mainly because of decreasing numbers holding lower level (certificate I/II) qualifications. Nevertheless more people held with VET qualifications than higher education qualifications in 2008—31.7 per cent held VET qualifications and 21.9 per cent held higher education qualifications.
- The fastest growth in qualifications has been at the diploma level—11.1 per cent or 48,000 additional persons per year. While significantly more people held qualifications at the advanced diploma than diploma level in 2001, the reverse was the case in 2008. The increase in the popularity of diplomas has resulted in 4.8 per cent of the population holding qualifications at this level in 2008 compared to 2.5 per cent in 2001. Shah (2009b) shows the number of people completing qualifications at the diploma level in the largely public system was less than 29,000 per year from 2001 to 2007. The only other source of supply of diplomas to account for the gap is the private provider sector or skilled migration. Private provider enrolments at the diploma

dependants) stationed in Australia. It includes students and temporary residents who are in the country for 12 months or more. The scope of the *Survey of Education and Work* is the same as that of the *Labour Force Survey* except that it is restricted to persons aged 15–64 years and excludes those who are permanently unable to work, patients in hospitals, residents of homes, boarding school pupils and inmates of prisons.

⁸ Some individuals provide insufficient information to enable their responses to be codes to a detailed level of qualification. In some cases, there is however enough information to code the response to a higher level. The ABS codes these as not further defined (nfd). For the analysis in this report, the nfd codes have been reassigned to an appropriate detailed level using a simple profile matching algorithm. Individuals whose level of qualification was not determined (code 011) were similarly assigned either one of the six lowest levels or not assigned a qualification at all.

level are generally international students who are counted in the labour force statistics if they are resident in Australia for 12 months or more.

- About 62.6 per cent of all certificate level qualifications in 2008 were at the certificate III level, which is the level of most trade qualifications. Although the number with qualifications at this level has been rising, the rate of increase is significantly lower than at certificate IV.
- A declining number of people are holding qualifications at the certificate I/II levels. In particular, the number holding certificate I qualifications declined by 68.4 per cent from 2001 than in 2008. The number of people who actually complete lower level qualifications is however likely to be higher because many use lower level qualifications as stepping stones to higher level qualifications.

Table 2 Persons with qualifications (level), civilian population, Australia, 2001–08 ('000)

Level of highest non-school qualification	2001	2002	2003	2004	2005	2006	2007	2008	Change 2001–08 (%)	
									Average year-on-year	Total
Higher education	2,180	2,296	2,361	2,488	2,606	2,753	2,830	3,037	4.9	39.3
VET	3,826	3,913	4,026	4,188	4,202	4,234	4,312	4,391	2.0	14.8
<i>Adv diploma^a</i>	557	604	574	600	620	628	639	601	1.2	7.8
<i>Diploma</i>	324	363	411	443	469	481	536	670	11.1	106.7
<i>Certificate IV</i>	286	295	311	362	359	371	425	506	8.7	76.9
<i>Certificate III</i>	1,670	1,746	1,849	1,865	1,818	1,896	1,936	1,953	2.3	17.0
<i>Certificate II</i>	554	598	567	586	690	572	574	525	-0.2	-5.2
<i>Certificate I</i>	436	307	314	332	246	287	202	138	-13.2	-68.4
With qualifications	6,006	6,209	6,387	6,675	6,807	6,988	7,142	7,428	3.1	23.7
Without qualifications	6,783	6,718	6,688	6,498	6,489	6,407	6,488	6,423	-0.8	-5.3
All	12,788	12,927	13,075	13,173	13,296	13,395	13,630	13,851	1.1	8.3

Source: Unpublished ABS *Education and Work Survey*, 2001–08 (Cat. no. 6227.0). Scope: persons aged 15–64 years. As estimates have been rounded, discrepancies may occur between sums of the component items and total. Small numbers have large associated standard errors and should be used with caution.

a. Includes associate degree.

Table 3 shows the qualifications in 2008 by labour force status. The trends within each sub-group of the population will be described later. The table shows:

- Relatively fewer people held qualifications among the not employed populations than the employed population—39.6 per cent of the unemployed, 34.9 per cent of those not in the labour force and 59.8 per cent of the employed. Persons not in the labour force include many of full-time students who are yet to acquire qualifications but who are in the process of doing so.

Table 3 Persons with qualifications (level) by labour force status, civilian population, Australia, 2008 ('000)

Level of highest non-school qualification	Employed			Unemployed	Not in labour force	Total
	Full-time	Part-time	All			
Higher education	2,012	570	2,582	54	401	3,037
VET	2,733	866	3,599	133	659	4,391
<i>Adv diploma^a</i>	317	147	464	18	119	601
<i>Diploma</i>	413	134	547	18	104	670
<i>Certificate IV</i>	305	120	425	10	70	506
<i>Certificate III</i>	1,383	297	1,680	52	220	1,953
<i>Certificate II</i>	253	134	387	26	112	525
<i>Certificate I</i>	62	35	96	8	33	138
With qualifications	4,746	1,436	6,182	187	1,059	7,428
Without qualifications	2,661	1,498	4,159	286	1,978	6,423
All	7,407	2,934	10,340	473	3,038	13,851

Source: Unpublished ABS *Education and Work Survey*, 2001–08 (Cat. no. 6227.0). Scope: persons aged 15–64 years. As estimates have been rounded, discrepancies may occur between sums of the component items and total. Small numbers have large associated standard errors and should be used with caution.

a. Includes associate degree.

Table 4 shows qualifications profiles by state in 2008. It shows:

- ACT had the highest proportion of people with qualifications. This is partly due the high concentration of the Australian Government bureaucracy, which has a much higher proportion of people with qualifications than the general population, in the ACT. The ACT is the only jurisdiction in which there were more people with higher education qualifications than VET qualifications.
- Among the states, NSW had the highest proportion the population with qualifications and Tasmania has the lowest. Victoria however had the highest proportion holding higher education qualifications.

Table 4 Percentage with qualifications (level) by state, civilian population, Australia, 2008 (%)

Level of highest non-school qualification	NSW	Vic	Qld	SA	WA	Tas	NT	ACT	Australia
Higher education	23.3	24.1	18.6	19.1	19.8	16.6	20.2	36.4	21.9
VET	32.3	30.1	32.8	31.2	32.1	31.4	31.2	25.3	31.6
<i>Adv diploma/diploma^a</i>	9.9	9.1	8.3	7.5	9.7	7.0	9.9	10.8	9.1
<i>Certificate III/IV</i>	17.3	16.7	20.0	18.6	17.2	19.7	16.3	9.9	17.7
<i>Certificate I/II</i>	5.1	4.2	4.4	5.1	5.3	4.7	5.0	4.6	4.7
With qualifications	55.6	54.2	51.3	50.3	51.9	48.0	51.4	61.8	53.5
Without qualifications	44.4	45.8	48.7	49.7	48.1	52.0	48.6	38.2	46.5
All	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Unpublished ABS *Education and Work Survey*, 2001–08 (Cat. no. 6227.0). Scope: persons aged 15–64 years. As estimates have been rounded, discrepancies may occur between sums of the component items and total. Small numbers have large associated standard errors and should be used with caution.

a. Includes associate degree.

2.2 Qualifications—employed population

This section focuses on the qualifications profile of the employed population. It includes descriptions by sex, age and hours of work.

2.2.1 Trends in the number with qualifications

Table 5 shows the numbers of people with qualifications from 2001 to 2008. As the employed population comprises the bulk of the civilian population, it is not surprising that that generally the trends reflect those observed in the civilian population as a whole. The main points from this table are:

- Employment grew 2.1 per cent per year, which is nearly twice the rate of population growth. Consequently, the employment rate for 15–64 year-olds increased from 69.8 per cent in 2001 to 74.7 per cent in 2008.
- Employment of people with qualifications increased faster than for people without qualifications—3.6 per cent per year compared to 0.3 per cent. The proportion with qualifications increased from 54.2 per cent in 2001 to 59.8 per cent in 2008.
- While the number with higher education qualifications increased at the about the same rate in the employed population as in the civilian population as a whole, the number with VET qualifications increased at a faster rate in the employed population.
- The number of advanced diploma holders dropped by 9.4 per cent in 2008. At the same time the number of diploma holders grew by 21.5 per cent. These figures appear to be inconsistent with the trends over the previous seven years. They suggest possible reporting or coding errors. It seems like some advanced diplomas have been incorrectly coded to diplomas.
- An additional 43,000 people with diplomas were employed each year.

- While the number of people holding qualifications at certificate II level remained largely unchanged, the number with certificate I fell from 389,000 to 96,000 from 2001 to 2008. These trends suggest certificate II replace certificate I as the de facto entry level qualification for employment.

Table 5 Persons with qualifications (level), employed population, Australia, 2001–08 ('000)

Level of highest non-school qualification	2001	2002	2003	2004	2005	2006	2007	2008	Change 2001–08 (%)	
									Average year-on-year	Total
Higher education	1,849	1,964	1,990	2,103	2,230	2,354	2,428	2,582	4.9	39.7
VET	2,991	3,078	3,191	3,327	3,357	3,443	3,525	3,599	2.7	20.4
<i>Adv diploma^a</i>	440	469	446	472	488	502	512	464	0.9	5.4
<i>Diploma</i>	254	286	331	361	388	398	450	547	11.7	115.3
<i>Certificate IV</i>	224	238	244	289	291	304	351	425	9.8	89.5
<i>Certificate III</i>	1,394	1,453	1,558	1,558	1,539	1,616	1,653	1,680	2.7	20.5
<i>Certificate II</i>	389	430	408	438	480	431	420	387	0.2	-0.6
<i>Certificate I</i>	289	202	204	209	172	192	138	96	-13.0	-66.6
With qualifications	4,839	5,041	5,181	5,430	5,587	5,797	5,953	6,182	3.6	27.7
Without qualifications	4,088	4,024	4,100	3,962	4,120	4,050	4,168	4,159	0.3	1.7
All	8,927	9,066	9,281	9,392	9,707	9,847	10,121	10,340	2.1	15.8

Source: Unpublished ABS *Education and Work Survey*, 2001–08 (Cat. no. 6227.0). Scope: persons aged 15–64 years. As estimates have been rounded, discrepancies may occur between sums of the component items and total. Small numbers have large associated standard errors and should be used with caution.

a Includes associate degree.

More than four out of every ten people with qualifications were graduates in engineering or management and commerce. The fastest growth in employment has been for IT and arts graduates and slowest for engineering graduates.

Field of education is the second dimension of a qualification. Table 6 shows the numbers in employment by field of education from 2001 to 2008. It shows:

- More than four out of every ten people with qualifications were graduates in engineering or management and commerce.
- The fastest growth in employment has been for IT (7.4 per cent per year) and arts (6.3 per cent per year) graduates and slowest for engineering graduates.

Table 6 Persons with qualifications (field of education), employed population, Australia, 2001–08 ('000)

Field of education	2001	2002	2003	2004	2005	2006	2007	2008	Change 2001–08 (%)	
									Average year-on-year	Total
Sciences	185	161	178	196	209	209	212	229	3.4	23.4
IT	148	178	185	209	216	214	237	240	7.4	62.5
Engineering	1,089	1,128	1,166	1,140	1,141	1,195	1,173	1,190	1.3	9.2
Architec & building	348	356	353	395	390	388	406	434	3.3	24.7
Agriculture & environ	131	158	146	157	170	171	170	173	4.3	31.5
Health	505	508	493	520	563	580	581	610	2.8	21.0
Education	367	386	389	418	418	445	436	465	3.5	26.7
Management & comm	1,032	1,121	1,172	1,218	1,305	1,331	1,402	1,406	4.6	36.3
Society & culture	576	577	593	636	628	704	745	792	4.8	37.6
Arts	177	190	197	228	227	224	247	269	6.3	52.3
Hospitality	279	278	305	308	317	331	340	369	4.1	31.9
Mixed	2	3	5	4	3	4	5	5	13.9	90.5
With qualifications	4,839	5,041	5,181	5,430	5,587	5,797	5,953	6,182	3.6	27.7
Without qualifications	4,088	4,024	4,100	3,962	4,120	4,050	4,168	4,159	0.3	1.7
All	8,927	9,066	9,281	9,392	9,707	9,847	10,121	10,340	2.1	15.8

Source: Unpublished ABS *Education and Work Survey*, 2001–08 (Cat. no. 6227.0). Scope: persons aged 15–64 years. As estimates have been rounded, discrepancies may occur between sums of the component items and total. Small numbers have large associated standard errors and should be used with caution.

a Includes associate degree.

Table 7 shows the distributions of qualification by field of education in 2008. People without qualifications are excluded from this table. The table shows:

- More than three-quarters of all science and education qualifications were at the higher education level.
- Similarly, more than three-quarters of all engineering, architecture and building, hospitality qualifications were at a VET level—predominantly certificate III.
- Above average proportion of IT, management and commerce and arts qualifications were at the diploma level.
- Relatively high proportions of qualifications in agriculture and environment, management and commerce and hospitality were at certificate I/II levels.

Table 7 Percentage with qualifications (level) by field of education, employed population with qualifications, Australia, 2008 (%)

Level of highest non-school qualification	Field of education												
	Sci	IT	Eng	Arch & Bldg	Agri & Environ	Health	Edu	Man & Comm	Society & Culture	Arts	Hosp	Mixed	All
Higher ed	88.4	55.4	20.4	11.1	30.3	60.3	77.6	39.9	57.3	55.0	2.9	0.4	41.8
VET	11.6	44.6	79.6	88.9	69.7	39.7	22.4	60.1	42.7	45.0	97.1	99.6	58.2
<i>Adv diploma^a</i>	4.0	8.1	4.9	2.9	8.7	14.5	10.6	8.4	4.8	12.3	5.9	2.2	7.5
<i>Diploma</i>	2.8	15.5	3.8	4.0	7.7	6.1	3.6	15.0	10.3	15.6	10.6	11.0	8.9
<i>Certificate IV</i>	0.9	6.9	4.1	5.2	6.7	8.9	4.5	10.7	7.1	4.3	7.5	26.3	6.9
<i>Certificate III</i>	1.7	5.4	58.7	70.7	29.8	7.2	3.1	12.7	16.5	8.6	58.0	22.9	27.2
<i>Certificate II</i>	1.7	6.8	6.3	4.8	13.3	2.3	0.4	10.9	3.3	3.4	11.6	9.1	6.3
<i>Certificate I</i>	0.4	1.8	1.7	1.3	3.5	0.6	0.2	2.5	0.6	0.7	3.4	28.1	1.6
All	100	100	100	100	100	100	100	100	100	100	100	100	100

Source: Unpublished ABS *Education and Work Survey*, 2001–08 (Cat. no. 6227.0). Scope: persons aged 15–64 years. As estimates have been rounded, discrepancies may occur between sums of the component items and total. Small numbers have large associated standard errors and should be used with caution.

a. Includes associate degree.

Table 8 shows the distribution of qualifications at each level across fields of education in 2008. It shows:

- While higher education level qualifications were much more likely to have education, health, society and culture or science field, VET qualifications were much more likely to have engineering.
- Qualifications at certain levels were highly clustered in just a few fields. For instance, while 22.7 per cent of all qualifications were in the management and commerce field, the percentage of diplomas, certificates IV, II or I in the same field were in excess of 35 per cent. Similarly, 19.1 percent of all advanced diplomas were in health and 41.6 per cent of all certificate IIIs were in engineering.

Table 8 Percentage with qualifications (field of education) by level of qualification, employed population with qualifications, Australia, 2008 (%)

Level of highest non-school qualification	Field of education												
	Sci	IT	Eng	Arch & Bldg	Agri & Environ	Health	Edu	Man & Comm	Society & Culture	Arts	Hosp	Mixed	All
Higher ed	7.8	5.1	9.4	1.9	2.0	14.3	14.0	21.7	17.6	5.7	0.4	0.0	100
VET	0.7	3.0	26.3	10.7	3.3	6.7	2.9	23.5	9.4	3.4	9.9	0.1	100
<i>Adv diploma^a</i>	2.0	4.2	12.7	2.7	3.2	19.1	10.7	25.3	8.3	7.1	4.7	0.0	100
<i>Diploma</i>	1.2	6.8	8.3	3.2	2.4	6.8	3.0	38.4	14.9	7.7	7.1	0.1	100
<i>Certificate IV</i>	0.5	3.9	11.5	5.4	2.7	12.8	5.0	35.5	13.2	2.7	6.5	0.3	100
<i>Certificate III</i>	0.2	0.8	41.6	18.3	3.1	2.6	0.8	10.6	7.8	1.4	12.7	0.1	100
<i>Certificate II</i>	1.0	4.2	19.4	5.3	5.9	3.7	0.5	39.6	6.8	2.4	11.0	0.1	100
<i>Certificate I</i>	0.9	4.6	20.6	5.7	6.3	3.7	0.8	35.8	5.2	2.1	13.0	1.3	100
All	3.7	3.9	19.3	7.0	2.8	9.9	7.5	22.7	12.8	4.4	6.0	0.1	100

Source: Unpublished ABS *Education and Work Survey*, 2001–08 (Cat. no. 6227.0). Scope: persons aged 15–64 years. As estimates have been rounded, discrepancies may occur between sums of the component items and total. Small numbers have large associated standard errors and should be used with caution.

a. Includes associate degree.

2.2.2 Qualifications by gender

Table 9 shows the qualifications profile at May 2008 by gender. It also shows the changes in employment from 2001 to 2008. The table shows:

- Female employment increased at a faster rate than male employment, and it was mostly due to an increase in the number of females with qualifications being employed.
- In 2008, 45.4 per cent of all employed persons were females, which is one percentage point higher than in 2001.
- A slightly higher proportion of males than females had qualifications in 2008.
- Almost the same proportion females as males had qualifications, but there are substantial differences in the profiles of the two groups. Relatively more females had higher education qualifications and relatively fewer had VET qualifications. In particular, significantly less number of females than males held qualifications at the certificate III level.

Table 9 Persons with qualifications (level) in 2008 and percentage changes from 2001–08 by age, employed population, Australia

Level of highest non-school qualification	Males				Females			
	May 2008		Change 2001–08 (%)		May 2008		Change 2001–08 (%)	
	'000	%	Average year-on-year	Total	'000	%	Average year-on-year	Total
Higher education	1,274	22.6	4.5	36.2	1,308	27.8	5.3	43.2
VET	2,125	37.7	2.2	16.6	1,474	31.4	3.4	26.2
<i>Adv diploma^a</i>	202	3.6	2.0	11.5	262	5.6	0.3	1.1
<i>Diploma</i>	255	4.5	11.5	110.9	292	6.2	12.1	119.3
<i>Certificate IV</i>	208	3.7	11.5	107.9	217	4.6	8.6	74.6
<i>Certificate III</i>	1,240	22.0	0.9	6.5	440	9.4	9.9	92.3
<i>Certificate II</i>	175	3.1	3.1	21.9	212	4.5	-1.6	-13.7
<i>Certificate I</i>	45	0.8	-10.6	-59.7	52	1.1	-14.5	-71.0
With qualifications	3,399	60.3	3.0	23.3	2,782	59.2	4.2	33.6
Without qualifications	2,243	39.7	0.3	1.7	1,916	40.8	0.3	1.8
All	5,642	100.0	1.9	13.7	4,698	100.0	2.5	18.5

Source: Unpublished ABS *Education and Work Survey*, 2001–08 (Cat. no. 6227.0). Scope: persons aged 15–64 years. As estimates have been rounded, discrepancies may occur between sums of the component items and total. Small numbers have large associated standard errors and should be used with caution.

a. Includes associate degree.

2.2.3 Qualifications by age

Table 10 shows the qualifications profile at May 2008 by age. As in the previous table the percentage changes from 2001 to 2008 are also included in the table. The table shows:

- Employment increased at a much higher rate among workers aged 45–64 years than among any other age group. It increased among those who had qualifications as well as among those who did not. Analysis of data that is not included in the table show the group's share of total employment increased from 31.5 per cent in 2001 to 36 per cent in 2008. This increase has been mainly at the expense of a declining share for the group aged 25–34 years.
- The youngest group are least likely to hold qualifications. The group includes many students (both part-time and full-time) who are working and who are also in the process of acquiring qualifications.
- In 2008, 31.3 per cent of 25–44 year-olds held a higher education qualification compared to 24.1 per cent of 45–64 year-olds. Both groups include about the same proportions with VET qualifications. Among the older group, more had lower level qualifications (certificate I/II). This means that in the future the proportion of 45–64 year-olds with higher education qualifications is likely to be higher because they will generally assume the current characteristics of the 24–44 year-olds.
- Employment growth not only varied by age but also by level of qualification. Employment of people who had advanced diplomas declined among the 25–44 year-olds but increased among other age groups. On the other hand, employment of those who had qualifications at the certificate II level increased rapidly among the oldest group but declined among the younger groups.

