



Workforce Futures

A Paper to Promote Discussion

Towards an Australian Workforce Development Strategy

Skills Australia

Background Paper One:

What does the future hold?

Meeting Australia's skill needs

September 2009



Contents

Foreword to Workforce Futures	3
An overview	4
Possible futures	4
Narrowing the focus on skill needs	5
Current trends in education and skills	5
What should we plan for?	6
Section 1: Possible futures	8
1.1 Three scenarios of possible future worlds	9
The scenario exercise	9
Modelling the demand and supply of skills in three worlds	11
A comment on Australian population ageing trends	12
1.2 Modelling outcomes	13
Changes in industry and occupational employment	13
The balance of demand and supply of qualifications	16
Main conclusions	18
Section 2: Narrowing the focus on skill needs	20
2.1 The shape of Australian industry	21
Sectoral change	21
Factors influencing industry composition	22
2.2 Current industry trends	24
Recent and projected industry trends	24
Recent and projected occupational trends	28
Main conclusions	31
Section 3: Current trends in education and skills	32
3.1 Formal education and training	33
Participation	33
Course completions	34
Apprenticeships and traineeships	35
Educational attainment	37
Fields of study	38
Literacy and life skills	41
International comparisons	42
3.2 Continuing adult learning	43
Employment-based training	44
Who has access to work-related learning?	46
International comparisons	47

3.3	Expenditure and sources of finance	49
	Public funds expenditure	49
	Employer training expenditure	52
	International comparisons	53
	Section 4: What should we plan for?	54
4.1	Considerations on workforce planning	55
	The role of governments in planning future skills	55
	A more nuanced approach to planning	56
4.2	An approach to minimising risk	57
	Rationale	57
	Using the risk methodology	61
	A risk-approach to skills planning	64
4.3	A way forward on skills and workforce planning	65
	Adopting a broader workforce development approach	65
	Some next steps for consideration	66
	Appendices	69
	Appendix A: Government targets	70
	Appendix B: Additional data	72
	Appendix C: Planning activities by stakeholders	75

Foreword to Workforce Futures

How can we best ensure that Australia has the workforce capability required for a productive, sustainable and inclusive future? Skills Australia is releasing *Workforce Futures*—a set of discussion documents—to promote debate about this question.

The ideas in these papers, modified in response to input from stakeholders, will form the basis for an *Australian Workforce Development Strategy*, to be released later in 2009.

Skills Australia's approach to conceptualising workforce development encompasses three interrelated elements:

- the demand for future skills and what planning for the future entails
- improving the value from the skills investments being made in the existing and future workforce, through greater attention to how skills are used in a workplace setting
- joining up separate areas of government action on workforce participation, social inclusion and innovation so policies on skills connect with wider economic, employment and social strategies.

Two background papers provide evidence and arguments relating to these elements, accompanied by points for consideration and proposals for possible ways forward. These are:

- What does the future hold? Meeting Australia's skill needs
- Powering the workplace: Realising Australia's skills potential

A discussion paper, *Workforce Futures*, summarises the arguments and proposals from the two papers.

These papers are not just about action for governments. Workforce development strategies need to be firmly based on the specific and connected ways in which governments,¹ employers, industry, individuals, education providers and a host of services collectively shape Australia's skills base.

Consequently, both papers seek comment about the appropriate roles and responsibilities of all the key agents that drive change. They include suggestions about issues where shared frameworks may be beneficial, and offer options for such frameworks.

As you read this paper you might help us by considering the following broad questions.

- ***Are Skills Australia's interpretations of our future skill needs reasonable?***
- ***What is the best way for governments and other stakeholders to address planning for our future skills needs? Is there a need for a new approach?***
- ***What are the most appropriate responses for government policy regarding Australia's skill needs in the future?***

¹ 'Government' in this paper refers to State, Territory, national and local governments. The term 'industry' includes employers, employees, and their representative associations and covers the private, public and not-for-profit sectors. 'Education providers' includes tertiary sector public and private organisations – universities, TAFE colleges and other Registered Training Organisations, and their representative associations.