Table 10 Persons with qualifications (level) in 2008 and percentage changes from 2001–08 by age, employed population, Australia

Level of highest non-school qualification	15–24 years				25–44 years				45–64 years			
	May 2008		Change 2001–08 (%)		May 2008		Change 2001–08 (%)		May 2008		Change 2001–08 (%)	
	'000	%	Average year-on-year	Total	'000	%	Average year-on-year	Total	'000	%	Average year-on-year	Total
Higher ed	196	10.5	3.2	22.4	1,489	31.3	4.6	36.7	897	24.1	6.0	49.7
VET	444	23.8	2.5	17.9	1,756	36.9	1.0	6.8	1,399	37.6	5.4	44.4
<i>Adv diploma^a</i>	18	1.0	2.7	-17.6	193	4.0	-2.2	-15.4	253	6.8	4.5	32.9
<i>Diploma</i>	82	4.4	7.5	52.6	315	6.6	11.7	115.5	150	4.0	16.6	177.2
<i>Certificate IV</i>	61	3.3	9.2	64.9	210	4.4	8.4	73.7	154	4.1	13.4	132.0
<i>Certificate III</i>	210	11.3	3.5	26.0	843	17.7	1.0	7.1	627	16.8	5.3	42.5
<i>Certificate II</i>	60	3.2	-0.4	-4.4	156	3.3	-3.6	-24.2	171	4.6	6.5	41.5
<i>Certificate I</i>	13	0.7	-12.2	-62.7	39	0.8	-16.4	-75.0	44	1.2	-8.2	-54.6
With quals.	640	34.4	2.6	19.2	3,245	68.2	2.5	18.7	2,296	61.7	5.6	46.4
Without quals.	1,222	65.6	1.2	8.8	1,511	31.8	-1.8	-12.1	1,425	38.3	2.0	14.5
All	1,862	100	1.7	12.2	4,757	100	1.0	6.8	3,721	100	4.1	32.3

Source: Unpublished ABS *Education and Work Survey*, 2001–08 (Cat. no. 6227.0). Scope: persons aged 15–64 years. As estimates have been rounded, discrepancies may occur between sums of the component items and total. Small numbers have large associated standard errors and should be used with caution.

a Includes associate degree.

2.2.4 Qualifications by hours of work

Table 11 shows qualifications by full/part-time status at May 2008 and the changes from 2001 to 2008. The table shows:

- Part-time employment in Australia has been steadily rising—2.8 per cent per year. In 2008, 28.4 per cent of the employed population worked part-time compared to 27.2 per cent in 2001.

- A much smaller proportion of part-time workers held qualifications in 2008 than full-time workers. However part-time workers include many students who are in the process of acquiring qualifications.
- Relatively more part-time workers held lower level qualifications (certificate I/II) in 2008.
- Part-time employment increased at a faster rate than full-time employment at each level of qualification. Part-time employment of people with certificate IIIs increased by 7.4 per cent per year, which is a much higher rate than for full-time workers.

Table 11 Persons with qualifications in 2008 and percentage changes from 2001–08 by hours of work, employed population, Australia

Level of highest non-school qualification	Full-time				Part-time			
	May 2008		Change 2001–08 (%)		May 2008		Change 2001–08 (%)	
	'000	%	Average year-on-year	Total	'000	%	Average year-on-year	Total
Higher ed	2012	27.2	4.5	35.5	570	19.4	6.8	56.9
VET	2733	36.9	2.3	16.9	866	29.5	4.2	32.8
<i>Adv diploma^a</i>	317	4.3	0.5	2.3	147	5.0	2.0	12.7
<i>Diploma</i>	413	5.6	11.3	110.1	134	4.6	13.1	133.2
<i>Certificate IV</i>	305	4.1	9.9	89.2	120	4.1	10.3	90.2
<i>Certificate III</i>	1383	18.7	1.9	14.2	297	10.1	7.4	62.8
<i>Certificate II</i>	253	3.4	-0.2	-3.3	134	4.6	1.3	5.1
<i>Certificate I</i>	62	0.8	-13.6	-68.6	35	1.2	-11.3	-62.4
With qualifications	4746	64.1	3.1	24.1	1436	48.9	5.1	41.4
Without qualifications	2661	35.9	-0.1	-0.6	1498	51.1	0.9	6.3
All	7407	100.0	1.9	13.9	2934	100.0	2.8	21.0

Source: Unpublished ABS *Education and Work Survey*, 2001–08 (Cat. no. 6227.0). Scope: persons aged 15–64 years. As estimates have been rounded, discrepancies may occur between sums of the component items and total. Small numbers have large associated standard errors and should be used with caution.

a. Includes associate degree.

2.2.5 Qualifications by occupation

This report uses the *Australian and New Zealand Standard Classification of Occupations* (ANZSCO) for occupation statistics. The classification is skill-based with one of five skill levels attached to each occupation. An approximate correspondence between levels of skill and levels of qualification is:

- skill level 1—higher education level
- skill level 2—advanced diploma or diploma
- skill level 3—certificate IV or certificate III with at least two years of on-the-job training
- skill level 4—certificate II or III
- skill level 5—certificate I.

Relevant experience could be a substitute for a formal qualification though. The major ANZSCO groups and the predominant skill levels of the occupations in them are:

- Managers (skill levels 1 and 2)
- Professionals (skill level 1)
- Technicians and trades workers (skill levels 2 and 3)
- Community and personal service workers (skill levels 2, 3, 4, and 5)
- Clerical and administrative workers (skill levels 2, 3, 4, and 5)
- Sales workers (skill levels 2, 3, 4, and 5)
- Machinery operators and drivers (skill level 4)
- Labourers (skill levels 4 and 5).

As will be shown below, the correspondence between occupation, skill level and qualification level are only approximate. In fact, in most occupations there are people working whose skills

(qualifications) are either higher or lower than that indicated above. In many occupations, some do not have any formal qualifications.

Thus at any point in time there will always be some people for whom there will be a mismatch between their occupation and qualification. The mismatches are more prevalent among the young who engage in intensive job search at the time of transition from education and training to work. These search activities result in job turnover, which often includes occupational change. An individual's tenure in a mismatch state may only be temporary. Intense job search, and high level of job turnover, is also common among newly arrived migrants. It is part of the process of adjustment as they learn about the local labour market (Shah 2009a). With age job search activities, as well as occupational changes, generally diminish in intensity for most people.

Table 12 shows the qualifications profiles by major occupation group in 2008 and Table 13 shows the average annual growth in employment from 2001 to 2008. Clearly, in each occupation group there are many people for whom there is an apparent mismatch between the level of their qualification and the level of skill level assigned to the occupation. However some people may only be in such a state for a relatively short period. The tables show:

- The largest occupation group in 2008 was that of professionals with about 20.8 per cent of total employment. Its share of total employment in 2001 was 19.4 per cent. The next two largest groups were technicians and trades and clerical and administrative workers, each with about 15.2 per cent share of total employment.
- More than third (36.5 per cent) of all managers did not hold a formal qualification in 2008. More people in this group held VET than higher education qualifications. The most common level of VET qualification was certificate III, a qualification that is common among tradespersons. Over the last 20 years many tradespersons have become sub-contractors and managers of small businesses, even though essentially they are still doing the same work that they did as tradespersons.
- Most (89.4 per cent) professionals had a qualification—70.2 per cent higher education and 19.3 per cent VET (mostly at higher levels). The net annual growth in the employment of higher education graduates in professional occupations was 52,000, which is about half the total net annual growth.
- More than two out of every three technicians and tradespeople held qualifications. These were mainly at level of certificate III. While the net increase in the number with qualifications in these occupations was 20,000 per year, another 9,000 per year without qualifications were also employed. Many of the ones without qualifications are probably apprentices, whose numbers have increased substantially in recent years National Centre for Vocational Education Research (NCVER 2009). Others were likely to have been employed during the boom times when there were skills shortages in some segments of the labour market.
- The proportion with qualifications among community and personal services workers was about the same as among managers—62.5 per cent. Even though the skill levels associated with these occupations exclude higher education qualifications, 13.5 per cent in fact had qualifications at this level. While the most common level of qualification in these occupations certificate III, 15.7 per cent in the group held advanced diplomas or diplomas.
- About half of all clerical and administrative workers held qualifications. The level of the qualification of a substantial number (30.6 per cent) was higher education. A significant proportion (15.8 per cent) of the VET qualifications held were at certificate I/II level. Unlike in most other occupation groups, the number of people without qualifications in this group declined each year by about 7,000.
- Only about a third of sales workers, machine operators and drivers and labourers had qualifications. The qualifications profiles in these three groups are generally similar. However

sales workers included a relatively higher proportion with higher level qualifications (higher education, advanced diploma and diploma) and machine operators and drivers included a relatively higher proportion with certificate IIIs.

- The growth in employment for people with qualifications has been faster than that of total employment. The difference in the rates varies significantly by level of qualification and occupation group (see Table 11). However one needs to exercise care in interpreting this table as some cell entries are based on estimates which vary substantially from one year to the next because of relatively small sample sizes.

Table 12 Per cent with qualifications (level) by major occupation group, employed population, Australia, May 2008 (%)

Level of highest non-school qualification	Managers	Prof	Tech & trades	Community & personal services	Clerical & admin	Sales	Machine operators & drivers	Labourers	All
Higher education	30.2	70.2	6.8	13.5	15.8	9.6	5.3	5.9	25.0
VET	33.3	19.3	61.5	49.0	35.9	26.6	30.3	25.8	34.8
<i>Adv diploma^a</i>	5.4	7.2	2.7	6.3	4.6	3.8	1.2	1.7	4.5
<i>Diploma</i>	5.6	5.2	4.2	9.4	7.5	4.7	2.0	2.6	5.3
<i>Certificate IV</i>	4.3	2.7	4.3	9.2	5.2	2.9	3.0	2.5	4.1
<i>Certificate III</i>	13.4	3.1	45.4	19.2	10.4	10.0	19.3	13.5	16.2
<i>Certificate II</i>	3.7	0.9	3.8	4.0	6.5	4.4	3.7	4.4	3.7
<i>Certificate I</i>	1.1	0.2	1.0	0.9	1.6	0.9	1.0	1.1	0.9
With qualifications	63.5	89.4	68.3	62.5	51.7	36.2	35.6	31.7	59.8
Without quals.	36.5	10.6	31.7	37.5	48.3	63.8	64.4	68.3	40.2
All (%)	100	100	100	100	100	100	100	100	100
All ('000)	1,300	2,152	1,567	928	1,584	993	700	1,116	10,340

Source: Unpublished ABS *Education and Work Survey*, 2001–08 (Cat. no. 6227.0). Scope: persons aged 15–64 years. As estimates have been rounded, discrepancies may occur between sums of the component items and total. Small numbers have large associated standard errors and should be used with caution. Occupation data from 2001 to 2006 were converted from ASCO (second edition) to ANZSCO using a concordance developed using data from 2006 Census.

a Includes associate degree.

Table 13 Average year-on-year growth in employment by qualification (level) and major occupation group, Australia, 2001–08

Level of highest non-school qualification	Managers	Prof	Tech & trades	Community & personal services		Clerical & admin	Sales	Machine operators & drivers		Labourers	All
Average year-on-year growth ('000)											
Higher education	21	52	4	5	9	6	3	4	105		
VET	13	7	16	21	13	6	6	5	87		
<i>Adv diploma^a</i>	1	-2	1	2	0	2	0	0	3		
<i>Diploma</i>	6	7	4	6	11	4	1	3	42		
<i>Certificate IV</i>	4	3	5	7	4	1	2	2	29		
<i>Certificate III</i>	5	1	6	12	9	3	3	2	41		
<i>Certificate II</i>	0	-1	3	-1	-2	-1	1	1	0		
<i>Certificate I</i>	-4	-2	-3	-4	-9	-3	-1	-3	-28		
With qualifications	34	59	20	26	22	12	9	9	192		
Without quals.	1	1	9	1	-7	-3	3	4	10		
All	35	60	29	28	15	9	12	14	202		
Average year-on-year growth (%)											
Higher education	7.2	4.0	5.1	5.7	4.5	10.1	17.3	8.6	4.9		
VET	3.4	1.9	1.8	5.9	2.5	2.6	3.3	2.2	2.7		
<i>Adv diploma^a</i>	2.1	-0.8	5.6	3.4	0.4	7.6	1.8	0.3	0.9		
<i>Diploma</i>	14.1	9.4	8.8	10.1	16.5	16.3	14.5	18.3	11.7		
<i>Certificate IV</i>	13.3	7.3	11.0	12.7	7.4	8.5	24.1	16.8	9.8		
<i>Certificate III</i>	3.5	2.2	0.9	9.9	7.4	4.4	2.4	1.9	2.7		
<i>Certificate II</i>	2.0	-3.6	6.5	-1.4	-1.2	-0.6	5.4	2.9	0.2		
<i>Certificate I</i>	-12.6	-16.6	-7.4	-15.1	-13.9	-12.0	-8.5	-11.4	-13.0		
With qualifications	5.0	3.5	2.0	5.7	3.1	4.0	4.5	3.1	3.6		
Without quals.	0.5	0.6	2.1	0.6	-0.8	-0.4	0.8	0.6	0.3		
All	3.1	3.1	2.0	3.4	1.0	1.0	1.9	1.3	2.1		

Source: Unpublished ABS *Education and Work Survey*, 2001–08 (Cat. no. 6227.0). Scope: persons aged 15–64 years. As estimates have been rounded, discrepancies may occur between sums of the component items and total. Small numbers have large associated standard errors and should be used with caution. Occupation data from 2001 to 2006 were converted from ASCO (second edition) to ANZSCO using a concordance developed using data from 2006 Census.

a. Includes associate degree.

Table 14 shows the occupational distributions by field of education in 2008. It shows:

- More than half of all people holding science, health or education qualifications were employed in professional occupations. These occupations were also the most common destinations of IT and arts graduates.
- Occupation in trades were the most common destinations of engineering, architecture or building graduates.
- Community and personal services employed a significant percentage of people with qualifications in the health field.
- While a certain amount of mismatch between qualifications and occupations can be normally expected in a dynamic labour market, the number of IT graduates working as sales workers, machine operators and drivers or labourers seems to be unusually high. This is despite quite rapid growth in employment of IT graduates (see section 2.2.1). This could mean that there is an excess supply of IT graduates. It could also indicate a highly variable quality of the supply.

Table 14 Percentage in occupation groups by field of education, employed population, Australia, 2008 (%)

Field of education	Occupation group								All
	Managers	Prof	Tech & trades	Community & personal services	Clerical & admin	Sales	Machine operators & drivers	Labourers	
Sciences	14.9	56.6	7.7	3.6	8.1	2.9	1.9	4.1	100
IT	11.3	42.8	12.7	3.4	13.3	7.0	3.4	6.1	100
Engineering	13.4	16.9	40.8	2.3	4.8	3.7	9.5	8.6	100
Architec & building	16.1	9.6	54.1	2.3	2.4	2.4	4.8	8.4	100
Agri & environ	20.9	15.8	24.0	3.5	8.3	4.6	7.7	15.3	100
Health	4.8	60.4	3.3	17.7	7.2	2.7	1.2	2.6	100
Education	8.3	68.4	1.6	8.2	7.8	2.5	1.1	2.0	100
Man & commerce	19.7	24.4	3.8	5.2	29.4	10.4	3.0	4.1	100
Society & culture	11.2	33.2	3.3	28.4	13.7	4.7	1.8	3.7	100
Arts	8.6	45.0	10.0	7.7	11.6	9.8	1.7	5.7	100
Hospitality	11.3	2.5	33.9	15.0	13.8	9.5	4.2	9.8	100
Mixed	3.7	6.7	0.0	9.5	31.5	8.6	0.0	39.7	100
With qualifications	13.4	31.1	17.3	9.4	13.2	5.8	4.0	5.7	100
Without quals.	11.4	5.5	12.0	8.4	18.4	15.2	10.8	18.3	100
All	12.6	20.8	15.2	9.0	15.3	9.6	6.8	10.8	100

Source: Unpublished ABS *Education and Work Survey*, 2001–08 (Cat. no. 6227.0). Scope: persons aged 15–64 years. As estimates have been rounded, discrepancies may occur between sums of the component items and total. Small numbers have large associated standard errors and should be used with caution. Occupation data from 2001 to 2006 were converted from ASCO (second edition) to ANZSCO using a concordance developed using data from 2006 Census.

a Includes associate degree.

Table 15 shows the share of female employment in each occupation group from 2001 to 2008. It shows:

- The occupational employment in the Australian labour market is highly segregated by sex. Strong differences exist in the male to female ratio in most occupations, except professionals. However even among professionals there are occupations in which the ratio is highly skewed. For instance, school teaching and nursing are highly feminised. The ratios have generally remained stable in all occupation groups, except managers, professionals and technicians and trades in which there has been shifts in varying amounts towards employment of more women. The biggest shift has been in managerial occupations in which the proportion of women employed increased by 4.1 percentage points.
- Technicians, trades, machine operators and drivers are predominantly male occupations—more than 87 per cent of jobs were held by males in 2008. Among managers and labourers, the proportion of jobs held by males was a little less at about 66 per cent. In contrast, a large majority employed as community and personal services, clerical and administrative and sales workers were women.

Table 15 Per cent females by major occupation group, employed population, Australia, 2001–08 (%)

Occupation group	2001	2002	2003	2004	2005	2006	2007	2008	Average 2001–08
Managers	30.4	31.2	31.5	32.2	33.0	34.0	32.8	34.5	32.5
Professionals	48.8	49.4	49.3	50.9	50.9	51.3	51.3	51.7	50.5
Technicians & trades	12.8	12.2	12.6	12.6	14.3	13.5	13.9	13.3	13.1
Community & pers services	69.0	66.4	66.6	67.1	68.9	68.2	69.1	69.9	68.1
Clerical & administrative	76.0	75.9	76.4	76.1	75.5	76.9	74.9	76.6	76.0
Sales	62.0	61.0	62.2	61.7	62.0	61.8	63.8	60.9	61.9
Machine operators & drivers	10.2	11.2	11.1	11.5	11.5	10.7	8.8	10.3	10.7
Labourers	34.7	35.0	35.7	33.5	33.4	34.8	35.5	34.9	34.7
All	44.4	44.3	44.7	44.8	45.1	45.5	45.2	45.4	44.9

Source: Unpublished ABS *Education and Work Survey*, 2001–08 (Cat. no. 6227.0). Scope: persons aged 15–64 years. As estimates have been rounded, discrepancies may occur between sums of the component items and total. Small numbers have large associated standard errors and should be used with caution. Occupation data from 2001 to 2006 were converted from ASCO (second edition) to ANZSCO using a concordance developed using data from 2006 Census.

a Includes associate degree.

2.3 Qualifications—unemployed population

This section provides some additional details of the qualifications profile of the unemployed population.

2.3.1 Trends in the number with qualifications

Table 16 shows the numbers of unemployed with qualifications from 2001 to 2008. The main points from this table are:

- Overall unemployment fell 4.7 per cent per year. Surprisingly, it fell faster for those who did not have qualifications than for those who had. In 2001, 35.2 per cent of the unemployed had qualifications compared to 39.6 per cent in 2008.
- Unemployment fell more rapidly for those with VET qualifications than for those with higher education qualification.

Table 16 Persons with qualifications (level), unemployed population, Australia, 2001–08 ('000)

Level of highest non-school qualification	2001	2002	2003	2004	2005	2006	2007	2008	Change 2001–08 (%)	
									Average year-on-year	Total
Higher Education	53	55	64	65	61	57	52	54	0.6	1.8
VET	181	167	168	149	147	142	120	133	-4.0	-26.8
<i>Adv dip/dip^a</i>	32	38	34	29	30	26	30	36	2.9	13.9
<i>Certificate III/IV</i>	85	78	83	76	74	73	56	63	-3.6	-26.0
<i>Certificate I/II</i>	65	51	51	45	43	42	34	34	-8.4	-47.8
With qualifications	235	222	232	214	208	199	172	187	-3.0	-20.3
Without qualifications	431	401	383	344	331	317	287	286	-5.7	-33.8
All	666	622	615	558	539	516	459	473	-4.7	-29.1

Source: Unpublished ABS *Education and Work Survey*, 2001–08 (Cat. no. 6227.0). Scope: persons aged 15–64 years. As estimates have been rounded, discrepancies may occur between sums of the component items and total. Small numbers have large associated standard errors and should be used with caution.

a Includes associate degree.

2.3.2 Qualifications by gender

Table 17 shows the qualifications of the unemployed by gender at May 2008 and the changes from 2001 to 2008. It shows:

- Male unemployment fell at a slightly higher rate than female unemployment from 2001 to 2008. By 2008 just over half of the unemployed were male.
- Relatively more females held qualifications in 2008, but the qualifications profiles for males and females are generally similar.

Table 17 Persons with qualifications (level) in 2008 and percentage changes from 2001–08 by sex, unemployed persons, Australia

Level of highest non-school qualification	Males				Females			
	May 2008		Change 2001–08 (%)		May 2008		Change 2001–08 (%)	
	'000	%	Average year-on-year	Total	'000	%	Average year-on-year	Total
Higher education	26	10.8	0.7	-2.4	28	12.3	1.4	6.2
VET	66	26.9	-4.7	-31.9	67	29.3	-3.1	-21.0
<i>Adv dip/dip^a</i>	16	6.3	1.8	4.6	20	9.0	4.5	22.0
<i>Certificate III/IV</i>	33	13.3	-8.4	-47.7	30	13.3	5.8	34.7
<i>Certificate I/II</i>	18	7.3	3.2	-9.0	16	7.1	-12.2	-64.6
With qualifications	93	37.7	-3.5	-25.5	95	41.6	-2.1	-14.6
Without qualifications	153	62.3	-6.5	-38.4	133	58.4	-4.2	-27.5
All	245	100.0	-5.6	-34.1	227	100.0	-3.4	-22.6

Source: Unpublished ABS *Education and Work Survey*, 2001–08 (Cat. no. 6227.0). Scope: persons aged 15–64 years. As estimates have been rounded, discrepancies may occur between sums of the component items and total. Small numbers have large associated standard errors and should be used with caution.

a Includes associate degree.

2.3.3 Qualifications by age

Table 18 shows the qualifications by age at May 2008 and the changes from 2001 to 2008. It shows

- The 15–24 years age group is over represented among the unemployed population. The proportion in this age group has not changed much since 2002.
- While unemployment has fallen among all age groups, it has fallen least among the 45–64 year-olds who made up 23 per cent of the unemployed population in 2008.
- The number of unemployed people with qualifications only increased among the 45–64 year-olds from 2001 to 2008.

Table 18 Persons with qualifications (level) in 2008 and percentage changes from 2001–08 by age, unemployed population, Australia

Level of highest non-school qualification	15–24 years				25–44 years				45–64 years			
	May 2008		Change 2001–08 (%)		May 2008		Change 2001–08 (%)		May 2008		Change 2001–08 (%)	
	'000	%	Average year-on-year	Total	'000	%	Average year-on-year	Total	'000	%	Average year-on-year	Total
Higher ed	10	5.1	9.2	7.7	28	16.0	-1.1	-10.4	17	15.1	4.9	26.9
VET	30	16.0	-5.7	-38.9	59	33.2	-5.9	-35.3	44	40.4	2.6	5.0
<i>Adv dip/dip^a</i>	4	2.4	-0.9	-15.2	18	10.1	2.7	6.7	14	12.4	7.8	42.3
<i>Cert III/IV</i>	17	9.0	1.8	-19.3	26	14.6	-5.2	-37.2	20	18.5	2.2	-12.2
<i>Cert I/II</i>	8	4.5	-10.7	-62.7	15	8.5	-9.5	-54.4	11	9.6	2.7	9.1
With quals.	39	21.1	-3.8	-31.8	87	49.2	-4.7	-28.9	61	55.6	2.9	10.1
Without quals.	147	78.9	-5.0	-30.8	90	50.8	-6.7	-39.5	49	44.4	-5.0	-30.9
All	186	100.0	-5.0	-31.0	176	100.0	-5.9	-34.7	110	100.0	-1.5	-12.8

Source: Unpublished ABS *Education and Work Survey*, 2001–08 (Cat. no. 6227.0). Scope: persons aged 15–64 years. As estimates have been rounded, discrepancies may occur between sums of the component items and total. Small numbers have large associated standard errors and should be used with caution.

a Includes associate degree.

2.4 Qualifications—population not in the labour force

This section also provides some additional details of the qualifications of those who were not in the labour force.

2.4.1 Trends in the number with qualifications

Table 19 shows the numbers with qualifications among this population from 2001 to 2008. It shows:

- The number in this sub-population fell by only 0.7 per cent per year despite strong growth in employment and a significant fall in unemployment. However it was shown in section 2.1 that labour force participation rate increased from 75 to 78.1 per cent in this period. This means that a significant component of employment growth has been due to increased migration.
- As in the general population, the number with qualifications in this sub-population has also been increasing and the number without qualifications falling.

Table 19 Persons with qualifications (level), population not in labour force, Australia, 2001–08 ('000)

Level of highest non-school qualification	2001	2002	2003	2004	2005	2006	2007	2008	Change 2001–08 (%)	
									Average year-on-year	Total
Higher Education	277	278	307	321	315	342	349	401	5.5	44.4
VET	654	668	667	711	697	650	667	659	0.2	0.7
<i>Adv diploma^a</i>	98	115	110	114	121	116	111	119	3.1	21.5
<i>Diploma</i>	57	58	64	67	63	67	71	104	10.0	83.0
<i>Certificate IV</i>	47	43	51	57	52	51	65	70	6.5	48.4
<i>Certificate III</i>	205	230	223	248	221	222	236	220	1.3	7.3
<i>Certificate II</i>	123	132	122	122	178	111	128	112	1.5	-9.4
<i>Certificate I</i>	123	90	97	103	63	82	56	33	-13.4	-73.0
With qualifications	932	946	974	1,032	1,013	992	1,016	1,059	1.9	13.7
Without qualifications	2,264	2,293	2,205	2,192	2,038	2,040	2,034	1,978	-1.9	-12.6
All	3,195	3,239	3,179	3,224	3,051	3,031	3,050	3,038	-0.7	-4.9

Source: Unpublished ABS *Education and Work Survey*, 2001–08 (Cat. no. 6227.0). Scope: persons aged 15–64 years. As estimates have been rounded, discrepancies may occur between sums of the component items and total. Small numbers have large associated standard errors and should be used with caution.

a Includes associate degree.

2.4.2 Qualifications by gender

Table 20 shows the qualifications by gender of the population not in the labour force. It shows:

- In 2008, for every one male there were two females outside the labour force.⁹ Partly this is because more women than men leave the labour force for raising families and also to look after elderly parents. It is therefore not surprising that a higher percentage of them have qualifications.
- While the number of women with qualifications increased by 2.9 per cent per year, the number without qualifications fell 2.4 per cent per year. The number of men without qualifications also fell but at a much lower rate.

⁹ This ratio has remained more or less stable since 2001.

Table 20 Persons with qualifications (level) in 2008 and percentage changes from 2001-08 by sex, population not in the labour force, Australia

Level of highest non-school qualification	Males				Females			
	May 2008		Change 2001-08 (%)		May 2008		Change 2001-08 (%)	
	'000	%	Average year-on-year	Total	'000	%	Average year-on-year	Total
Higher education	105	10.3	3.7	24.4	296	14.6	6.6	53.2
VET	201	19.7	-1.5	-11.3	457	22.7	1.1	7.0
<i>Adv diploma^a</i>	27	2.6	2.6	2.0	93	4.6	4.4	28.5
<i>Diploma</i>	24	2.3	3.7	22.7	80	4.0	12.9	114.2
<i>Certificate IV</i>	15	1.5	12.5	108.4	55	2.7	5.9	37.5
<i>Certificate III</i>	105	10.3	-3.0	-22.0	116	5.7	8.1	62.5
<i>Certificate II</i>	25	2.5	3.4	14.6	87	4.3	1.3	-14.5
<i>Certificate I</i>	6	0.6	-11.5	-66.7	27	1.4	-13.5	-74.1
With qualifications	306	30.0	-0.1	-1.6	753	37.3	2.9	21.4
Without qualifications	713	70.0	-0.9	-6.3	1266	62.7	-2.4	-15.8
All	1,019	100.0	-0.7	-4.9	2,019	100.0	-0.7	-4.9

Source: Unpublished ABS *Education and Work Survey*, 2001-08 (Cat. no. 6227.0). Scope: persons aged 15-64 years. As estimates have been rounded, discrepancies may occur between sums of the component items and total. Small numbers have large associated standard errors and should be used with caution.

a Includes associate degree.

2.4.3 Qualifications by age

Table 21 shows the qualifications by age. It shows:

- The 45-64 year-olds comprise the largest proportion and the 15-24 years-olds the smallest proportion of the population not in the labour force in 2008. The number in the youngest group has however been increasing.
- Only a minority among the youngest and the oldest age groups had qualifications in 2008. The youngest group is likely to include a large number of people in the process of acquiring qualifications. The number with qualifications in this group has been increasing rapidly, albeit from a small base.

Table 21 Persons with qualifications (level) in 2008 and percentage changes from 2001-08 by age, population not in the labour force, Australia

Level of highest non-school qualification	15-24 years				25-44 years				45-64 years			
	May 2008		Change 2001-08 (%)		May 2008		Change 2001-08 (%)		May 2008		Change 2001-08 (%)	
	'000	%	Average year-on-year	Total	'000	%	Average year-on-year	Total	'000	%	Average year-on-year	Total
Higher ed	32	3.8	5.7	40.3	207	22.2	6.1	50.3	162	12.6	5.1	38.3
VET	62	7.5	6.4	39.8	260	27.9	-0.8	-6.4	336	26.2	0.4	1.4
<i>Adv diploma^a</i>	3	0.3	20.0	-4.6	36	3.9	-1.6	-12.4	81	6.3	6.4	48.4
<i>Diploma</i>	17	2.0	13.6	58.3	49	5.2	10.5	73.8	39	3.0	16.4	110.8
<i>Certificate IV</i>	8	1.0	18.8	108.5	36	3.8	9.6	83.7	26	2.0	4.6	9.3
<i>Certificate III</i>	23	2.7	12.5	103.1	82	8.8	3.1	18.1	116	9.0	-0.7	-7.1
<i>Certificate II</i>	10	1.2	0.3	-21.4	44	4.7	-3.0	-32.0	58	4.5	8.1	25.8
<i>Certificate I</i>	2	0.3	6.7	-36.9	14	1.5	-14.6	-74.4	17	1.3	-11.0	-73.7
With quals.	94	11.4	5.6	39.9	467	50.2	1.8	12.4	498	38.8	1.6	11.0
Without quals.	730	88.6	0.5	3.5	464	49.8	-3.8	-24.3	784	61.2	-2.6	-17.0
All	824	100.0	1.0	6.6	931	100.0	-1.4	-9.5	1,282	100.0	-1.1	-8.0

Source: Unpublished ABS *Education and Work Survey*, 2001-08 (Cat. no. 6227.0). Scope: persons aged 15-64 years. As estimates have been rounded, discrepancies may occur between sums of the component items and total. Small numbers have large associated standard errors and should be used with caution.

a Includes associate degree.

3 Forecasts of employment by qualification 2010 to 2025

This chapter reports on forecasts of qualifications in Australia from 2010¹⁰ to 2025. The forecasts of qualifications are presented by occupation.

The analyses consider forecasts of employment by occupation from the MONASH model¹¹ as a starting point. These particular set of MONASH forecasts were released in September 2009 and incorporate the five-year macro forecasts of the Australian economy made by ACCESS Economics and released in June 2009. Thus they factor in the impact of the global financial crisis though not necessarily the speed of the recovery so far. The MONASH forecasts are to 2016 and for the purposes of this report they have been extrapolated to 2025.

MONASH forecasts do not include the impact of climate mitigation and adaption policies that are likely to be implemented over the next few years, although the impact of some large infrastructure projects that are related to climate change, such as in the water industry, are likely to have been factored in. Nevertheless, the model is really about a 'business as usual' case but one which ignores the costs of not tackling climate change, costs that Stern (2006) and Garnaut (2008) believe will be incurred. Future research in modelling the economy does need to consider the impact of climatic events that are predicted to increase in frequency. The modelling will need to incorporate the risk associated with these events. These risks are measurable and have already been calculated by climate scientists.

The projections of qualifications are built on the forecasts of employment by occupation. They incorporate the trends in the skills profile of the Australian workforce from 2001 to 2008. As consistent data on skills of the entire workforce are unavailable, the analyses use qualifications as a proxy. The analyses in the previous chapter provided clear evidence of skills deepening in the workforce, meaning that the number of people with qualifications is growing faster than overall growth in employment. These trends are incorporated in the projections of employment by occupation and qualification. Without incorporating the skills deepening trends, qualifications in the workforce will be grossly underestimated.

Key findings

Employment increased from 9 million in 2001 to 10.8 million in 2009, an average annual increase of 2.2 per cent. The impact of the global financial crisis has had minimal impact on aggregate employment in 2009. However employment is forecast to remain flat for a couple of years because of the crisis before increasing about 1.7 per cent year. Employment is forecast to be 13.5 million in 2025, which is 25 per cent more than in 2009. If net overseas migration were to continue at the record levels it has reached in recent years or labour force participation rate were to increase then employment can be expected to increase more. Treasury's *Mid-year Economic and Fiscal Outlook 2009-10*¹² of the Australian economy is more optimistic about the employment outlook for the next two years than assumed in this report.

Employment by industry

¹⁰ The year 2010 refers to the financial year 2009-10. This will be the convention adopted in the entire report.

¹¹ A brief description of the MONASH model is given in Appendix 1 of the report. The forecasts were produced in 2007 and, therefore, do not factor in the strong growth in employment in 2008 or the fallout from the global financial crisis since then.

¹² Australian Government (2009)

Manufacturing and construction are forecast to bear the brunt of the impact of the global financial crisis in the short-term.

Employment is forecast to increase at 3 per cent per year in electricity, gas and waste services. This is due to a number of the infrastructure projects that are currently underway or are at an advanced stage of planning, including water desalination plants and gas-fired power stations.

Other sectors in which employment is forecast to grow by more than 2 per cent per year are mining, professional, scientific and technical services, education and training and arts and recreation services. Following long-term trends, employment is however forecast to fall in agriculture, forestry and fishing and manufacturing.

In absolute terms, the highest growth in employment is forecast in professional, scientific and technical services and health. In each of these sectors, an additional 400,000 persons are forecast to be employed in 2025 than in 2009.

While employment is forecast to grow in the telecommunication sector perhaps as a result of the expected rollout of the National Broadband Network, it is expected to fall in information media.

Employment by occupation

Employment is forecast to increase across all occupations. It is forecast to increase at above average rates for managers, professionals and community and personal services workers.

Technicians and trades and labourers are the two main groups expected to be affected by the global financial crisis.

Employment by qualification

Forecasts of the numbers of people holding qualifications take account of skills deepening by occupation.

Employment of people with qualifications is forecast to increase by 58.6 per cent to 10.3 million in 2025. This is equivalent to a compound rate of growth of 2.9 per cent per year, which is more than twice the rate of growth in total employment. As a result, 76.6 per cent of the employed persons are expected to hold qualifications in 2025.

Qualifications are expected to increase at a slightly higher rate at the higher education than VET level. In spite of this a higher proportion of people with qualifications are expected to hold VET-level qualifications than higher education qualifications in 2025—58.1 per cent compared to 41.9 per cent.

A significant shift is expected in the qualifications profile towards diploma and certificate IV level qualifications and away from other VET-level qualifications. In 2025, about 3 million people are expected to hold diploma or certificate IV qualifications and almost none are expected to hold certificate I as their highest qualification. Although the proportion holding certificate II is expected to be lower in 2025 than in 2009, about 400,000 persons are expected to hold qualifications at this level in 2025.

Employment by qualification and occupation

The growth in the number holding qualifications is expected to vary by occupation. Changes are also expected in the qualifications profile of occupations.

The proportion of **managers** with qualifications is expected to increase from 64.4 per cent in 2009 to 84.9 per cent in 2025. A significant shift towards higher level VET qualifications (diploma and certificate IV) and away from lower level qualifications (certificates I-III) is expected.

As a high proportion of **professionals** already hold qualifications, the increase in the proportion with qualifications is relatively small—from 89 percent in 2009 to 91.7 per cent in 2025.

Only a modest improvement is expected in the proportion with qualifications among **technicians and tradespersons**—2.5 percentage points increase to 70.9 per cent in 2025. The qualifications profile is expected to shift generally towards higher level qualifications (certificate IV and above) and away from certificate III. The number with certificate II is also expected to increase.

The proportion with qualifications among **community and personal service workers** is also expected to increase sharply—from 63.3 per cent in 2009 to 85.9 per cent in 2025. Most of the increase is expected among those who hold VET qualifications (diploma, certificate III and certificate IV) whose numbers are expected to double from 2009 to 2025.

An increasing proportion of **clerical and administrative workers** are expected to hold qualifications—from 53.2 per cent in 2009 to 76.1 per cent in 2025. The qualifications profile is expected to shift substantially towards diploma, certificate IV and certificate III level qualifications and away from other VET-level qualifications.

Despite a substantial increase in the number with qualifications among **sales workers**, 39.9 per cent are expected to be without qualifications in 2025. On the other hand, an increasing proportion of those with qualifications are expected to hold higher education qualifications.

The number of **machine operators and drivers** with qualifications is expected to more than double between 2009 and 2025. About 63.1 per cent are expected to hold qualifications in 2025, with about a quarter of these at the higher education level. The qualifications profile is also expected to shift significantly towards diploma and certificate IV and away from certificate III.

The proportion with qualifications among **labourers** is expected to increase from 32.1 per cent in 2009 to 50.3 per cent in 2025. The qualifications profile is expected to shift towards diploma and higher education qualifications and generally away from other levels.

3.1 Forecasts of employment

This report uses the latest forecasts of employment by occupation from the MONASH model as a starting point to forecast employment by occupation and qualification. A brief description of the MONASH model is given in Appendix 1. The forecasts were produced in September 2009 and include the impact of the global financial crisis as assessed by ACCESS Economics in their five-year *Business Outlook* of the Australian economy released in June 2009.

The MONASH forecasts at the two-digit occupation level were extrapolated to 2025.¹³

Figure 1 shows the actual employment in Australia from 2001 to 2009 and forecasted employment from 2010 to 2025. Employment increased from 9 million in 2001 to 10.8 million in 2009, an average annual increase of 2.2 per cent.¹⁴ The impact of the global financial crisis has resulted in very little change in employment in 2009 from the previous year. According to MONASH forecasts, the impact of the crisis on employment is likely to continue well into 2011 because of the lag effect. Employment is however expected to remain flat rather than decline until 2011. After 2011, it is forecast to increase though at a lower rate of 1.7 per cent.