An overview

Possible futures

The Australian economy operates in a globally sensitive environment. How our future turns out depends on what happens outside our borders, as well as the decisions we make and the settings we inherit from the past.

Over the last several decades, industrial economies based on manufacturing have shifted to economies driven by services, electronic technologies and information, and have become reliant on higher levels of cognitive and interactive skills. Australia has been no exception. Trends suggest our economy and jobs will continue to be oriented in this direction. But the future is subject to dynamic and complex forces that we need to have on our radar.

Skills Australia used scenario planning² to grapple with this uncertainty. This approach involves the identification of several potential futures for Australia in the world of 2025. The economic, social and political variables adapted from Shell for this exercise are:

- the degree of openness of global markets
- society's aspirations to equity and social inclusion
- the role of the state in regulation and protecting the security of citizens.

Each scenario is associated with different rates of growth and industry composition that generated varying demand for labour and qualified workers. Economic modelling was used to distil trends and planning issues regardless of which scenario takes shape. The results provide a picture of the general directions of industry and occupational change, the qualifications needed in each world, and the likelihood that these will be available. Governments, education providers and industry can undertake more detailed planning against this backdrop.

Each of the scenarios projects the need for additional qualifications over the next five years or so compared to the just over 500,000 students who currently complete a qualification every year. The degree of mismatch between the supply and demand for qualifications is most marked in the Open Doors world, the more expansive open economy scenario.

For the more protectionist Low Trust Globalisation and Flags scenarios no significant imbalance is projected between the demand and supply of qualifications by 2025. However, in the Open Doors world a significant excess demand of around 170,000 completed qualifications is still projected in 2025.

In all scenarios there is a significant trend increase in the level of skills emerging. There is a marked move towards graduates and a movement away from Certificate I and II qualifications. This reflects both a continuation of the trend toward skill deepening and

² Adapted from Royal Dutch/Shell Group. Three possible worlds were constructed and stakeholder feedback was elicited about the type of workforce skills and development issues that are thrown up by each scenario. 'Open Doors' is viewed as a world of global markets, cooperative governance and cohesive civil societies. Growth, participation and migration are comparatively high. 'Low trust globalisation' is a world of global markets, distrusting states and regulatory intrusion; 'Flags' is a world of dogmatic, national preferences by states, reduced globalisation and conflicts. This scenario has the lowest growth, participation and migration.



the growth prospects for jobs requiring higher level skills. Interesting questions emerge from the modelling around future levels of demand for Certificate III and IV qualifications and their effective articulation into higher-level qualifications.

Migration will make a substantial contribution to closing the qualifications gap identified in the Open Doors scenario, although over time migration may help to push the supply of skills above demand for the other two scenarios.

The projected increases in the amount and quality of training will enable an increase in employment participation in each scenario notwithstanding the ageing of the population. The biggest increase in participation would occur under Open Doors, reaching an anticipated 69 per cent in 2025. At least over the next fifteen years, this increase in employment participation would be sufficient to offset the projected impact of the ageing of the population, with significant fiscal benefits for governments.

Narrowing the focus on skill needs

This Section documents potential skill needs at a narrower level, by looking at job trends in the recent past and short- to medium-term future. The Australian Government's (Department of Education, Employment and Workplace Relations) occupational and industry projections forecast growth patterns five years ahead. Past trends are adjusted to take into account anticipated changes such as cycles within industry sectors, new initiatives, or regional factors that impact on some industries more than others.

Unlike scenarios, trends assume the continuation of historic patterns, modified to take into account major events such as the economic recession, or a significant new area of government spending such as the National Broadband Network.

Because they are forecasts, a five year time-frame is considered reasonable as opposed to the long-term 15-year projections used in the scenario modelling in Section 1.

This Section recognises that education providers such as universities and vocational education providers already gather effective data and intelligence to perform the local assessments that sit inside broader-brush analyses.

The Section ends by asking questions such as:

- do the key agents in educational planning have access to the type and amount of information they need, and the know-how to use it?
- what is the appropriate division of responsibilities and roles between all of those who influence educational offerings and choices?
- are our systems sufficiently adaptive to respond effectively to continuing change?