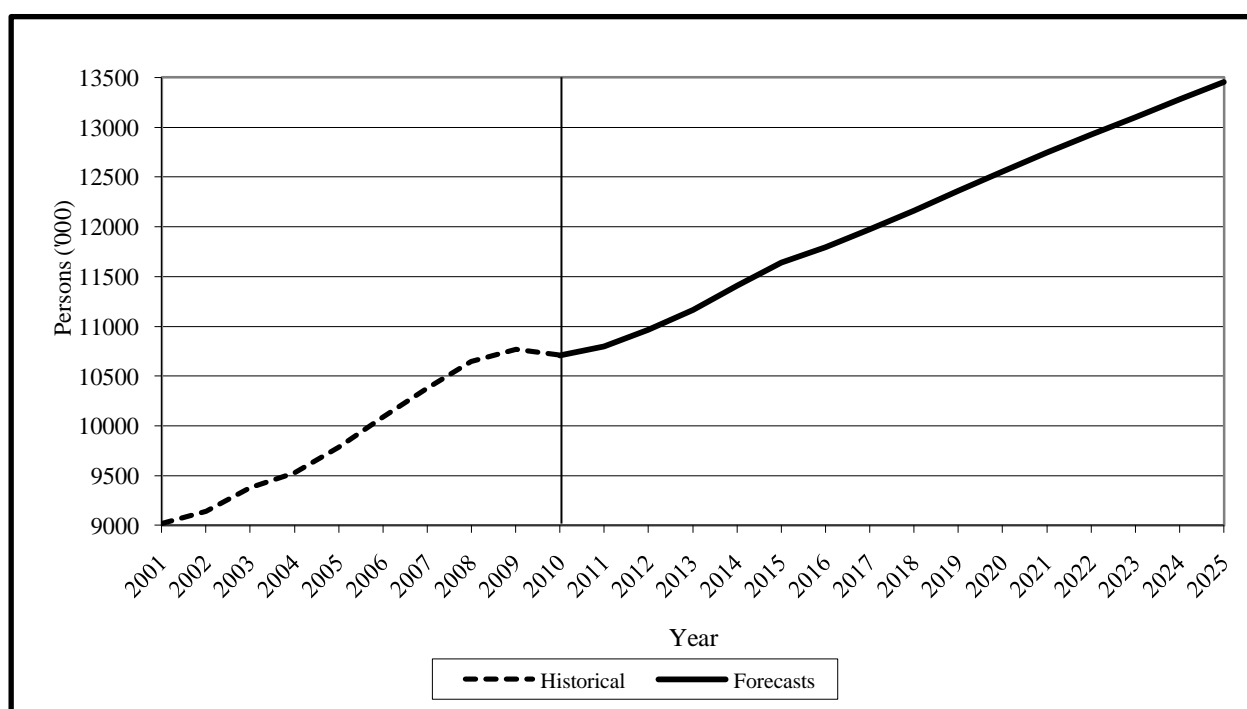
In 2025 employment is forecast to be 13.5 million, which is 25 per cent more than in 2009. If net overseas migration were to continue at the record levels it has reached in recent years, then employment is likely to be higher than this. Employment could also be higher if the labour force participation rate were to increase to levels higher than that assumed in the MONASH model. The labour force participation rate has indeed increased in recent years, particularly for older aged workers.

¹³ The stepwise autoregressive method was used to forecast the series for each occupation. This method is the default option in Proc Forecast in SAS. The forecasts were normalised to add up to the total.

¹⁴ The annual employment figures in this chapter are not directly comparable to those in chapter 2 for two reasons. First, the scope in this chapter is all persons aged 15 years or older compared to persons aged 15–64 years in chapter 2. Second, the annual employment referred to in this chapter is the average of the employment for four different months that are three months apart. For instance, the employment for 2008 is the average of the employment for August 2007, November 2007, February 2008 and May 2008. In the chapter 2, the employment for 2008 refers to the employment for May 2008.

In the *Mid-year Economic and Fiscal Outlook 2009-10*, the Australian Treasury is more optimistic about the employment outlook for the next two years than it was at the time of the May 2009 Budget (Australian Government 2009). It has revised the forecast for employment for 2010 from a negative growth of 1.5 per cent to a positive growth of 0.25 per cent. Similarly the forecast for 2011 has been revised from 0.5 to 1.5 per cent. This means that the MONASH forecast for 2010 is lower by 84,000 persons than the forecast of the Australian Government. The 2011 forecast is lower by 159,000.

Figure 1 Forecasts of employment, Australia, 2001–09 (actual) 2010–25 (forecasts)



Source: ABS *Labour Force Survey* (ABS Cat. no. 6202.0), Monash Economic Forecasts (CoPS September 2009) and CEET. Scope: persons aged 15 years or older.

3.2 Forecasts of employment by industry

Although there is generally a close relationship between industry output and employment, it can be affected by technological change and outsourcing of non-core activities to other sectors.

Table 22 shows the forecasts of employment by industry for selected years to 2025. It shows:

- In 2009, the three largest sectors in term of employment were retail (1.21 million) health care and social assistance (1.14 million) and manufacturing (1.02 million). The two smallest sectors were electricity, gas and waste services (135,000) and mining (167,000).
- Employment is forecast to increase at 3 per cent per year in electricity, gas and waste services. This is probably due to the number of the infrastructure projects that are currently underway or are at an advanced stage of planning, including water desalination plants and gas-fired power stations.
- Other sectors in which employment is forecast to grow by more than 2 per cent per year are mining, professional, scientific and technical services, education and training and arts and recreation services.
- In only two sectors is employment forecast to fall—agriculture, forestry and fishing and manufacturing. The reduction in employment in these industries is partly due to long-term trends, such as globalisation, organisational and technical change. According to Garnaut (2008,

Australian agriculture, forestry and fishing are, without strong mitigation, highly susceptible to climate change.

- In absolute numbers, employment is forecast to increase by most in professional, scientific and technical services and health sectors. An additional 400,000 persons are forecast to be employed in each of these sectors in 2025 than in 2009. In addition to these two sectors, construction, retail trade and education and training are also expected to employ more than a million people in 2025.
- Forecast of relatively low employment growth in the information media and telecommunication sector is surprising in the light of potentially large infrastructure spending on the National Broadband Network over the next few years. However an examination of the disaggregated data indicates employment in telecommunication is set to grow at an above average rate.
- While manufacturing and construction are forecast to bear the brunt of the flat job market in 2010 and 2011, professional, scientific and technical services is forecast to make the most gain.

Table 22 Forecasts of employment by industry, persons, Australia, 2010 to 2015, 2020 and 2025 ('000)

Industry	2009 (Actual)	2010	2011	2012	2013	2014	2015	2020	2025	Growth 2009-25 (%)	
										Annual average ^a	Total
Agriculture, forestry & fishing	358	357	345	346	350	354	353	318	297	-1.2	-17.0
Mining	167	157	156	157	157	157	156	195	229	2.0	37.3
Manufacturing	1,017	951	966	962	967	979	983	925	886	-0.9	-12.8
Elect, gas, water & waste	135	148	151	154	151	147	148	184	215	3.0	59.3
Construction	988	959	925	904	921	965	992	1,112	1,207	1.3	22.2
Wholesale trade	401	424	425	432	444	452	458	490	525	1.7	30.9
Retail trade	1,208	1,218	1,239	1,267	1,287	1,314	1,344	1,447	1,550	1.6	28.3
Accommodation & food	711	704	712	726	742	758	774	815	863	1.2	21.3
Transp, postal & warehousing	590	585	589	601	614	625	637	712	781	1.8	32.4
Info media & telecom	223	223	225	230	234	238	243	245	250	0.7	12.1
Financial & insurance services	396	381	391	401	407	417	422	453	478	1.2	20.7
Rental, hiring & real estate	193	187	190	193	196	201	207	229	246	1.5	27.8
Prof, scientific & tech services	777	818	828	850	875	897	926	1,055	1,179	2.6	51.7
Admin and support services	344	363	375	386	395	406	421	441	469	2.0	36.6
Public administration & safety	669	634	639	655	672	692	713	774	835	1.4	24.9
Education & training	801	817	831	856	883	901	920	1,016	1,112	2.1	38.7
Health care & social assistance	1,141	1,150	1,163	1,188	1,206	1,230	1,254	1,405	1,547	1.9	35.5
Arts & recreation services	199	200	206	212	214	218	224	260	292	2.4	46.3
Other services	449	436	440	446	447	454	462	479	497	0.6	10.6
All	10,767	10,710	10,797	10,967	11,163	11,406	11,638	12,555	13,457	1.4	25.0

Source: ABS *Labour Force Survey* (ABS Cat. no. 6202.0), Monash Economic Forecasts (CoPS September 2009) and CEET. Scope: persons aged 15 years or older. These forecasts may be at variance to those produced elsewhere in DEEWR because of different method, assumptions and data that may have been used to produce them.

Conversion from ANZSIC 1993 to ANZSIC 2006 uses a concordance provided by CoPS. As estimates have been rounded, discrepancies may occur between sums of the component items and total.

a. Compound growth

3.3 Forecasts of employment by occupation

Table 23 shows the forecasts of employment by major occupation group for selected years to 2025.¹⁵ It shows:

- Employment is forecast to increase across all occupations, with the highest rate of increase for managers and the lowest for labourers. It is also forecast to increase substantially for professionals and community and personal service workers.

¹⁵ Forecasts of employment by ANZSCO two-digit occupation are included in Table A1 in Appendix 2.

- The ranking of managers, in terms of the share of employment, will jump from fourth place in 2001 to second place in 2025.
- While employment of technicians and trades workers as a group is forecast to grow at below average rate, that of engineering, ICT and science technicians and skilled animal and horticulture tradespersons is forecast to grow at about average or higher rates (see Table A1 in Appendix 2).
- Technicians and trades and labourers are expected to bear the main brunt of the flat labour market in 2010 and 2011.

Table 23 Forecasts of employment by major occupation group, persons, Australia, 2010 to 2015, 2020 and 2025 ('000)

Major occupation group	2009									Growth 2009-25 (%)	
	(Actual)	2010	2011	2012	2013	2014	2015	2020	2025	Annual average ^a	Total
Managers	1,384	1,414	1,432	1,466	1,505	1,549	1,591	1,774	1,947	2.2	40.7
Professionals	2,236	2,256	2,293	2,353	2,412	2,471	2,531	2,832	3,116	2.1	39.4
Technicians & trades	1,641	1,608	1,599	1,597	1,610	1,642	1,667	1,784	1,888	0.9	15.1
Comm & personal services	961	961	974	998	1,018	1,041	1,066	1,195	1,307	1.9	36.0
Clerical & administrative	1,659	1,631	1,643	1,667	1,693	1,726	1,758	1,837	1,929	0.9	16.3
Sales	1,011	996	1,010	1,029	1,045	1,066	1,088	1,107	1,166	0.9	15.3
Machinery operators & drivers	718	723	723	727	737	748	757	816	864	1.2	20.3
Labourers	1,156	1,122	1,123	1,131	1,144	1,164	1,181	1,209	1,240	0.4	7.3
All	10,766	10,710	10,797	10,967	11,163	11,406	11,638	12,555	13,457	1.4	25.0

Source: ABS *Labour Force Survey* (ABS Cat. no. 6202.0), Monash Economic Forecasts (CoPS September 2009) and CEET. Scope: persons aged 15 years or older. These forecasts may be at variance to those produced elsewhere in DEEWR because of different method, assumptions and data that may have been used to produce them. Conversion from ASCO (second edition) to ANZSCO uses a concordance developed by CEET. As estimates have been rounded, discrepancies may occur between sums of the component items and total.

a Compound growth

3.4 Forecasts of employment by qualification

Chapter 2 showed evidence of skills deepening in the Australian population. The impact has been not only in terms of an increasing proportion of the population holding qualifications but also in terms of the level of the qualifications being held. It also showed that the employed population is relatively more qualified than the general population and that skills deepening varied by occupation. The desirable level of qualified people in an occupation is not static. The availability of more people with higher level qualifications make it possible for industry to use more skill-intensive technologies which further foster the demand for skills.

The relatively higher demand for people with qualifications than the total number required can also be seen as reducing the degree to which there are skill gaps within occupations—the employment of people who are inadequately qualified for the jobs they hold.

The qualifications profile of the workforce in the future will therefore depend not only on the changes in industrial and occupational structure of employment but also on the extent of skills deepening within occupations.

This section includes the forecasts of the number of people with qualifications among the employed population. The calculations assume the recently observed trends in skills deepening to continue in the forecast period. It also assumes that the number holding qualifications represents the true demand for qualifications.

In summary, regression methods are used to forecast the proportion holding qualifications at each level¹⁶ by occupation. The models are estimated with data that were described in chapter 2. It was

¹⁶ Higher education qualifications are aggregated into a single category.

noted in section 2.2.1 that the estimates for the numbers holding advanced diploma and diploma in 2008 appeared to be inconsistent with the trend from 2001 to 2007. For this reason the 2008 data for these two qualification levels have been excluded when estimating the regression models.

After appropriately normalising the forecasts of the proportions at each occupation level, they are multiplied by the forecasts of employment to obtain forecasts of qualifications by occupation.

The forecasts for 2010 to 2015 are derived at the sub-major (2-digit) occupation level and those for 2016 to 2025 are derived at the major (1-digit) occupation level.

Table 24 shows forecasts of qualifications in absolute numbers and Table 25 shows the same in percentage form. Rather than including forecasts for each year, only those for selected years are included. The forecast for 2009 is included as a benchmark. The tables show:

- Employment of people with qualifications is forecast to increase by 58.2 per cent to 10.3 million in 2025. This is equivalent to a compound rate of growth of 2.9 per cent per year, which is more than twice the rate of growth in total employment. As a result, 76.6 per cent of employed persons are expected to hold qualifications in 2025.
- Qualifications are expected to increase at a slightly higher rate at the higher education than VET level. By 2025, 32.1 per cent of the employed population is expected to hold higher education qualifications and 44.5 per cent VET qualifications.
- A shift is expected in the qualifications profile towards diploma and certificate IV level qualifications and away from other VET-level qualifications. In 2025, about 3 million people are expected to hold diploma and certificate IV qualifications and almost nobody will hold certificate I as their highest qualification.
- The Council of Australian Governments (COAG) has set

Table 24 Forecasts of employment by qualification (level), persons, Australia, 2010 to 2015, 2020 and 2025 ('000)

Level of highest non-school qualification	2009	2010	2011	2012	2013	2014	2015	2020	2025	Growth 2009-25 (%)	
										Annual average ^b	Total
Higher education	2,692	2,740	2,810	2,904	3,001	3,102	3,202	3,844	4,324	3.0	60.7
VET	3,826	3,844	3,922	4,036	4,170	4,336	4,506	5,138	5,985	2.8	56.4
<i>Adv diploma^a</i>	539	537	540	548	556	566	575	584	582	0.5	8.0
<i>Diploma</i>	555	592	643	704	771	849	933	1,282	1,809	7.7	226.3
<i>Certificate IV</i>	425	452	485	525	569	619	672	883	1,177	6.6	176.7
<i>Certificate III</i>	1,763	1,740	1,744	1,757	1,778	1,809	1,833	1,956	2,007	0.8	13.8
<i>Certificate II</i>	436	429	427	428	430	435	440	406	395	-0.6	-9.3
<i>Certificate I</i>	108	94	83	74	66	59	53	27	15	-11.7	-86.4
With qualifications	6,517	6,583	6,731	6,940	7,171	7,438	7,708	8,983	10,309	2.9	58.2
Without qualifications	4,249	4,127	4,066	4,027	3,992	3,968	3,931	3,572	3,148	-1.9	-25.9
All	10,766	10,710	10,797	10,967	11,163	11,406	11,638	12,555	13,457	1.4	25.0

Source: CEET. Scope: persons aged 15 years or older. As estimates have been rounded, discrepancies may occur between sums of the component items and total.

a Includes associate degree

b Compound growth

Table 25 Forecasts of employment by qualification (level), Australia, 2010 to 2015, 2020 and 2025 (%)

Level of highest non-school qualification	2009	2010	2011	2012	2013	2014	2015	2020	2025
Higher education	25.0	25.6	26.0	26.5	26.9	27.2	27.5	30.6	32.1
VET	35.5	35.9	36.3	36.8	37.4	38.0	38.7	40.9	44.5
<i>Adv diploma^a</i>	5.0	5.0	5.0	5.0	5.0	5.0	4.9	4.7	4.3
<i>Diploma</i>	5.2	5.5	6.0	6.4	6.9	7.4	8.0	10.2	13.4
<i>Certificate IV</i>	4.0	4.2	4.5	4.8	5.1	5.4	5.8	7.0	8.7
<i>Certificate III</i>	16.4	16.2	16.2	16.0	15.9	15.9	15.7	15.6	14.9
<i>Certificate II</i>	4.0	4.0	4.0	3.9	3.9	3.8	3.8	3.2	2.9
<i>Certificate I</i>	1.0	0.9	0.8	0.7	0.6	0.5	0.5	0.2	0.1
With qualifications	60.5	61.5	62.3	63.3	64.2	65.2	66.2	71.5	76.6
Without qualifications	39.5	38.5	37.7	36.7	35.8	34.8	33.8	28.5	23.4
All	100	100	100	100	100	100	100	100	100

Source: CEET. Scope: persons aged 15 years or older. As estimates have been rounded, discrepancies may occur between sums of the component items and total.

3.5 Forecasts of employment by qualification and occupation

Tables 26 to 33 show employment forecasts by qualification for each major occupation group. They show:

- An increasing number of managers are forecast to hold qualifications. In 2025, 84.9 per cent are expected to have qualifications compared to 64.4 per cent in 2009. A significant shift towards higher level VET qualifications (diploma and certificate IV) and away from lower level qualifications (certificates I-III) is expected among managers. The number with VET qualifications is expected to increase at a faster rate than the number with higher education qualifications. Consequently a smaller proportion of the qualifications are expected to be held at the higher education level in 2025 than in 2009. Almost twice as many people are forecast to have VET qualifications in 2025 than in 2009.
- While the proportion with qualifications among professionals is forecast to increase from 89 per cent in 2009 to 91.7 per cent in 2025, the qualifications profile is expected to remain largely unchanged. The only notable shift expected is towards diplomas with a corresponding shift away from advanced diplomas.
- A modest improvement is expected in the proportion with qualifications among technicians and tradespersons—2.5 percentage points increase from 2009 to 2025. Trade occupations will generally include a substantial number of apprentices who are in the process of acquiring their first qualification. The qualifications profile of technicians and tradespeople is expected to shift generally towards higher level qualifications (certificate IV and above). The number with certificate II is also expected to increase. A significantly lower proportion is expected to hold certificate III level qualifications—64.3 per cent of all qualifications in 2009 to 39.1 per cent in 2025. Certificate III is the typical current level of a trade qualification
- The proportion with qualifications among community and personal service workers is expected to increase sharply—from 63.3 per cent in 2009 to 85.9 per cent in 2025. Most of the increase is expected among those who hold VET qualifications (diploma, certificate III and certificate IV) whose numbers are expected to double from 2009 to 2025. While the total number with qualifications at the higher education level is expected to increase, the proportion holding qualifications at this level is expected to decline.
- An increasing proportion of clerical and administrative workers are expected to hold qualifications—from 53.2 percent in 2009 to 76.1 per cent in 2025. The qualifications profile is expected to shift substantially towards diploma, certificate IV and certificate III level qualifications and away from other VET-level qualifications. The share of qualifications at the

higher education level is expected to increase only marginally to 31.9 per cent in 2025. Certificate III is expected to be most common VET qualification in 2025.

- Although the number of sales workers with qualifications is expected to increase substantially from 2009 to 2025, 39.9 per cent are expected to be without qualifications in 2025 which is much higher than average across all occupations. Note that sales workers include a large number of students, many of whom are still in the process of acquiring their first qualification or at school. On the other hand, an increasing number of them are expected to hold higher education qualifications. The proportion of all sales workers with qualifications at this level is expected to increase from 28.3 per cent in 2009 to 41.9 per cent in 2025.
- The number of machine operators and drivers with qualifications is expected to more than double between 2009 and 2025. About 63.1 per cent are expected to hold qualifications in 2025, with about a quarter of these at the higher education level. The qualifications profile is also expected to shift significantly towards diploma and certificate IV and away from certificate III. Although an overall increase in the number holding certificate II is expected, the proportion at this level will be relatively small.
- Labourers will include the smallest proportion with qualifications among all occupation groups in 2025. The proportion with qualifications is however expected to increase from 32.1 per cent in 2009 to 50.3 per cent in 2025. The qualifications profile is expected to shift towards diploma and higher education qualifications and generally away from other levels with certificate II rather than certificate I likely to be an entry-level qualification in the future.

Table 26 Forecasts of employment for managers by qualification (level), persons, Australia, 2010 to 2015, 2020 and 2025 ('000)

Level of highest non-school qualification	2009	2010	2011	2012	2013	2014	2015	2020	2025	Growth 2009-25 (%)	
										Annual average ^b	Total
Higher education	414	430	443	458	475	493	510	654	706	3.4	70.7
VET	478	495	508	529	553	580	609	753	945	4.4	97.7
<i>Adv diploma^a</i>	81	81	80	80	79	79	79	75	65	-1.4	-19.7
<i>Diploma</i>	91	104	117	132	150	170	192	326	515	11.4	464.8
<i>Certificate IV</i>	54	60	65	71	78	86	94	132	176	7.6	224.1
<i>Certificate III</i>	186	187	187	188	189	190	190	181	159	-1.0	-14.5
<i>Certificate II</i>	52	51	50	49	49	48	47	36	28	-3.7	-45.3
<i>Certificate I</i>	14	12	10	9	8	7	6	3	1	-14.1	-91.2
With qualifications	892	925	951	987	1,028	1,073	1,119	1,407	1,652	3.9	85.2
Without qualifications	492	489	481	479	477	476	472	367	295	-3.1	-40.0
All	1,384	1,414	1,432	1,466	1,505	1,549	1,591	1,774	1,947	2.2	40.7

Source: CEET. Scope: persons aged 15 years or older. As estimates have been rounded, discrepancies may occur between sums of the component items and total.

a Includes associate degree

b Compound growth

Table 27 Forecasts of employment for professionals by qualification (level), persons, Australia, 2010 to 2015, 2020 and 2025 ('000)

Level of highest non-school qualification	2009	2010	2011	2012	2013	2014	2015	2020	2025	Growth 2009-25 (%)	
										Annual average ^b	Total
Higher education	1,542	1,558	1,584	1,624	1,664	1,700	1,737	1,996	2,194	2.2	42.2
VET	448	453	463	479	495	513	533	578	664	2.5	48.2
<i>Adv diploma^a</i>	179	177	175	176	176	176	176	179	177	-0.1	-1.2
<i>Diploma</i>	115	121	129	139	150	162	174	213	281	5.8	145.0
<i>Certificate IV</i>	58	60	64	68	73	78	84	96	119	4.6	106.2
<i>Certificate III</i>	71	71	72	74	77	79	82	76	78	0.6	9.9
<i>Certificate II</i>	21	20	19	18	17	16	15	13	10	-4.8	-54.5
<i>Certificate I</i>	5	4	3	3	2	2	2	1	0	-16.7	-94.6
With qualifications	1,990	2,011	2,047	2,103	2,159	2,214	2,270	2,574	2,858	2.3	43.6
Without qualifications	246	245	246	250	253	257	261	258	258	0.3	5.2
All	2,236	2,256	2,293	2,353	2,412	2,471	2,531	2,832	3,116	2.1	39.4

Source: CEET. Scope: persons aged 15 years or older. As estimates have been rounded, discrepancies may occur between sums of the component items and total.

a Includes associate degree

b Compound growth

Table 28 Forecasts of employment for technicians and tradespersons by qualification (level), persons, Australia, 2010 to 2015, 2020 and 2025 ('000)

Level of highest non-school qualification	2009	2010	2011	2012	2013	2014	2015	2020	2025	Growth 2009-25 (%)	
										Annual average ^b	Total
Higher education	120	122	126	130	136	143	150	190	229	4.1	90.0
VET	1,003	977	970	966	973	992	1,008	1,048	1,111	0.6	10.7
<i>Adv diploma^a</i>	54	54	54	56	57	59	61	74	84	2.8	56.1
<i>Diploma</i>	70	74	80	87	96	108	121	116	147	4.8	110.2
<i>Certificate IV</i>	65	69	74	80	87	96	105	151	217	7.8	232.3
<i>Certificate III</i>	723	688	667	646	632	623	610	586	524	-2.0	-27.6
<i>Certificate II</i>	73	76	79	83	87	93	99	112	134	3.8	83.0
<i>Certificate I</i>	18	17	16	14	14	13	12	8	5	-7.4	-71.0
With qualifications	1,124	1,099	1,095	1,096	1,109	1,135	1,158	1,237	1,339	1.1	19.2
Without qualifications	518	509	504	500	501	507	510	547	549	0.4	6.1
All	1,641	1,608	1,599	1,597	1,610	1,642	1,667	1,784	1,888	0.9	15.1

Source: CEET. Scope: persons aged 15 years or older. As estimates have been rounded, discrepancies may occur between sums of the component items and total.

a Includes associate degree

b Compound growth

Table 29 Forecasts of employment for community and personal services workers by qualification (level), persons, Australia, 2010 to 2015, 2020 and 2025 ('000)

Level of highest non-school qualification	2009	2010	2011	2012	2013	2014	2015	2020	2025	Growth 2009-25 (%)	
										Annual average ^b	Total
Higher education	129	129	131	133	135	137	139	158	159	1.3	23.6
VET	479	492	514	542	568	596	627	799	964	4.5	101.1
<i>Adv diploma^a</i>	62	62	62	63	63	64	64	71	69	0.6	9.7
<i>Diploma</i>	101	106	114	123	131	140	150	229	304	7.1	199.6
<i>Certificate IV</i>	85	90	97	104	112	120	129	170	212	5.9	148.5
<i>Certificate III</i>	183	191	202	215	227	240	253	312	369	4.5	101.2
<i>Certificate II</i>	38	35	33	31	29	28	26	17	11	-7.6	-71.9
<i>Certificate I</i>	9	7	6	5	5	4	4	1	0	-18.6	-96.3
With qualifications	608	621	644	675	703	734	766	957	1,123	3.9	84.7
Without qualifications	353	339	330	323	315	308	300	237	184	-4.0	-47.9
All	961	961	974	998	1,018	1,041	1,066	1,195	1,307	1.9	36.0

Source: CEET. Scope: persons aged 15 years or older. As estimates have been rounded, discrepancies may occur between sums of the component items and total.

a Includes associate degree

b Compound growth

Table 30 Forecasts of employment for clerical and administrative workers by qualification (level), persons, Australia, 2010 to 2015, 2020 and 2025 ('000)

Level of highest non-school qualification	2009	2010	2011	2012	2013	2014	2015	2020	2025	Growth 2009-25 (%)	
										Annual average ^b	Total
Higher education	276	279	288	299	310	322	333	416	469	3.4	69.6
VET	607	612	631	656	684	717	751	855	999	3.2	64.7
<i>Adv diploma^a</i>	96	96	99	103	106	111	115	110	113	1.1	18.5
<i>Diploma</i>	92	95	102	109	117	126	135	171	218	5.6	138.2
<i>Certificate IV</i>	84	88	93	100	107	114	122	151	185	5.0	119.6
<i>Certificate III</i>	188	193	204	217	231	246	262	337	416	5.1	121.5
<i>Certificate II</i>	118	114	111	109	107	105	104	81	64	-3.7	-45.7
<i>Certificate I</i>	29	25	22	19	16	14	12	5	2	-14.7	-92.2
With qualifications	883	890	919	955	994	1,038	1,084	1,270	1,468	3.2	66.2
Without qualifications	776	740	724	712	699	687	674	567	462	-3.2	-40.5
All	1,659	1,631	1,643	1,667	1,693	1,726	1,758	1,837	1,929	0.9	16.3

Source: CEET. Scope: persons aged 15 years or older. As estimates have been rounded, discrepancies may occur between sums of the component items and total.

a Includes associate degree

b Compound growth

Table 31 Forecasts of employment for sales workers by qualification (level), persons, Australia, 2010 to 2015, 2020 and 2025 ('000)

Level of highest non-school qualification	2009	2010	2011	2012	2013	2014	2015	2020	2025	Growth 2009-25 (%)	
										Annual average ^b	Total
Higher education	108	113	122	132	143	154	167	220	293	6.5	172.1
VET	273	274	284	295	306	318	332	361	407	2.5	49.2
<i>Adv diploma^a</i>	33	33	35	36	38	40	41	42	45	1.9	35.2
<i>Diploma</i>	38	39	42	45	48	52	55	72	91	5.6	140.7
<i>Certificate IV</i>	32	33	36	39	41	45	48	59	74	5.4	132.3
<i>Certificate III</i>	112	113	118	123	128	133	138	149	164	2.4	46.0
<i>Certificate II</i>	45	44	43	43	42	42	42	36	31	-2.4	-31.8
<i>Certificate I</i>	12	11	10	9	8	7	7	4	2	-10.5	-83.0
With qualifications	381	388	406	427	448	473	498	581	701	3.9	84.0
Without qualifications	631	608	604	602	596	593	590	526	465	-1.9	-26.2
All	1,011	996	1,010	1,029	1,045	1,066	1,088	1,107	1,166	0.9	15.3

Source: CEET. Scope: persons aged 15 years or older. As estimates have been rounded, discrepancies may occur between sums of the component items and total.

a Includes associate degree

b Compound growth

Table 32 Forecasts of employment for machine operators and drivers by qualification (level), persons, Australia, 2010 to 2015, 2020 and 2025 ('000)

Level of highest non-school qualification	2009	2010	2011	2012	2013	2014	2015	2020	2025	Growth 2009-25 (%)	
										Annual average ^b	Total
Higher education	40	44	49	54	61	69	77	101	141	8.2	254.5
VET	228	234	240	247	256	266	276	334	404	3.6	77.0
<i>Adv diploma^a</i>	13	14	14	14	15	16	16	15	15	0.7	11.7
<i>Diploma</i>	12	13	14	15	16	18	19	34	48	8.9	293.5
<i>Certificate IV</i>	21	24	28	32	37	43	50	85	148	13.0	606.7
<i>Certificate III</i>	141	141	140	140	141	142	141	142	129	-0.5	-8.4
<i>Certificate II</i>	33	35	37	38	41	43	45	55	62	4.0	87.1
<i>Certificate I</i>	8	7	7	6	6	5	5	3	2	-8.5	-76.0
With qualifications	268	278	288	301	317	335	353	434	545	4.5	103.2
Without qualifications	450	445	434	426	420	413	404	381	319	-2.1	-29.1
All	718	723	723	727	737	748	757	816	864	1.2	20.3

Source: CEET. Scope: persons aged 15 years or older. As estimates have been rounded, discrepancies may occur between sums of the component items and total.

a Includes associate degree

b Compound growth

Table 33 Forecasts of employment for labourers by qualification (level), persons, Australia, 2010 to 2015, 2020 and 2025 ('000)

Level of highest non-school qualification	2009	2010	2011	2012	2013	2014	2015	2020	2025	Growth 2009-25 (%)	
										Annual average ^b	Total
Higher education	62	64	68	73	78	84	90	110	134	4.9	113.9
VET	309	306	313	323	336	353	370	411	490	2.9	59.0
<i>Adv diploma^a</i>	22	21	21	21	21	21	22	18	15	-2.0	-28.2
<i>Diploma</i>	36	39	46	54	63	74	86	121	205	11.6	476.1
<i>Certificate IV</i>	25	26	28	30	33	36	40	39	45	3.6	76.5
<i>Certificate III</i>	159	155	154	153	154	155	156	173	169	0.4	6.4
<i>Certificate II</i>	55	54	55	56	58	60	61	58	55	0.1	0.8
<i>Certificate I</i>	13	11	9	8	7	6	6	3	1	-13.2	-89.7
With qualifications	371	371	381	396	414	437	460	521	624	3.3	68.2
Without qualifications	785	752	742	735	730	727	721	688	616	-1.5	-21.5
All	1,156	1,122	1,123	1,131	1,144	1,164	1,181	1,209	1,240	0.4	7.3

Source: CEET. Scope: persons aged 15 years or older. As estimates have been rounded, discrepancies may occur between sums of the component items and total.

a Includes associate degree

b Compound growth

4 Forecasts of persons not in employment 2010 to 2025

Chapter 2 showed the number of people with qualifications increasing at a faster rate than the number without qualifications even in the population that is not employed. The not employed include the unemployed and those currently not in the labour force. This chapter contains the forecasts of qualifications among the 15–64 year-olds in this population. It is expected that most of the demand for qualifications among this population will be from this age cohort.

Key findings

The number of people not in employment generally declined from 2001 to 2008 reflecting the buoyant Australian economy during this period. Since then numbers have increased largely because of the global financial crisis. It is expected that they will peak in 2010 and 2011 and then begin to fall from 2012.

As a percentage of the civilian population, the number not employed is forecast to decline from 27.1 per cent in 2009 to 23.1 per cent in 2025. This means that the employment rate for the 15–64 year-olds will rise over the forecast period.

As among the employed population, the number with qualifications among the not employed is forecast to increase at a faster rate than the number without qualifications. The number with qualifications in this population is expected to increase from 36.3 per cent in 2009 to 56.1 per cent in 2025.

More people are expected to hold higher education qualifications than VET qualifications in this population in 2025. Nearly twice as many people are expected to hold diplomas or certificate IVs in 2025 than in 2009.

4.1 Forecasts of persons not in employment

Forecasts of the number of not employed persons are obtained simply as the difference between the projections of the civilian population and the forecasts of employment as in chapter 3.

The projections of the civilian population are obtained from ABS (2008). They include projections of the Australian population by age under various scenarios of fertility and mortality rates and net overseas migration. This report uses projections in series B which assumes fertility rate of 1.8 babies per woman, net overseas migration of 180,000 per year and male and female mortality of 85 and 88 years, respectively.

Chapter 3 included forecasts of employment among the population aged 15 years or older. It is assumed that 15–64 year-olds make up 97.5 per cent of this group in the forecast period.¹⁷

Figure 2 shows the actual (2001 to 2009) and forecasted (2010 to 2025) size of the not employed population. The sharp increase from 2009 to 2011 is largely the result of the global financial crisis.

The unemployed comprised 15.7 per cent of the not employed population in 2001. In 2008 the percentage had fallen to 12.2 per cent before rising sharply to 14.1 per cent in 2009.

¹⁷ In 2009, 97.5 per cent of all employed were aged 15–64 years old (ABS *Labour Force* Cat. no. 6202.0)

Figure 2 Forecasts of persons aged 15–64 years not in employment, Australia, 2001–09 (actual) 2010–25 (forecasts)



Source: CEET. Scope: persons aged 15–64 years.

4.2 Forecasts of persons not in employment by qualification

The same method used for forecasting the number of employed people with qualifications is also used to forecast the number with qualifications among the not employed population. It assumes the observed trends in qualifications from 2001 to 2008 will continue in the forecast period.

Table 34 shows the forecasts of 15–64 year-olds with qualifications among the not employed for selected years to 2025. It shows:

- The number not employed in 2025 is expected to be marginally lower than in 2009 but as a proportion of the civilian population it is expected to be much lower. This means that the employment rate will be higher in 2025.
- The number with qualifications is forecast to increase at a faster rate than the number without qualifications. Thus the percentage with qualifications is expected to increase from 36.3 per cent in 2009 to 56 per cent in 2025.
- The number with higher education qualifications is expected to more than double from 2009 to 2025 and more persons are expected to hold higher education qualifications than VET qualifications in 2025. This is partly a result of the high growth rate in the number of females acquiring higher education qualifications and females also happen to be a significant majority of the not employed population.
- In spite of the relatively low growth expected in the number with VET qualifications, the numbers holding qualifications at the diploma and certificate IV levels are expected to nearly double. On the other hand, hardly anybody is expected to hold qualifications at certificate I level.

Table 34 Forecasts of persons aged 15-64 years who are not in employment by qualification (level), Australia, 2010 to 2015, 2020 and 2025 ('000)

Level of highest non-school qualification	2009	2010	2011	2012	2013	2014	2015	2020	2025	Growth 2009-25 (%)	
										Annual average ^b	Total
Higher education	536	605	655	691	722	747	773	948	1132	4.8	111.1
VET	912	983	1019	1031	1034	1027	1023	1048	1068	1.0	17.1
<i>Adv diploma^a</i>	155	169	177	181	183	184	184	193	199	1.6	28.5
<i>Diploma</i>	109	122	130	136	141	144	148	175	202	3.9	85.5
<i>Certificate IV</i>	95	107	115	121	126	130	134	162	191	4.5	101.0
<i>Certificate III</i>	328	353	365	368	367	363	359	350	332	0.1	1.4
<i>Certificate II</i>	171	182	186	184	181	177	172	156	138	-1.3	-19.5
<i>Certificate I</i>	54	51	45	40	34	29	25	12	6	-13.1	-89.4
With qualifications	1,448	1,588	1,674	1,722	1,756	1,774	1,797	1,996	2,200	2.6	51.9
Without qualifications	2,540	2,671	2,695	2,651	2,581	2,487	2,400	2,066	1,732	-2.4	-31.8
All	3,988	4,259	4,369	4,373	4,336	4,261	4,197	4,062	3,932	-0.1	-1.4
% of civilian population ^c	27.1	27.5	29.0	29.3	28.5	27.7	27.0	24.9	23.1		

Source: CEET. Scope: persons aged 15-64 years. As estimates have been rounded, discrepancies may occur between sums of the component items and total.

a Includes associate degree

b Compound growth

c 15-64 years

5 Required numbers with qualifications, 2010 to 2025

In the next 16 years, additional people with qualifications will be required if the qualifications profiles for the employed and the not employed populations, forecast for 2025, were to be realised.

The required numbers for the employed population will be more than that due simply as a result of growth in employment, the shifts in the structure of employment towards more skilled jobs and skills deepening within occupations. This is because qualified people will be needed to replace those who leave the workforce due to retirement, emigration, ill health, death etc. In some occupations, turnover needs can often be higher than demand due to growth.

The numbers retiring is likely to rise in coming years as the baby boomer generation ages. The last decade has however seen an increasing employment of older workers, which to a certain extent is counteracting the effects of the ageing population on the labour force.

In chapter 3, the employed workforce was forecast to include about 76.6 per cent holding non-school qualifications in 2025. To achieve this target will require many new entrants to the workforce to have qualifications and also many existing workers will need to acquire new qualifications. Not every new entrant will have a qualification though, just as not every existing worker will acquire a new qualification.

In chapter 4, the not employed population was forecast to include an increasing number with qualifications—56.1 per cent by 2025. Thus many people who are not employed, in particular those who are unemployed, are anticipated to acquire new qualifications in the next 16 years. The size of the population that is not employed and aged 15–64 years is projected to peak about 2012. As in the case of the employed population, there will be a need to replace those with qualifications in this population who leave for reasons such as retirement (that is reach 65 years of age), death and emigration.

This chapter provides estimates of the numbers of people with qualifications required over the next 16 years to achieve the qualifications profiles of the employed and not employed populations in 2025.

Key findings

The numbers of people with qualifications required for the employed and the not employed populations are expected to vary over time mainly in line with changes in the size of these two populations. As the employed population is forecast to increase, the qualifications requirements for it will also increase. In contrast, the size of the not employed population is expected to increase until about 2014 before declining and therefore these changes will affect qualifications requirements.

The total number of people with qualifications required for the 16 years to 2025 is estimated to be 8.8 million, at an annual average of 552,000. The annual average requirements with higher education qualifications are expected to be 214,000 (38.7 per cent) and those with VET level qualifications 338,000 (61.3 per cent).

Annual requirements are expected to increase from about 519,000 in 2010 to 596,000 in 2025. The requirements at the diploma and certificate IV levels are expected to increase sharply each year from 2010 to 2025. They will also increase at the higher education level but only moderately. The requirements are expected to remain generally constant at certificate III level but decline at all other levels.

In aggregate, the shares of qualifications required at the diploma and certificate III level will be almost the same. However at the diploma level they will increase from 12.3 per cent in 2009 to 21.9 per cent in 2021–2025 and at certificate III level they will fall from 21 per cent to 18.6 per cent.

Of total requirements, 82.1 per cent are expected for the employed population—73.9 per cent of all higher education qualifications and 87.2 per cent of all VET qualifications.

About 62.5 per cent of requirements for the employed population are expected to be met by new entrants and 37.5 per cent by existing workers acquiring new qualifications. New entrants are expected to provide substantially more than half of all requirements at the higher education and certificate I-III levels but only about half of all requirements at the advanced diploma, diploma and certificate IV levels.

More than half the requirements for the not employed population are expected to be at the higher education level. This reflects the significantly higher proportion of females in this population and perhaps also their higher propensity for acquiring higher education qualifications.

5.1 Estimates of qualifications requirements—employed population

New workers will be required if employment is forecast to grow from 2010 to 2025. New workers are also required to replace those who leave during this period. Together these workers constitute new entrants. Some new entrants will have qualifications and they will affect the qualifications profile of the working population.