Current trends in education and skills

Complementing Sections 1 and 2, which examine the future, Section 3 examines the state of play in Australia today on the supply of education and skills. It focuses on the issues that are pertinent to understanding the connections between education, the labour market and workplaces, such as the amount and types of education, training and work-related learning Australians currently engage in; as well as selected indicators of educational attainment. It concludes with a summary of investment in education and training in recent years.



Section 3 acknowledges the considerable and increasing investments government and individuals are making in post-school education and continuing learning. It also notes certain areas of concern, and asks:

- How can we best focus national efforts on improved adult literacy and numeracy?
- What role should the government take in encouraging work-based learning for existing workers, especially in relation to those employed part-time and casuals who currently tend to miss out?

What should we plan for?

Our purpose in the final Section is to identify criteria that will indicate which jobs/occupations/skills are necessary to plan for in the future. This work aims to distinguish the skills and occupations government should focus on from the ones labour markets and local planning activities deal with effectively.

As noted in *Foundations for the Future*, Skills Australia recognises that there are many jobs which are not skill-specific, and that the idea of matching demand and supply for many jobs needs to give way to a discussion about what it is feasible and realistic to plan for.

The Section proposes a set of criteria to identify those occupations where government skills planning and intervention is most appropriate. The suggested criteria are: a long lead time is involved in producing the qualification; there is high risk if the skill is in short supply; there is a good occupational fit; and good supporting information is available on the demand for a particular skill.

The criteria, and an associated methodology, are applied using recent data to identify areas where government and the community have an interest in preventing either high levels of wastage or harmful shortages in the coming decade.

The daily decisions made by individuals, employers, educational providers, recruitment firms, professional associations, migration agents and a host of other institutions will continue to collectively shape Australian labour markets and employment opportunities.

This Background Paper seeks feedback on the most useful role for governments and other stakeholders within this mix, particularly in terms of the following planning related issues.

Steps for consideration

Is it useful to develop a nationally agreed approach to skills and workforce planning within which the following elements could be included?

- Common planning principles: Recognition of common principles to guide skills and workforce planning and identification of the different roles and responsibilities for governments and other key players at a state, regional, local, industry and enterprise level
- A regular national 'snapshot' of demand for skills: The regular commissioning of broad-brush indicators of employment trends and related skill demands, using scenarios to consider the risks and opportunities of a range of plausible influences on demand and supply
- Different planning for different purposes: Ensuring coherence in skills planning – so individuals and organisations have access to timely and useful information



appropriate to their needs; they have the know-how to use it; and streamlining of efforts is maximised and duplication avoided

- A new planning methodology: Recognition that government intervention to influence training priorities should most usefully focus on identifying 'at risk' occupations where it is important to avoid negative labour market impacts of under- or over-supply. Such an approach would work in tandem with state governments, providers and other stakeholders in negotiating day to day planning and provision.

What areas of current tertiary education provision can strengthen workforce development efforts? Are the following items candidates for reconsideration?

- Increased national efforts on foundation skills, especially on literacy and numeracy: A renewed national focus on adult literacy, numeracy and foundation workplace skills is proposed for effective workforce participation and skill utilisation. This is important to improve engagement and productivity of current workers, and also for the potential workforce
- Consideration of per/student spending: It is important to understand whether public spending is sufficient to provide for anticipated demand, produce good outcomes, and meet the needs of particular groups
- Dimensions of employer expenditure: These dimensions are not up to date, and are an important consideration in terms of an increased focus on workforce development and workplace based learning
- Support for work based learning: The extent to which, and how best government can support work-based learning for existing workers, is an important consideration for strengthened public support for workforce development
- Adaptation of provision: The faster adaptation of provision to a changing occupational and workplace landscape is required to ensure contemporary relevance of teaching and learning. Expansion of workplace based delivery is anticipated to address changing needs and also integrate with whole of enterprise strategies to link learning to performance.



Section 1: Possible futures

Section 1 addresses the long term. It looks at possible skill demands fifteen years out. It's not realistic to predict the long term future. But it is important to prepare adequately for the risks associated with possible alternative economic and demographic scenarios. As an aid to this middle-range thinking, Skills Australia has considered the key global uncertainties and their impact using Royal Dutch/Shell Group's Global Scenarios to examine Australia's possible place in the world of 2025.