In some occupations new entrants with qualifications may be insufficient to achieve the qualifications profile forecast for 2025. Therefore, existing workers may need to acquire new qualifications to make up the shortfall.

The appropriate measure of replacement needs in this situation is *net replacement* (or net turnover) and it is calculated using a cohort-component method (Shah and Burke 2001). The model makes corrections for the changes in the future size of the labour force by age and sex. CEET has estimated net replacement rates by occupation for the last several years. The aggregate rate has varied around 2 per cent per year. The rate for the period 2010 to 2014, estimated using data from 1986 to 2009, was 2.3 per cent. Estimates in previous years have ranged from 2 per cent in 2008 to 2.3 per cent in 2006.

The mathematical details of the method for calculating the numbers of new entrants with qualifications and existing workers acquiring new qualifications can be found in Appendix 4 in Shah, Cooper and Burke (2007).

The method uses the ‘bottom up’ technique. It calculates qualifications requirements at each level by occupation for each year from 2010 to 2025. These are then summed to obtain total requirements. The calculations for 2010 to 2015 are performed at the sub-major (2-digit) occupation level while those for 2016 to 2025 are performed at the major (1-digit) occupation level.

Non-accredited training that existing workers undertake is outside the scope of this model. For instance, a substantial amount of product-specific training occurs in the ICT sector but because it is not formally accredited it is not accounted for in this model.

Table 35 shows the relative importance of replacement needs compared to employment growth when estimating the number of new entrants. The employment growth rates are from Table 24. The table shows that the net replacement rate is higher than the employment growth rate in every occupation group except managers and professionals. The highest rate is for sales workers. In this instance the net replacement rate is more than five times the employment growth rate. The main reason for such a high rate among sales workers is the relatively short tenure of a large number of sales jobs. For example, many students work in sales, often on a part-time and casual basis, while completing education and training courses for jobs in other occupations.

Table 35 Average employment growth and net replacement rates by major occupation group, Australia, 2010 to 2025 (%)

Major occupation group	Employment growth rate	Net replacement rate
Managers	2.2	2.0
Professionals	2.1	1.6
Technicians & tradespersons	0.9	1.9
Community & personal services workers	1.9	2.4
Clerical & administrative workers	0.9	1.8
Sales workers	0.9	5.2
Machinery operators and drivers	1.2	1.7
Labourers	0.4	2.7
All	1.4	2.3

Source: CEET net replacement model

Tables 36 and 37 show qualifications requirements from 2010 to 2025. The total requirements are met by new entrants with qualifications and existing workers acquiring new qualifications. The tables show:

- The total estimated requirements for the period 2010 to 2025 are over 7.2 million. On average, about 453,000 persons with new qualifications will be required each year over the next 16 years to attain the qualifications profile forecast for 2025.¹⁸
- Annual requirements will generally increase with time because the size of the employed population is expected to increase. However the average annual requirements for the 2016 to 2020 period—459,000 per year—are less than the requirements for 2015—477,000. The likely reason for this is that the calculations of the requirements for the 2016 to 2025 period use data that are more aggregated than those used for calculating requirements for earlier years.¹⁹
- About 62.5 per cent of all qualifications requirements are expected to be met by new entrants and 37.5 per cent by existing workers acquiring new qualifications.
- New entrants are expected to provide substantially more than half of all requirements at the higher education and certificate I-III levels but only about half of all requirements at the advanced diploma, diploma and certificate IV levels.
- Overall 65.1 per cent of all requirements are expected to be for VET qualifications. The requirements for diplomas and certificate IVs are expected to increase from 14.7 and 11.4 per cent of the total in 2010 to 24.4 and 15.8 per cent in the period 2021 to 2025, respectively. The requirements for other VET-level qualifications are expected to decline in relative terms.

¹⁸ In comparison, the qualifications requirements estimated in Shah (2009b) are lower. This is mainly because average employment growth and net replacement rates are higher in the modelling for the current study.

¹⁹ Aggregation bias is not uncommon in projections where cohort component method has been used. Net replacement needs are estimated using a cohort component method.

Table 36 Qualifications requirements among the employed population by level of qualification, persons, Australia, 2010–25 ('000)

Highest non-school qualification	2010	2011	2012	2013	2014	2015	2016–20	2021–25	Total 2010–25
New entrants									
Higher education	96	76	100	104	110	112	553	599	1,751
VET	125	113	135	146	171	172	893	1,026	2,782
<i>Adv diploma^a</i>	9	8	9	9	10	10	67	68	189
<i>Diploma</i>	24	23	31	35	41	44	255	346	799
<i>Certificate IV</i>	18	16	21	23	28	29	155	197	487
<i>Certificate III</i>	55	50	57	61	72	69	340	346	1,049
<i>Certificate II</i>	16	13	15	16	18	17	72	67	233
<i>Certificate I</i>	3	2	2	2	2	2	6	3	23
All	221	189	236	250	282	284	1,446	1,625	4,532
Existing workers									
Higher education	32	44	47	48	49	50	275	231	777
VET	83	110	120	128	136	144	572	645	1,937
<i>Adv diploma^a</i>	14	14	17	17	18	18	47	39	183
<i>Diploma</i>	25	36	39	43	46	51	207	265	713
<i>Certificate IV</i>	21	26	28	30	33	36	164	199	536
<i>Certificate III</i>	18	27	28	29	29	29	128	117	404
<i>Certificate II</i>	6	8	8	9	10	10	26	25	101
<i>Certificate I</i>	0	0	0	0	0	0	0	0	0
All	115	154	168	176	185	193	847	876	2,714
All									
Higher education	128	120	148	152	159	162	828	830	2,527
VET	208	223	256	274	307	315	1,465	1,670	4,719
<i>Adv diploma^a</i>	22	22	26	26	28	28	113	107	373
<i>Diploma</i>	49	59	70	77	88	95	462	611	1,512
<i>Certificate IV</i>	38	42	49	54	61	65	319	395	1,023
<i>Certificate III</i>	74	77	85	90	101	98	467	463	1,454
<i>Certificate II</i>	22	21	23	25	27	27	98	92	335
<i>Certificate I</i>	3	2	2	2	2	2	6	3	23
All	336	344	403	426	466	477	2,293	2,501	7,246

Note: Rows and columns may not add to the total due to rounding.

a Includes associate degree.

Table 37 Qualifications requirements among the employed population by level of qualification, Australia, 2010–25 (%)

Highest non-school qualification	2010	2011	2012	2013	2014	2015	2016–20	2021–25	Total 2010–25
New entrants									
Higher education	43.4	40.2	42.6	41.6	39.2	39.6	38.2	36.9	38.6
VET	56.6	59.8	57.4	58.4	60.8	60.4	61.8	63.1	61.4
<i>Adv diploma^a</i>	3.9	4.1	3.8	3.7	3.6	3.6	4.6	4.2	4.2
<i>Diploma</i>	11.0	12.2	13.1	13.8	14.6	15.6	17.6	21.3	17.6
<i>Certificate IV</i>	8.0	8.6	9.0	9.4	10.0	10.4	10.7	12.1	10.7
<i>Certificate III</i>	25.1	26.6	24.1	24.4	25.5	24.2	23.5	21.3	23.2
<i>Certificate II</i>	7.3	7.1	6.4	6.3	6.3	5.9	5.0	4.1	5.1
<i>Certificate I</i>	1.3	1.3	1.0	0.9	0.8	0.7	0.4	0.2	0.5
All	100	100	100	100	100	100	100	100	100
Existing workers									
Higher education	27.8	28.6	28.2	27.4	26.4	25.7	32.5	26.4	28.6
VET	72.2	71.4	71.8	72.6	73.6	74.3	67.5	73.6	71.4
<i>Adv diploma^a</i>	11.8	9.1	10.1	9.7	9.7	9.3	5.5	4.5	6.8
<i>Diploma</i>	21.7	23.3	23.3	24.3	25.1	26.3	24.4	30.3	26.3
<i>Certificate IV</i>	17.8	16.7	16.6	17.2	17.8	18.4	19.4	22.7	19.7
<i>Certificate III</i>	15.8	17.3	16.8	16.3	15.7	15.1	15.1	13.4	14.9
<i>Certificate II</i>	5.1	5.1	5.0	5.2	5.2	5.2	3.1	2.8	3.7
<i>Certificate I</i>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
All	100.0	100	100	100	100	100	100	100	100.0
All									
Higher education	38.0	35.0	36.6	35.7	34.1	33.9	36.1	33.2	34.9
VET	62.0	65.0	63.4	64.3	65.9	66.1	63.9	66.8	65.1
<i>Adv diploma^a</i>	6.6	6.3	6.4	6.2	6.0	5.9	4.9	4.3	5.1
<i>Diploma</i>	14.7	17.2	17.3	18.1	18.8	20.0	20.2	24.4	20.9
<i>Certificate IV</i>	11.4	12.2	12.1	12.6	13.1	13.6	13.9	15.8	14.1
<i>Certificate III</i>	21.9	22.4	21.1	21.1	21.6	20.5	20.4	18.5	20.1
<i>Certificate II</i>	6.6	6.2	5.8	5.8	5.9	5.6	4.3	3.7	4.6
<i>Certificate I</i>	0.9	0.7	0.6	0.5	0.5	0.4	0.3	0.1	0.3
All	100	100	100	100	100	100	100	100	100

Note: Columns may not add to the total due to rounding.

a Includes associate degree.

Table 38 shows the total requirements for qualifications from 2010 to 2025 by occupation group and Table 39 shows the occupational shares of qualification requirements. These tables show:

- The proportion of qualifications requirements provided through new entrants varies by occupation group. The proportion ranges from 73.2 per cent for professionals to just 39.3 per cent for machine operators and drivers.
- Not surprisingly, 70.4 per cent of all qualification requirements in professional occupations are expected at the higher education level. The requirements at this qualification level are below average in all other occupation groups except sales in which 38.1 per cent are expected at this level.
- More than half (58.1 per cent) of all requirements for higher education qualifications are expected to be in manager and professional occupations but requirements for VET-level qualifications are generally more evenly spread across the occupation groups.
- A relatively high percentage (29.7 per cent) of all diploma requirements is for managerial occupations. The requirements in each of the other occupation groups are less than half this number. Similarly, high percentages of all advanced diploma requirements are for sales (21.1 per cent) and professional (20.8 per cent) occupations.

Table 38 Qualifications requirements among the employed population by major occupation group, Australia, total 2010–25 (%)

Highest non-school qualification	Occupation group								All
	Managers	Prof	Tech & trades	Community & personal services	Clerical & admin	Sales	Machine operators & drivers	Labourers	
	New entrants								
Higher education	32.7	76.8	13.7	16.9	31.0	36.4	22.0	20.2	38.6
VET	67.3	23.2	86.3	83.1	69.0	63.6	78.0	79.8	61.4
<i>Adv diploma^a</i>	1.1	1.6	5.3	6.9	7.9	6.7	3.3	3.9	4.2
<i>Diploma</i>	35.5	12.5	9.2	22.4	12.7	12.4	8.3	23.1	17.6
<i>Certificate IV</i>	13.8	4.0	11.2	17.3	12.6	10.1	20.9	7.2	10.7
<i>Certificate III</i>	13.4	4.4	50.7	33.5	27.2	25.9	30.5	32.7	23.2
<i>Certificate II</i>	3.2	0.6	9.0	2.7	7.9	7.5	14.0	11.9	5.1
<i>Certificate I</i>	0.3	0.0	0.8	0.3	0.8	1.1	0.9	0.9	0.5
All	100	100	100	100	100	100	100	100	100
All ('000)	758	1,153	572	576	539	514	167	254	4,532
	Existing workers								
Higher education	27.8	28.6	28.2	27.4	26.4	25.7	32.5	26.4	28.6
VET	72.2	71.4	71.8	72.6	73.6	74.3	67.5	73.6	71.4
<i>Adv diploma^a</i>	11.8	9.1	10.1	9.7	9.7	9.3	5.5	4.5	6.8
<i>Diploma</i>	21.7	23.3	23.3	24.3	25.1	26.3	24.4	30.3	26.3
<i>Certificate IV</i>	17.8	16.7	16.6	17.2	17.8	18.4	19.4	22.7	19.7
<i>Certificate III</i>	15.8	17.3	16.8	16.3	15.7	15.1	15.1	13.4	14.9
<i>Certificate II</i>	5.1	5.1	5.0	5.2	5.2	5.2	3.1	2.8	3.7
<i>Certificate I</i>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
All	100	100	100	100	100	100	100	100	100
All ('000)	115	154	168	176	185	193	847	876	2,714
	All								
Higher education	32.4	70.4	16.2	11.2	26.4	38.1	30.7	21.7	34.9
VET	67.6	29.6	83.8	88.8	73.6	61.9	69.3	78.3	65.1
<i>Adv diploma^a</i>	1.4	4.9	6.5	5.4	7.0	9.6	2.8	2.5	5.1
<i>Diploma</i>	40.4	14.5	13.4	25.3	15.9	9.6	8.2	41.9	20.9
<i>Certificate IV</i>	13.6	5.9	19.8	21.4	13.5	10.7	33.9	7.2	14.1
<i>Certificate III</i>	9.8	3.8	31.0	34.8	32.2	26.4	13.7	18.3	20.1
<i>Certificate II</i>	2.2	0.5	12.6	1.7	4.6	4.9	10.3	8.0	4.6
<i>Certificate I</i>	0.2	0.0	0.5	0.2	0.4	0.7	0.4	0.5	0.3
All	100	100	100	100	100	100	100	100	100
All ('000)	1,111	1,575	945	912	951	822	425	505	7,246

Note: Rows and columns may not add to the total due to rounding.

a Includes associate degree.

Table 39 Occupational shares of qualification requirements by level of qualification, Australia, total 2010–25 (%)

Highest non-school qualification	Occupation group								All
	Managers	Prof	Tech & trades	Community & personal services	Clerical & admin	Sales	Machine operators & drivers	Labourers	
	New entrants								
Higher education	14.2	50.6	4.5	5.6	9.5	10.7	2.1	2.9	100
VET	18.3	9.6	17.7	17.2	13.4	11.7	4.7	7.3	100
<i>Adv diploma^a</i>	4.3	10.0	16.1	20.9	22.5	18.1	2.9	5.2	100
<i>Diploma</i>	33.6	18.0	6.6	16.2	8.6	8.0	1.7	7.4	100
<i>Certificate IV</i>	21.4	9.5	13.2	20.4	13.9	10.7	7.2	3.8	100
<i>Certificate III</i>	9.7	4.9	27.6	18.4	13.9	12.7	4.9	7.9	100
<i>Certificate II</i>	10.5	3.1	22.0	6.6	18.2	16.6	10.0	13.0	100
<i>Certificate I</i>	10.2	2.1	20.8	8.6	18.0	23.7	6.6	10.2	100
All	16.7	25.4	12.6	12.7	11.9	11.3	3.7	5.6	100
	Existing workers								
Higher education	14.4	28.8	9.6	0.6	10.8	16.2	12.1	7.5	100
VET	12.5	10.3	15.4	17.1	16.9	9.4	8.5	9.9	100
<i>Adv diploma^a</i>	4.1	31.8	17.0	5.3	12.9	24.2	3.4	1.4	100
<i>Diploma</i>	25.3	11.9	10.4	14.2	11.5	2.2	2.9	21.4	100
<i>Certificate IV</i>	8.7	8.7	23.0	17.9	11.3	6.8	20.4	3.4	100
<i>Certificate III</i>	1.8	2.2	0.8	30.8	39.5	20.8	1.7	2.3	100
<i>Certificate II</i>	0.2	0.1	66.5	0.0	1.7	1.4	20.2	9.8	100
<i>Certificate I</i>	-	-	-	-	-	-	-	-	-
All	13.0	15.6	13.8	12.4	15.2	11.3	9.5	9.2	100
	All								
Higher education	14.2	43.9	6.0	4.0	9.9	12.4	5.2	4.3	100
VET	15.9	9.9	16.8	17.2	14.8	10.8	6.2	8.4	100
<i>Adv diploma^a</i>	4.2	20.8	16.5	13.2	17.8	21.1	3.2	3.3	100
<i>Diploma</i>	29.7	15.1	8.4	15.2	10.0	5.2	2.3	14.0	100
<i>Certificate IV</i>	14.7	9.0	18.3	19.1	12.5	8.6	14.1	3.6	100
<i>Certificate III</i>	7.5	4.1	20.2	21.9	21.1	14.9	4.0	6.4	100
<i>Certificate II</i>	7.4	2.2	35.4	4.6	13.2	12.0	13.1	12.0	100
<i>Certificate I</i>	10.2	2.1	20.8	8.6	18.0	23.7	6.6	10.2	100
All	15.3	21.7	13.0	12.6	13.1	11.3	5.9	7.0	100

Note: Rows may not add to the total due to rounding.

a. Includes associate degree.

5.2 Estimates of qualifications requirements—not employed population

The calculations of qualifications requirements among the not employed population use the same method as that used for the employed population. The net replacement rate for this population is assumed to be the same as the overall replacement rate for the employed population. Table 40 shows the requirements from 2010 to 2025. It shows:

Total requirements for qualifications among the not employed population are expected to be about 1.6 million.

- Annual requirements are projected to decline until 2014 before going up. This partly reflects the changes in the size of this population over this period (see Figure 2).
- More than half the requirements are expected to be at the higher education level, thus reflecting the significantly higher proportion of females in this population.
- While the proportion of requirements for higher education qualifications is expected to increase significantly over time, that for certificate I to III are expected to decline.

Table 40 Qualifications requirements among the not employed population by level of qualification, persons ('000) and per cent, Australia, 2010–25 ('000)

Highest non-school qualification	2010	2011	2012	2013	2014	2015	2016–20	2021–25	Total 2010–25
Persons ('000)									
Higher education	81	63	51	46	41	43	269	298	891
VET	102	69	45	38	32	32	190	181	690
<i>Adv diploma^a</i>	20	14	10	9	7	7	43	41	151
<i>Diploma</i>	14	11	8	7	6	6	38	41	130
<i>Certificate IV</i>	13	10	8	7	6	6	40	43	133
<i>Certificate III</i>	36	23	14	11	8	8	48	39	187
<i>Certificate II</i>	15	9	4	4	4	4	19	17	76
<i>Certificate I</i>	4	2	1	1	1	1	2	1	12
All	183	132	96	84	72	75	459	479	1,581
Per cent									
Higher education	44.1	48.0	52.8	54.9	56.3	57.1	58.5	62.2	56.4
VET	55.9	52.1	47.2	45.1	43.7	42.9	41.4	37.8	43.6
<i>Adv diploma^a</i>	10.8	10.7	10.6	10.2	9.5	9.5	9.4	8.6	9.5
<i>Diploma</i>	7.8	8.0	8.2	8.1	7.8	7.9	8.3	8.6	8.3
<i>Certificate IV</i>	7.3	7.7	8.2	8.3	8.3	8.4	8.7	8.9	8.4
<i>Certificate III</i>	19.5	17.4	14.8	12.6	11.6	11.0	10.5	8.1	11.8
<i>Certificate II</i>	8.2	6.6	4.5	4.9	5.6	5.3	4.1	3.5	4.8
<i>Certificate I</i>	2.3	1.6	1.0	0.9	0.9	0.8	0.4	0.2	0.8
All	100	100	100	100	100	100	100	100	100

Note: Rows and columns may not add to the total due to rounding.

a Includes associate degree.

5.3 Estimates of qualifications requirements—civilian population

Table 41 provides a summary of the total qualification requirements for the civilian population²⁰ from 2010 to 2025. It shows:

- The total qualifications requirements for the 16 years to 2025 are estimated to be 8.8 million, at an annual average of 552,000. The annual average requirements for higher education qualifications are expected to be 214,000 and those at the VET level 338,000.
- About 38.7 per cent of all requirements will be at the higher education level and 61.3 per cent at the VET level.
- The requirements at the diploma and certificate IV levels are expected to increase sharply each year from 2010 to 2025. They will also increase at the higher education level but only moderately. The requirements are expected to remain generally constant at certificate III level but decline at all other levels.
- In aggregate, the shares of qualifications required at the diploma and certificate III level will be almost the same. However at the diploma level they will increase from 12.3 per cent in 2009 to 21.9 per cent in 2021–2025 and at certificate III level they will fall from 21 per cent to 18.6 per cent.

²⁰ For the not employed component of the civilian population, the requirements are for only the 15–64 years cohort.

Table 41 Qualifications requirements among the civilian population by level of qualification, persons ('000) and per cent, Australia, 2010–25 ('000)

Highest non-school qualification	2010	2011	2012	2013	2014	2015	2016–20	2021–25	Total 2010–25	Annual average
Persons ('000)										
Higher education	209	184	198	198	200	205	1,096	1,128	3,418	214
VET	311	292	301	312	339	348	1,655	1,852	5,409	338
<i>Adv diploma^a</i>	42	36	36	35	35	35	157	148	523	33
<i>Diploma</i>	64	70	78	84	93	101	500	652	1,642	103
<i>Certificate IV</i>	52	52	57	61	67	71	359	438	1,156	72
<i>Certificate III</i>	109	100	99	100	109	106	515	501	1,641	103
<i>Certificate II</i>	37	30	28	29	31	31	117	108	411	26
<i>Certificate I</i>	7	5	3	3	3	3	8	4	35	2
All	519	476	499	510	539	553	2,752	2,980	8,827	552
Per cent										
Higher education	40.2	38.6	39.7	38.9	37.1	37.1	39.8	37.9	38.7	
VET	59.8	61.4	60.3	61.1	62.9	62.9	60.2	62.1	61.3	
<i>Adv diploma^a</i>	8.1	7.5	7.2	6.8	6.5	6.4	5.7	5.0	5.9	
<i>Diploma</i>	12.3	14.6	15.6	16.5	17.3	18.3	18.2	21.9	18.6	
<i>Certificate IV</i>	9.9	11.0	11.4	11.9	12.4	12.9	13.0	14.7	13.1	
<i>Certificate III</i>	21.0	21.0	19.9	19.7	20.3	19.2	18.7	16.8	18.6	
<i>Certificate II</i>	7.1	6.3	5.6	5.7	5.8	5.6	4.2	3.6	4.7	
<i>Certificate I</i>	1.4	1.0	0.7	0.6	0.5	0.5	0.3	0.1	0.4	
All	100	100	100	100	100	100	100	100	100	

Note: Rows and columns may not add to the total due to rounding.

a Includes associate degree.

6 Concluding remarks

This report has provided an assessment of the number of people with VET qualifications that will be required in Australia from 2010 to 2025. It considered population and employment growth, industrial and occupational changes, trends in skills deepening and net replacement needs within occupations in deriving the estimates. The total number of qualifications that would need to be completed in this period is likely to be higher than estimates provided in this report because some people do multiple qualifications. Lower level qualifications are sometimes stepping stones to higher level qualifications.

At least since 2001, significant skills deepening trends are evident in a number of occupations. These trends are partly driving the requirements for qualifications reported here. In particular, the growth in the number of people with diplomas is substantial. No doubt some of this growth is actual demand but there is a possibility that part might be supply-induced demand. With the current data it is impossible to investigate what proportion of this growth might be supply driven.

Economic projections are inherently uncertain, especially over long horizons. It is inevitable that developments that are currently unforeseen will eventually render projections from any model, not just the one used for this report, to be inaccurate. Nevertheless, most organisations and individuals do make plans based on assumptions about the future. It is imperative that these projections are updated on a regular basis to account for new information and improvement in methods.

Economy-wide policy development on future skills demand should not however rely solely on ad hoc and partial evaluation of the labour market that fail to take account of interactions between sectors. The starting point for robust development of public policy should be baseline, economy-wide information that is systematic, comprehensive and consistent. A reputable model with a long track record has distinct advantages over partial analysis in producing such information. The MONASH/CEET model used for this report meets these criteria. It takes account of the inter-relationships between different sectors of the economy, historical trends and changes in consumer tastes and technology.

The analysis in this report provides general parameters and a framework within which to approach skills and workforce development. Regular monitoring of conditions in the labour market can provide a basis for ongoing finer adjustment and updating of these parameters. Bottom-up information from other sources, such as employee and employer surveys, can and should be added to the baseline information for further fine tuning of policies.

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Appendix 1 MONASH model for forecasting employment

MONASH is a computational general equilibrium model for forecasting employment by occupation (Adams et al. 1994; Dixon and Rimmer 1996; Meagher 1997; Dixon and Rimmer 2000;). It is maintained by the Centre of Policy Studies (CoPS), Monash University. An intuitive description of the model is contained in Appendix O in Industry Commission (1997)

In brief, the MONASH model is a sequence of single-period models, linked through time by the behaviour of capital and labour markets. It has three main elements—a database, theory and parameters—that are embodied in the model’s system of equations. These equations describe how industries and consumers respond to changes in policy. The core of the database is a large input-output matrix, which shows how each sector of the economy is linked to other sectors. These linkages are only for a particular point in time. Behaviour responses of different groups to policy changes are based on economic theory. The model specifies likely responses of producers, consumers, foreigners and investors to policy changes. It also includes a government sector, the revenue and expenditure behaviour of which is modelled separately. While theory guides the model’s broad assumptions (which can be altered to accommodate different scenarios), actual numerical parameters are required to estimate the size of the responses. In MONASH, these parameters are derived either from the input-output database or from other external sources.

MONASH converts the forecast for aggregate output to forecasts for output by industry. These are then converted to forecasts of employment by industry, which in turn are converted to employment by occupation.

MONASH uses a range of historical data input to estimate the model. These include:

- national accounts
- input-output tables
- state accounts
- Census data on population
- Foreign trade statistics
- Capital stock statistics
- Income and expenditure surveys
- Other unpublished data from the ABS.

To generate forecasts, MONASH has to have access to informed opinion on future changes to variables that are exogenous to the system. The model is adaptable and can incorporate data from a range of sources. Currently it uses the following:

- Access Economics’ 5-year macro forecasts of output by major industry sector
- Australian Bureau of Agricultural and Resource Economics’ (ABARE) export prices and volumes for primary products
- Tourism Forecasting Council’s (TFC) prospects for tourism
- Productivity Commission’s assessment on changes in protection implied by government industry policy
- CoPS’ assessment of changes in technology and consumer tastes.

Appendix 2 Employment projections by occupation

Table A1 Employment projections by occupation (2-digit), persons, Australia, 2013, 2018 and 2020 ('000)

Industry	2009										Change 2009–25 (%)	
	Actual	2010	2011	2012	2013	2014	2015	2020	2025	Average year-on-year	Total	
Chief exec, general man & legis	92	97	101	106	111	116	122	152	179	4.3	94.5	
Farmers and farm managers	213	212	206	207	210	213	214	205	202	-0.3	-5.1	
Specialist managers	614	635	650	669	692	718	743	871	988	3.0	61.0	
Hospitality, retail & service man	465	469	475	484	492	502	511	546	578	1.4	24.2	
Arts & media professionals	86	88	88	89	90	90	91	98	104	1.2	20.5	
Business, HR & marketing prof	565	586	605	627	649	672	696	793	889	2.9	57.2	
Design, eng, science & transp prof	345	332	333	338	344	350	356	403	443	1.6	28.3	
Education professionals	448	480	488	503	518	528	539	592	645	2.3	43.9	
Health professionals	418	414	417	424	429	436	442	496	543	1.7	30.0	
ICT professionals	198	193	195	201	208	214	220	237	257	1.7	29.9	
Legal, social & welfare prof	175	163	166	171	176	181	186	212	235	1.9	34.1	
Eng, ICT & science technicians	223	215	214	216	218	222	225	251	274	1.3	22.7	
Automotive & engineering trades	368	357	360	363	366	373	378	393	407	0.6	10.6	
Construction trades	372	356	345	338	342	356	364	387	413	0.7	11.0	
Electrotechnology & teleco trades	223	208	205	203	203	205	207	223	234	0.3	4.8	
Food trades	153	154	155	157	159	161	164	181	196	1.6	28.2	
Skilled animal & hort trades	107	118	119	121	123	127	131	147	162	2.6	51.5	
Other technicians & trades	195	200	200	200	197	198	198	202	203	0.2	3.9	
Health & welfare support workers	107	112	114	117	120	123	127	147	165	2.7	53.8	
Carers & aides	356	361	368	379	389	399	410	464	514	2.3	44.7	
Hospitality workers	213	217	218	222	226	230	234	253	271	1.5	27.0	
Protective Service workers	137	127	127	129	130	132	134	142	148	0.5	8.6	
Sports & personal service workers	148	145	147	151	153	157	161	189	208	2.1	40.3	
Office man & program admin	231	252	261	271	283	296	309	376	438	4.1	89.7	
Personal assistants & secretaries	148	159	156	155	153	152	151	128	111	-1.8	-25.1	
General clerical workers	241	243	247	253	259	267	275	286	302	1.4	25.6	
Inquiry clerks & receptionists	278	273	275	280	284	289	295	319	340	1.3	21.9	
Numerical clerks	409	368	366	366	365	367	367	338	324	-1.4	-21.0	
Clerical & office support workers	117	111	110	110	110	110	111	117	122	0.3	4.0	
Other clerical & administrative	235	225	228	233	238	244	249	272	294	1.4	25.3	
Sales representatives & agents	180	181	185	191	197	204	211	221	236	1.7	31.5	
Sales assistants & salespersons	626	622	631	644	654	667	681	677	712	0.8	13.8	
Sales support workers	206	193	193	193	193	194	196	209	218	0.4	5.6	
Machine & stationary plant ops	176	171	169	166	165	165	165	158	152	-0.9	-13.9	
Mobile plant operators	134	137	136	135	137	140	142	153	162	1.2	20.6	
Road & rail drivers	303	298	300	305	312	318	323	348	371	1.3	22.2	
Storepersons	104	117	118	120	123	125	128	157	179	3.5	72.5	
Cleaners & laundry workers	246	240	242	244	245	248	251	246	243	-0.1	-1.2	
Construction & mining labourers	165	166	162	160	162	166	169	188	205	1.4	23.9	
Factory process workers	224	230	232	233	235	238	240	235	232	0.2	3.6	
Farm, forestry & garden workers	108	98	96	95	96	96	96	66	44	-5.4	-59.3	
Food preparation assistants	160	147	148	150	151	153	154	169	179	0.7	11.6	
Other labourers	253	242	245	250	256	262	269	306	337	1.8	33.4	
All	10,766	10,710	10,797	10,967	10,884	11,121	11,638	12,555	13,457	1.4	25.0	

Note: Columns may not add to the total due to rounding.

Appendix 3 Projections of employment by occupation and qualification

Table A2 Qualifications (level) projections by occupation (2-digit), persons, Australia, 2009 ('000)

Occupation group	HEd	Ad dip	Dip	Cert IV	Cert III	Cert II	Cert I	None	Total
Chief exec, general man & legis	240	7	2	4	11	2	1	26	92
Farmers and farm managers	365	14	8	5	27	13	4	117	213
Specialist managers	298	38	47	22	78	18	5	134	614
Hospitality, retail & service managers	125	22	34	23	71	19	5	215	465
Arts & media professionals	138	8	2	1	4	2	0	24	86
Business, HR & marketing prof	58	37	41	21	23	8	2	103	565
Design, eng, science & transport prof	9	22	24	5	16	4	1	33	345
Education professionals	9	35	11	8	7	2	0	20	448
Health professionals	12	54	17	13	13	2	0	22	418
ICT professionals	12	12	13	6	7	2	1	32	198
Legal, social & welfare professionals	6	11	7	5	1	1	0	12	175
Engineering, ICT & science technicians	14	21	24	13	46	8	2	52	223
Automotive & engineering trades	27	6	12	8	217	14	3	98	368
Construction trades	34	3	9	14	185	14	5	132	372
Electrotechnology & teleco trades	18	8	6	10	106	13	3	65	223
Food trades	24	6	6	5	59	6	2	57	153
Skilled animal & horticultural trades	25	3	6	7	25	7	1	51	107
Other technicians & trades	57	7	6	8	84	11	2	63	195
Health & welfare support workers	16	19	18	21	7	2	0	12	107
Carers & aides	36	19	33	32	114	14	3	106	356
Hospitality workers	35	4	9	7	21	10	3	141	213
Protective Service workers	75	9	24	7	23	4	1	43	137
Sports & personal service workers	12	11	17	17	19	8	1	49	148
Office managers & program admin	44	18	14	15	24	15	5	82	231
Personal assistants & secretaries	31	8	7	6	13	20	6	72	148
General clerical workers	56	15	14	13	23	19	4	116	241
Inquiry clerks & receptionists	20	13	13	14	36	20	6	142	278
Numerical clerks	8	25	24	20	43	28	6	189	409
Clerical & office support workers	5	7	5	3	14	5	1	69	117
Other clerical & administrative workers	22	10	15	12	34	12	3	106	235
Sales representatives & agents	5	14	10	11	35	7	2	69	180
Sales assistants & salespersons	16	14	22	15	58	28	8	423	626
Sales support workers	6	5	6	6	18	10	3	138	206
Machine & stationary plant operators	14	2	3	6	39	10	2	106	176
Mobile plant operators	5	2	1	3	28	6	1	87	134
Road & rail drivers	7	6	6	8	64	11	3	183	303
Storepersons	15	3	2	3	10	6	1	74	104
Cleaners & laundry workers	240	4	8	5	29	12	3	168	246
Construction & mining labourers	365	3	2	5	40	5	2	102	165
Factory process workers	298	5	4	5	27	15	2	152	224
Farm, forestry & garden workers	125	2	3	4	18	5	1	70	108
Food preparation assistants	138	3	8	2	10	6	1	124	160
Other labourers	58	5	11	5	35	13	2	168	253
All	2,692	539	555	425	1,763	436	108	4,249	10,766
All (%)	25.0	5.0	5.2	4.0	16.4	4.0	1.0	39.5	100

Note: Columns and rows may not add to the total due to rounding.

Table A3 Qualifications (level) projections by occupation (2-digit), persons, Australia, 2010 ('000)

Occupation group	HEd	Ad dip	Dip	Cert IV	Cert III	Cert II	Cert I	None	Total
Chief exec, general man & legis	42	7	2	4	11	2	1	28	97
Farmers and farm managers	27	14	9	6	26	13	3	114	212
Specialist managers	285	38	54	24	78	18	4	134	635
Hospitality, retail & service managers	76	22	39	25	72	18	4	213	469
Arts & media professionals	48	8	2	1	4	2	0	23	88
Business, HR & marketing prof	345	38	44	22	23	8	2	104	586
Design, eng, science & transport prof	233	20	24	5	14	3	1	31	332
Education professionals	392	36	12	9	8	2	0	21	480
Health professionals	291	52	19	13	14	2	0	24	414
ICT professionals	123	12	12	5	7	2	1	30	193
Legal, social & welfare professionals	128	10	7	5	1	1	0	11	163
Engineering, ICT & science technicians	57	20	24	12	44	8	2	50	215
Automotive & engineering trades	9	6	14	8	205	15	3	97	357
Construction trades	10	3	11	16	172	15	4	126	356
Electrotechnology & teleco trades	11	8	5	10	96	13	3	62	208
Food trades	13	6	6	6	59	6	1	55	154
Skilled animal & horticultural trades	6	4	7	9	28	8	1	55	118
Other technicians & trades	15	7	7	8	85	11	2	64	200
Health & welfare support workers	27	20	20	22	7	1	0	13	112
Carers & aides	34	19	35	35	123	13	2	100	361
Hospitality workers	19	4	9	7	22	10	3	142	217
Protective Service workers	23	9	25	7	21	4	1	38	127
Sports & personal service workers	25	10	18	19	19	7	1	46	145
Office managers & program admin	62	20	16	18	27	17	4	88	252
Personal assistants & secretaries	18	8	8	7	15	21	5	77	159
General clerical workers	37	16	15	15	24	18	3	114	243
Inquiry clerks & receptionists	35	12	13	14	39	18	5	136	273
Numerical clerks	70	23	22	19	41	24	4	164	368
Clerical & office support workers	12	8	5	3	13	4	1	64	111
Other clerical & administrative workers	45	9	15	12	33	11	2	98	225
Sales representatives & agents	32	15	10	12	36	6	2	68	181
Sales assistants & salespersons	60	14	24	16	59	27	7	414	622
Sales support workers	20	4	6	6	18	10	2	126	193
Machine & stationary plant operators	8	2	3	7	38	11	2	101	171
Mobile plant operators	6	2	2	3	29	7	1	88	137
Road & rail drivers	24	7	6	9	63	11	3	175	298
Storepersons	6	3	3	4	12	7	1	82	117
Cleaners & laundry workers	17	4	9	5	29	12	3	162	240
Construction & mining labourers	6	3	2	7	40	5	2	101	166
Factory process workers	15	5	4	5	28	16	2	153	230
Farm, forestry & garden workers	4	2	3	4	17	4	1	63	98
Food preparation assistants	6	2	9	2	9	5	1	113	147
Other labourers	15	4	12	4	32	12	2	159	242
All	2,740	537	592	452	1,740	429	94	4,127	10,710
All (%)	25.6	5.0	5.5	4.2	16.2	4.0	0.9	38.5	100

Note: Columns and rows may not add to the total due to rounding.

Table A4 Qualifications (level) projections by occupation (2-digit), persons, Australia, 2011 ('000)

Occupation group	HEd	Ad dip	Dip	Cert IV	Cert III	Cert II	Cert I	None	Total
Chief exec, general man & legis	44	7	2	5	12	2	0	29	101
Farmers and farm managers	28	14	9	6	25	13	3	109	206
Specialist managers	294	38	61	26	77	18	4	133	650
Hospitality, retail & service managers	76	21	44	28	74	17	4	211	475
Arts & media professionals	49	8	2	1	4	2	0	22	88
Business, HR & marketing prof	358	39	48	24	24	7	1	104	605
Design, eng, science & transport prof	235	19	26	4	14	3	0	31	333
Education professionals	399	35	12	10	8	2	0	22	488
Health professionals	288	52	21	13	15	2	0	26	417
ICT professionals	125	12	13	6	7	2	1	30	195
Legal, social & welfare professionals	129	11	7	6	1	1	0	11	166
Engineering, ICT & science technicians	57	20	24	12	43	7	1	49	214
Automotive & engineering trades	10	6	17	9	202	16	3	99	360
Construction trades	10	3	13	17	161	16	4	121	345
Electrotechnology & teleco trades	11	8	5	11	91	14	3	63	205
Food trades	15	7	7	7	58	5	1	53	155
Skilled animal & horticultural trades	6	4	8	9	28	8	1	55	119
Other technicians & trades	16	7	7	9	84	12	2	64	200
Health & welfare support workers	27	21	22	22	8	1	0	13	114
Carers & aides	34	18	37	38	132	12	2	95	368
Hospitality workers	20	4	9	8	23	10	3	143	218
Protective Service workers	24	9	27	7	20	4	1	35	127
Sports & personal service workers	26	10	19	22	19	7	1	44	147
Office managers & program admin	64	21	17	20	29	17	4	89	261
Personal assistants & secretaries	18	8	8	7	16	20	5	75	156
General clerical workers	39	17	17	16	25	18	3	112	247
Inquiry clerks & receptionists	35	12	13	15	42	17	4	135	275
Numerical clerks	72	23	23	19	44	24	4	157	366
Clerical & office support workers	12	9	6	3	13	4	1	62	110
Other clerical & administrative workers	48	9	17	13	35	11	2	95	228
Sales representatives & agents	34	16	10	13	37	6	1	67	185
Sales assistants & salespersons	66	14	26	17	61	27	6	414	631
Sales support workers	22	4	6	6	19	10	2	123	193
Machine & stationary plant operators	8	2	3	9	37	12	2	97	169
Mobile plant operators	7	2	2	4	29	7	1	85	136
Road & rail drivers	27	7	7	11	63	11	3	171	300
Storepersons	7	3	3	5	12	7	1	81	118
Cleaners & laundry workers	18	4	10	5	30	12	3	161	242
Construction & mining labourers	7	4	2	8	39	5	2	97	162
Factory process workers	16	5	5	6	28	18	2	152	232
Farm, forestry & garden workers	4	2	3	4	18	4	1	61	96
Food preparation assistants	6	2	11	2	9	5	1	113	148
Other labourers	17	4	15	4	31	13	2	159	245
All	2,810	540	643	485	1,744	427	83	4,066	10,797
All (%)	26.0	5.0	6.0	4.5	16.2	4.0	0.8	37.7	100

Note: Columns and rows may not add to the total due to rounding.