These scenarios define three variant future worlds that Skills Australia explored with its stakeholders. Economic modelling was then undertaken, using an internally consistent set of assumptions that attempts to capture the key features of each of these scenarios, to then quantify the differences between them. Differences exist in both the volume and the composition of skills because the scenarios imply alternative futures for economic growth, industry structure and employment growth coming from workforce participation and migration. Based on the increasing propensity to hold qualifications in a job, the modelling found that in 2025 the percentage of the population with a post-school qualification would vary from 75 per cent (under the high-productivity growth 'Open Doors' scenario) to 71 per cent (under the lower growth, protectionist 'Flags' world). Currently some 60 per cent of employed people hold a post-school qualification, up from 55 per cent in 2001.

The modelling also produced numerical estimates of the supply of skills, modelling prospective student participation at different qualification levels over the period to 2025.³ The modellers assume that demographic change and the state of the labour market (unemployment rates) are the key variables influencing trends here.

The outcome from setting expected demand against expected supply is that under Open Doors, a deficit of some 170,000 qualifications is expected to 2025, most of which are at Diploma level and above. Under the middle-range 'Low-trust Globalisation' scenario, a deficit of approximately 120,000 is expected to 2015, evening out somewhat in the next decade. In the Flags world, there is again a deficit of higher-level qualification to 2015, but an overall sufficiency by 2025.

As Access Economics notes, 'a mismatch between demand and supply can create incentives for other actions to occur'. Section 1.1 describes the scenarios and the modelling assumptions for each world. Section 1.2 summarises the quantitative estimates of qualifications requirements and supply arising from the scenarios.

³ The analysis uses qualifications as a proxy for skills. The full Access Economics report, *Economic modelling of skills demand*, which provides details of assumptions and methodology, will be published separately. Note that the analysis presented below is based on draft modelling, which will be subject to some minor revisions.



1.1 Three scenarios of possible future worlds

The scenario exercise

The volatility of recent global financial and political developments underscores the importance of being prepared for surprising world events and understanding how each shapes demand for skills. As an aid to long term strategy formulation, Skills Australia used the *Global Scenarios to 2025* developed by the Royal Dutch/Shell Group in 2005 as the basis for examining Australia's possible place in the world of 2025. Three global scenarios devised by Shell were used to consider the possible future nature of Australian industries, organisations and the workplaces within them, on the one hand, and the likely future demand and supply of the skills that Australia would need in each context.

This exercise enables us to confront our assumptions about the future and to be more proactive in monitoring and anticipating change and responding to global drivers. The scenarios are not predictions of the future; nor are they 'right' or 'wrong' propositions about where we might be headed nationally or globally. Each offers a perspective on a plausible future and the factors that might play out in different economic, social and political conditions. They are able to throw a light on which strategic actions are worth taking, whatever scenario unfolds.

The global economic, social and political driving forces that shape the scenarios are commercial market incentives, social aspirations towards equity and cohesion and the level of intervention by states. The scenarios 'value', or factor in, these dynamics of market efficiency, fairness or social justice and security for citizens within civil society to different degrees. The three scenarios are defined by considering future 'worlds' where two of the above drivers are dominant. These worlds can be characterised as follows and are described in more detail in Table 1 overleaf:

- Open Doors—a world of global markets and cohesive civil societies
- Low trust globalisation—a world of global markets and coercive states regulating and gatekeeping opportunities
- Flags—a world of dogmatic, exclusive social values and protective attempts by states to rally divided societies around national interests.

Skills Australia used the Shell material as a stimulus for thinking about the skills demands of the future in two one-day workshops with expert stakeholders. Key issues addressed in workshops were:

- migration
- ageing population
- workforce participation
- education and training (including foundation skills such as literacy and numeracy)
- infrastructure and environmental sustainability.

Other issues that arose were workforce mobility (regionally, nationally and globally); the rise of Asia and Australia's strategic relations with Asian economies; food and fuel security; climate change; technology transfer and innovation; the changing forms that education and learning takes; and the dynamics of other global economies.