Table A5 Qualifications (level) projections by occupation (2-digit), persons, Australia, 2012 ('000)

Occupation group	HEd	Ad dip	Dip	Cert IV	Cert III	Cert II	Cert I	None	Total
Chief exec, general man & legis	45	7	2	6	12	2	0	30	106
Farmers and farm managers	30	14	10	6	24	13	2	108	207
Specialist managers	306	38	69	28	76	18	3	132	669
Hospitality, retail & service managers	77	21	51	30	75	17	3	210	484
Arts & media professionals	51	8	2	1	4	2	0	21	89
Business, HR & marketing prof	373	40	52	26	24	7	1	105	627
Design, eng, science & transport prof	240	19	28	4	13	3	0	31	338
Education professionals	412	34	12	11	9	2	0	22	503
Health professionals	287	51	24	14	17	2	0	29	424
ICT professionals	130	13	13	6	7	2	1	30	201
Legal, social & welfare professionals	132	12	8	7	1	1	0	12	171
Engineering, ICT & science technicians	58	20	24	12	43	7	1	50	216
Automotive & engineering trades	10	6	20	10	197	17	2	101	363
Construction trades	11	3	15	19	152	17	4	117	338
Electrotechnology & teleco trades	11	9	4	11	87	15	3	63	203
Food trades	17	8	9	8	58	5	1	52	157
Skilled animal & horticultural trades	6	4	8	10	28	8	1	55	121
Other technicians & trades	18	7	7	10	82	12	2	62	200
Health & welfare support workers	27	22	24	22	8	1	0	13	117
Carers & aides	34	18	40	41	144	11	1	90	379
Hospitality workers	20	4	9	8	25	10	3	144	222
Protective Service workers	25	9	30	7	20	4	1	33	129
Sports & personal service workers	26	9	20	26	19	6	1	43	151
Office managers & program admin	66	23	19	22	30	18	3	90	271
Personal assistants & secretaries	19	8	9	7	16	19	4	73	155
General clerical workers	40	18	19	17	27	18	2	111	253
Inquiry clerks & receptionists	36	13	14	16	47	17	4	134	280
Numerical clerks	74	23	24	20	48	23	3	151	366
Clerical & office support workers	12	10	7	3	13	4	0	60	110
Other clerical & administrative workers	52	9	18	14	37	10	1	92	233
Sales representatives & agents	36	17	11	14	39	6	1	67	191
Sales assistants & salespersons	73	15	28	18	63	27	6	415	644
Sales support workers	23	4	6	7	21	10	2	120	193
Machine & stationary plant operators	8	2	3	10	37	12	2	93	166
Mobile plant operators	9	2	2	4	29	7	1	83	135
Road & rail drivers	31	8	7	13	63	11	3	169	305
Storepersons	7	3	3	6	12	8	1	81	120
Cleaners & laundry workers	19	4	12	5	31	11	2	160	244
Construction & mining labourers	8	4	2	9	38	4	1	94	160
Factory process workers	17	5	5	6	28	19	2	150	233
Farm, forestry & garden workers	4	1	3	4	18	3	1	59	95
Food preparation assistants	6	2	14	2	8	5	0	112	150
Other labourers	19	4	18	4	30	13	1	159	250
All	2904	548	704	525	1757	428	74	4027	10967
All (%)	26.5	5.0	6.4	4.8	16.0	3.9	0.7	36.7	100.0

Note: Columns and rows may not add to the total due to rounding.

Table A6 Qualifications (level) projections by occupation (2-digit), persons, Australia, 2013 ('000)

Occupation group	HEd	Ad dip	Dip	Cert IV	Cert III	Cert II	Cert I	None	Total
Chief exec, general man & legis	47	7	2	8	13	2	0	32	111
Farmers and farm managers	32	14	11	7	24	13	2	106	210
Specialist managers	319	38	79	30	75	18	3	131	692
Hospitality, retail & service managers	77	21	57	33	77	16	3	208	492
Arts & media professionals	53	8	2	1	3	2	0	20	90
Business, HR & marketing prof	387	41	57	27	24	7	1	105	649
Design, eng, science & transport prof	246	18	30	4	12	3	0	31	344
Education professionals	424	33	12	13	10	2	0	23	518
Health professionals	284	50	27	14	19	2	0	32	429
ICT professionals	135	13	14	6	7	2	0	31	208
Legal, social & welfare professionals	134	12	8	8	1	0	0	12	176
Engineering, ICT & science technicians	60	21	24	12	43	7	1	50	218
Automotive & engineering trades	11	6	24	10	192	18	2	103	366
Construction trades	11	2	18	22	147	19	4	118	342
Electrotechnology & teleco trades	11	9	4	11	84	17	3	65	203
Food trades	19	9	10	9	57	5	1	50	159
Skilled animal & horticultural trades	6	4	9	11	29	9	1	56	123
Other technicians & trades	19	6	7	11	79	13	2	61	197
Health & welfare support workers	27	23	26	22	8	1	0	13	120
Carers & aides	34	18	42	44	154	10	1	85	389
Hospitality workers	21	4	9	8	26	10	2	145	226
Protective Service workers	26	9	33	8	19	3	1	31	130
Sports & personal service workers	27	9	22	30	19	6	1	41	153
Office managers & program admin	68	24	20	25	32	19	3	92	283
Personal assistants & secretaries	19	7	9	7	17	19	4	72	153
General clerical workers	42	19	20	19	29	18	2	110	259
Inquiry clerks & receptionists	37	13	14	17	51	16	3	133	284
Numerical clerks	76	22	26	20	51	22	3	144	365
Clerical & office support workers	12	12	8	4	12	4	0	58	110
Other clerical & administrative workers	55	9	20	15	38	10	1	90	238
Sales representatives & agents	38	19	11	15	41	6	1	67	197
Sales assistants & salespersons	80	15	31	19	65	26	5	413	654
Sales support workers	25	4	6	7	22	10	2	116	193
Machine & stationary plant operators	8	2	3	11	36	13	1	90	165
Mobile plant operators	11	2	2	5	29	7	1	82	137
Road & rail drivers	35	8	8	15	64	11	2	167	312
Storepersons	8	4	3	7	12	8	1	81	123
Cleaners & laundry workers	20	3	14	5	31	11	2	159	245
Construction & mining labourers	9	5	2	11	38	4	1	93	162
Factory process workers	18	6	5	7	28	21	1	148	235
Farm, forestry & garden workers	5	1	4	4	19	3	1	59	96
Food preparation assistants	6	2	17	1	8	4	0	111	151
Other labourers	21	4	21	4	30	14	1	160	256
All	3,001	556	771	569	1,778	430	66	3,992	11,163
All (%)	26.9	5.0	6.9	5.1	15.9	3.9	0.6	35.8	100

Note: Columns and rows may not add to the total due to rounding.

Table A7 Qualifications (level) projections by occupation (2-digit), persons, Australia, 2014 ('000)

Occupation group	HEd	Ad dip	Dip	Cert IV	Cert III	Cert II	Cert I	None	Total
Chief exec, general man & legis	49	7	2	9	14	2	0	33	116
Farmers and farm managers	35	15	13	7	24	13	2	106	213
Specialist managers	332	38	90	33	74	18	3	130	718
Hospitality, retail & service managers	77	20	65	37	78	16	2	206	502
Arts & media professionals	55	8	2	1	3	1	0	19	90
Business, HR & marketing prof	402	42	62	29	24	6	1	106	672
Design, eng, science & transport prof	251	17	32	4	12	3	0	30	350
Education professionals	433	32	13	14	10	2	0	23	528
Health professionals	283	50	31	15	21	1	0	35	436
ICT professionals	140	14	14	6	8	1	0	31	214
Legal, social & welfare professionals	137	13	9	9	1	0	0	12	181
Engineering, ICT & science technicians	61	21	25	13	43	7	1	51	222
Automotive & engineering trades	11	6	28	11	188	20	2	106	373
Construction trades	13	2	23	26	146	21	4	120	356
Electrotechnology & teleco trades	11	9	4	12	82	19	3	67	205
Food trades	21	10	11	10	56	5	1	48	161
Skilled animal & horticultural trades	6	3	9	12	29	9	1	56	127
Other technicians & trades	20	6	7	12	78	13	1	60	198
Health & welfare support workers	27	24	28	22	8	1	0	14	123
Carers & aides	34	18	44	47	166	9	1	80	399
Hospitality workers	22	4	10	9	28	10	2	146	230
Protective Service workers	27	9	36	8	19	3	0	29	132
Sports & personal service workers	27	8	23	34	20	5	0	39	157
Office managers & program admin	70	26	22	28	34	19	3	94	296
Personal assistants & secretaries	19	7	9	7	18	18	3	70	152
General clerical workers	44	21	22	21	31	18	2	109	267
Inquiry clerks & receptionists	38	13	14	18	56	15	3	132	289
Numerical clerks	79	22	27	21	55	22	2	139	367
Clerical & office support workers	12	13	9	4	12	4	0	56	110
Other clerical & administrative workers	59	9	22	16	40	10	1	87	244
Sales representatives & agents	40	21	12	16	42	6	1	67	204
Sales assistants & salespersons	87	15	34	20	68	26	5	413	667
Sales support workers	27	4	6	8	23	11	2	114	194
Machine & stationary plant operators	8	1	3	13	36	15	1	88	165
Mobile plant operators	13	2	2	5	29	8	1	81	140
Road & rail drivers	40	9	9	17	65	11	2	164	318
Storepersons	8	4	4	8	12	9	1	80	125
Cleaners & laundry workers	21	3	16	5	32	11	2	157	248
Construction & mining labourers	10	5	2	13	38	4	1	93	166
Factory process workers	20	6	5	8	28	23	1	147	238
Farm, forestry & garden workers	5	1	4	5	20	3	1	58	96
Food preparation assistants	5	2	21	1	8	4	0	111	153
Other labourers	23	4	26	5	29	14	1	161	262
All	3,102	566	849	619	1,809	435	59	3,968	11,406
All (%)	27.2	5.0	7.4	5.4	15.9	3.8	0.5	34.8	100

Note: Columns and rows may not add to the total due to rounding.

Table A8 Qualifications (level) projections by occupation (2-digit), persons, Australia, 2015 ('000)

Occupation group	HEd	Ad dip	Dip	Cert IV	Cert III	Cert II	Cert I	None	Total
Chief exec, general man & legis	50	7	2	11	15	2	0	35	122
Farmers and farm managers	37	15	14	7	23	13	2	103	214
Specialist managers	345	37	103	35	73	18	2	129	743
Hospitality, retail & service managers	77	19	73	40	80	15	2	204	511
Arts & media professionals	57	8	1	1	3	1	0	18	91
Business, HR & marketing prof	417	43	67	32	25	6	1	107	696
Design, eng, science & transport prof	257	17	35	3	11	3	0	30	356
Education professionals	442	31	13	16	11	2	0	24	539
Health professionals	280	49	34	15	23	1	0	39	442
ICT professionals	144	14	15	7	8	1	0	31	220
Legal, social & welfare professionals	139	14	10	11	1	0	0	12	186
Engineering, ICT & science technicians	63	22	26	13	44	6	1	51	225
Automotive & engineering trades	12	6	33	12	184	21	2	108	378
Construction trades	13	2	28	31	142	23	4	121	364
Electrotechnology & teleco trades	10	10	3	13	80	21	3	69	207
Food trades	23	11	13	11	55	4	1	45	164
Skilled animal & horticultural trades	6	3	10	13	30	9	1	57	131
Other technicians & trades	21	6	7	13	76	14	1	59	198
Health & welfare support workers	27	25	30	22	8	1	0	14	127
Carers & aides	34	17	47	51	177	8	1	75	410
Hospitality workers	22	4	10	9	30	9	2	147	234
Protective Service workers	28	9	39	8	19	3	0	27	134
Sports & personal service workers	27	8	25	39	20	5	0	37	161
Office managers & program admin	72	27	24	31	37	20	3	95	309
Personal assistants & secretaries	20	7	9	7	19	17	3	69	151
General clerical workers	46	22	25	23	33	18	1	108	275
Inquiry clerks & receptionists	39	13	15	19	62	14	3	131	295
Numerical clerks	81	22	28	21	59	21	2	133	367
Clerical & office support workers	12	15	11	4	12	3	0	54	111
Other clerical & administrative workers	64	8	24	17	42	10	1	84	249
Sales representatives & agents	42	22	12	18	44	5	1	67	211
Sales assistants & salespersons	96	15	37	21	70	25	4	412	681
Sales support workers	29	4	6	9	25	11	1	111	196
Machine & stationary plant operators	8	1	3	15	36	16	1	85	165
Mobile plant operators	16	2	2	6	29	8	1	79	142
Road & rail drivers	45	9	10	19	65	12	2	160	323
Storepersons	9	4	4	9	12	10	1	80	128
Cleaners & laundry workers	23	3	19	5	33	11	2	156	251
Construction & mining labourers	11	6	2	16	38	4	1	92	169
Factory process workers	21	6	5	8	28	25	1	145	240
Farm, forestry & garden workers	5	1	4	5	21	3	1	57	96
Food preparation assistants	5	1	25	1	8	4	0	109	154
Other labourers	25	4	31	5	28	15	1	161	269
All	3,202	575	933	672	1,833	440	53	3,931	11,638
All (%)	27.5	4.9	8.0	5.8	15.7	3.8	0.5	33.8	100

Note: Columns and rows may not add to the total due to rounding.

Table A9 Qualifications (level) projections by occupation (2-digit), persons, Australia, 2020 ('000)

Occupation group	HEd	Ad dip	Dip	Cert IV	Cert III	Cert II	Cert I	None	Total
Chief exec, general man & legis	56	6	28	11	16	3	0	32	184
Farmers and farm managers	76	9	38	15	21	4	0	42	248
Specialist managers	321	37	160	65	89	18	1	180	1050
Hospitality, retail & service managers	201	23	100	41	56	11	1	113	658
Arts & media professionals	69	6	7	3	3	0	0	9	107
Business, HR & marketing prof	559	50	60	27	21	4	0	72	866
Design, eng, science & transport prof	284	26	30	14	11	2	0	37	440
Education professionals	418	38	45	20	16	3	0	54	646
Health professionals	349	31	37	17	13	2	0	45	541
ICT professionals	167	15	18	8	6	1	0	22	259
Legal, social & welfare professionals	149	13	16	7	6	1	0	19	231
Engineering, ICT & science technicians	27	10	16	21	83	16	1	77	328
Automotive & engineering trades	42	16	26	33	129	25	2	120	513
Construction trades	41	16	25	33	127	24	2	119	505
Electrotechnology & teleco trades	24	9	15	19	73	14	1	68	291
Food trades	19	8	12	15	59	11	1	55	236
Skilled animal & horticultural trades	16	6	10	13	48	9	1	45	193
Other technicians & trades	21	8	13	17	66	13	1	62	263
Health & welfare support workers	19	9	28	21	38	2	0	29	176
Carers & aides	61	28	89	66	121	7	0	92	556
Hospitality workers	33	15	48	36	66	4	0	50	303
Protective Service workers	19	8	27	20	37	2	0	28	170
Sports & personal service workers	25	11	36	27	49	3	0	37	226
Office managers & program admin	85	23	35	31	69	17	1	116	492
Personal assistants & secretaries	29	8	12	11	24	6	0	40	168
General clerical workers	65	17	27	24	52	13	1	88	374
Inquiry clerks & receptionists	72	19	30	26	58	14	1	98	417
Numerical clerks	77	20	32	28	62	15	1	104	443
Clerical & office support workers	27	7	11	10	22	5	0	36	154
Other clerical & administrative workers	62	16	25	22	50	12	1	84	356
Sales representatives & agents	44	8	14	12	30	7	1	105	326
Sales assistants & salespersons	135	25	44	36	91	22	2	322	999
Sales support workers	42	8	14	11	28	7	1	99	309
Machine & stationary plant operators	20	3	7	17	28	11	1	74	232
Mobile plant operators	19	3	6	16	27	10	1	72	225
Road & rail drivers	43	6	14	36	61	23	1	163	511
Storepersons	19	3	6	16	27	10	1	73	230
Cleaners & laundry workers	22	4	25	8	35	12	1	140	385
Construction & mining labourers	17	3	19	6	27	9	0	107	295
Factory process workers	21	3	24	7	34	11	1	134	368
Farm, forestry & garden workers	6	1	7	2	9	3	0	37	103
Food preparation assistants	15	2	17	5	24	8	0	96	265
Other labourers	28	5	31	10	44	15	1	174	481
All	3,844	584	1,282	883	1,956	406	27	3,572	16,127
All (%)	23.8	3.6	7.9	5.5	12.1	2.5	0.2	22.1	100

Note: Columns and rows may not add to the total due to rounding.

Table A10 Qualifications (level) projections by occupation (2-digit), persons, Australia, 2025 ('000)

Occupation group	HEd	Ad dip	Dip	Cert IV	Cert III	Cert II	Cert I	None	Total
Chief exec, general man & legis	65	6	47	16	15	3	0	27	179
Farmers and farm managers	73	7	53	18	17	3	0	31	202
Specialist managers	358	33	262	89	81	14	1	150	988
Hospitality, retail & service managers	210	19	153	52	47	8	0	88	578
Arts & media professionals	73	6	9	4	3	0	0	9	104
Business, HR & marketing prof	626	50	80	34	22	3	0	74	889
Design, eng, science & transport prof	312	25	40	17	11	1	0	37	443
Education professionals	454	37	58	25	16	2	0	53	645
Health professionals	382	31	49	21	14	2	0	45	543
ICT professionals	181	15	23	10	6	1	0	21	257
Legal, social & welfare professionals	165	13	21	9	6	1	0	19	235
Engineering, ICT & science technicians	33	12	21	32	76	19	1	80	274
Automotive & engineering trades	49	18	32	47	113	29	1	118	407
Construction trades	50	18	32	47	114	29	1	120	413
Electrotechnology & teleco trades	28	10	18	27	65	17	1	68	234
Food trades	24	9	15	23	54	14	1	57	196
Skilled animal & horticultural trades	20	7	13	19	45	12	0	47	162
Other technicians & trades	25	9	16	23	56	14	1	59	203
Health & welfare support workers	20	9	38	27	47	1	0	23	165
Carers & aides	63	27	119	83	145	4	0	72	514
Hospitality workers	33	14	63	44	76	2	0	38	271
Protective Service workers	18	8	34	24	42	1	0	21	148
Sports & personal service workers	25	11	48	34	59	2	0	29	208
Office managers & program admin	106	26	50	42	94	15	1	105	438
Personal assistants & secretaries	27	7	13	11	24	4	0	26	111
General clerical workers	73	18	34	29	65	10	0	72	302
Inquiry clerks & receptionists	82	20	38	33	73	11	0	81	340
Numerical clerks	79	19	37	31	70	11	0	77	324
Clerical & office support workers	30	7	14	12	26	4	0	29	122
Other clerical & administrative workers	71	17	33	28	63	10	0	70	294
Sales representatives & agents	59	9	18	15	33	6	0	94	236
Sales assistants & salespersons	179	27	56	45	100	19	1	284	712
Sales support workers	55	8	17	14	31	6	0	87	218
Machine & stationary plant operators	25	3	8	26	23	11	0	56	152
Mobile plant operators	26	3	9	28	24	12	0	60	162
Road & rail drivers	60	6	21	64	56	27	1	137	371
Storepersons	29	3	10	31	27	13	0	66	179
Cleaners & laundry workers	26	3	40	9	33	11	0	121	243
Construction & mining labourers	22	3	34	7	28	9	0	102	205
Factory process workers	25	3	38	8	32	10	0	115	232
Farm, forestry & garden workers	5	1	7	2	6	2	0	22	44
Food preparation assistants	19	2	30	6	24	8	0	89	179
Other labourers	36	4	56	12	46	15	0	168	337
All	4,324	582	1,809	1,177	2,007	395	15	3,148	13,457
All (%)	32.1	4.3	13.4	8.7	14.9	2.9	0.1	23.4	100

Note: Columns and rows may not add to the total due to rounding.