Table 1: Main points of difference between the three Global Scenarios

Feature	Open Doors	Low Trust Globalisation	Flags
“Success”	Responsible local and global citizen, with compassionate, inclusive values	Winning, gaining power and material wealth	Good neighbour, good employee, good group member – i.e. with “our” values
The economy	Higher productivity and GDP growth.	Intermediate GDP growth. Higher inflation and real interest rates.	Curtailed trade and lower GDP growth. Higher inflation, interest rates, govt. debt.
Energy	Natural gas use grows. Price signals used to promote use of renewables.	Development of alternative energy sources is encouraged for national security reasons.	Energy security concerns promote increased energy efficiency and use of renewables.
Industry and markets	Shareholders and stakeholders cooperate. Comprehensive corporate reporting to markets and stakeholders. Companies (especially SMEs) innovate, partner, share information. Harmonisation of workplace legislation.	Heavy compliance costs. Large, vertically integrated firms dominate. R&D is important but low trust limits sharing. Home bias in investment.	Globalisation falters. Reduced competitive pressures. States act to provide public goods as markets fail to do so. Rate of workforce growth slows appreciably. Inefficient labour market.
Occupations and jobs	Growth in most knowledge-economy jobs. Workers are very mobile. Team and networking skills are in greater demand.	Defence, security, monitoring and compliance (e.g. law, accounting), wealth management are growth areas.	Localised over and under supply of skills is common. Lower aggregate demand for most skills but public employment grows.
Technology	Built-in technology ensures high levels of security and trust. Standardisation facilitates use. Entrepreneurial risk-taking.	Venture capitalists fund disruptive technologies that might challenge large players.	High military spending promotes innovation. Private investors demand high risk premiums. Technology, IP is hoarded.
Workplace and management	Consensus and mutual accountability are valued. Work competes with other loyalties in people’s lives. People seek fulfilment as well as employability. Participative management.	Planning is short-term, reactive. Work is stressful, demanding and competitive. IR is largely decentralised.	Nepotism and patronage are commonplace despite scrutiny by media and community groups. Many government rules and regulations.
Migration	Open borders and acceptance of differences foster migration.	Restricted and tightly controlled. Limited migration to fill nationally important skill gaps.	Seriously restricted within and between nations.
Community	People actively participate in multiple groups. More equitable society. Social groups and media have powerful voices.	Inequalities increase between and within countries. Community and NGO groups are active but frequently unable to influence events.	Strong identification with local community. Distrust of outsiders.
Government	Politics is inclusive but more complex. Security and trust are jointly created by government, companies, investors, community. Governments cooperate for shared and longer term benefits.	National security is primary focus. Overlapping jurisdictions; conflicting laws; intrusive checks and controls. Competition between governments. International politics is driven by self-interest. Trade sanctions are prevalent.	Opposed groups vie for influence leading to populist politics and patronage. Nations impose self-serving rules, regulations and trade barriers limiting transnational activities. Fractured global governance.
The environment	Global challenges dealt with cooperatively and proactively. Precautionary principle.	Pollution and climate change issues are dealt with as crises emerge.	Strong community calls for action. Govts reluctant to challenge local power bases.
Learning and skills development	Innovations quickly disseminated. Skill development well funded by all stakeholders. Harmonisation of qualifications and assessment processes nationally and globally.	Supply of education is increasingly left to private sector with labour markets determining curriculum. People seek to learn skills with high market value. Short term and niche focus.	Government regulation and funding biased towards loyal, local employers, providers and electorates.



Modelling the demand and supply of skills in three worlds

Following scenario testing and exploration with stakeholders, the Access Economics model was applied to the three scenarios to quantify economic outcomes and the demand for skills over the next two decades. Separate assumptions about five key variables were used to characterise the nature of the economy, and to estimate the size of the workforce and the distribution of employment across industries and occupations in each scenario. The variables were:

- economic growth – both globally and nationally
- the level of net migration to Australia
- labour productivity growth in the Australian economy
- exports as a share of Australian GDP
- the capital to labour ratio in the Australian economy.

Modelling the future demand for qualifications takes account of the anticipated impacts from employment growth and the changing structure of employment in each of the scenarios. The modelling also takes account of the net replacement of existing workers due to retirement or turnover as well as skills deepening:

- Net replacement/retirement: The actual requirement for workers is much greater than the net change in employment. Workers who leave employment have to be replaced so that even in occupations where total numbers are in decline there will be a need for new entrants, many of them with post-school qualifications.
- Skills deepening: It has been assumed that the proportion of employed persons with qualifications (skills deepening) continues to rise very rapidly as it has in recent years. Access Economics builds skills deepening into its model to account for the recent and increasing trend of job roles becoming more complex, and requiring skills that will require higher levels of qualifications.⁴ The skills deepening in the modelling is considerable, though even more would be required to meet the COAG target of halving the proportion of persons 20 to 64 holding less than a Certificate III qualification.

The modelling of the scenarios aims to help us understand how economic drivers might influence the need for qualifications and how the distribution of qualifications is likely to respond to the needs of the future.

Table 2 presents a summary of the key economic parameters used within the Open Doors, Low-trust Globalisation and Flags scenarios respectively. Economic growth rates were determined by considering Australia's sensitivity to the global rates assumed in the *Shell Global Scenarios to 2025*.⁵ The above-global economic growth rate for Open Doors results from setting high age-specific workforce participation rates consistent with this scenario and the participation rates achieved by the better performing OECD countries, and with the achievement of the COAG targets for education and skills. In the other two scenarios, assumptions are set about population and productivity growth, and unemployment, leaving participation rates as the derived variable.⁶

⁴ Lowry, Diannah, Molloy, Simon and McGlennon, Samuel (2008) 'Future skill needs: projections and employers' views', *Australian Bulletin of Labour*, Vol 34, Issue 2, pp. 213-215.

⁵ See [//www-static.shell.com/static/aboutshell/downloads/our_strategy/shell_global_scenarios/exsum_23052005.pdf](http://www-static.shell.com/static/aboutshell/downloads/our_strategy/shell_global_scenarios/exsum_23052005.pdf)

⁶ Access Economics (2009), *Economic modelling of skills demand*, p. 4.



Table 2: Summary of assumptions by scenario to 2025

Variable	Open Doors %	Low-trust Globalisation %	Flags %
Global growth rate	3.8	3.1	2.6
Assumptions			
Australian growth rate	3.9	3.0	2.2
Annual net migration as share of population in 2025	1.0	0.8	0.4
Labour productivity	1.75	1.50	1.30
Exports	6.3	4.4	2.9
Capital/labour ratio	1.5	1.0	0.5
Implied results			
Population	1.7	1.5	1.0
Workforce	2.1	1.5	1.0
Employment	2.2	1.5	0.9
Unemployment % of labour force	4.5	5.1	6.0
Labour force participation rate ¹	69	64	63
Exports to GDP in 2025	31	26	23
Business investment to GDP	14.0	12.2	10.5

Source: Access Economics (2009), *Economic modelling of skills demand*, p. i, small numbers rounded to one decimal place, larger numbers rounded to whole numbers.

Notes: Except where stated, figures are for average growth rate 2010 to 2025 (% per annum).

1. Population 15+years of age in 2025.

A comment on Australian population ageing trends

Access Economics scenario modelling and Australian Bureau of Statistics projections reflect the critical demographic challenges of an ageing population faced by Australia. As fertility levels fall and the large 'baby boom' generation passes through, the population and labour force will gradually age and there will be changes in the makeup of the labour force. Migration remains a major contributor to population growth, partially off-setting the effects of ageing.

The three scenarios modelled by Access Economics imply annual population growth rates ranging from 1.7 per to 1.0 per cent per annum in the period 2010 to 2025. These are similar to the high and low Australian Bureau of Statistics projections which range from 1.6 per cent to 1.0 per cent per annum for the same period.⁷ These spell an ageing workforce (see Appendix B, Table B1) and increased aged dependency in the Australian economy (highlighted in Australian Treasury Intergenerational Reports) as baby boomer retirements surge and are not fully replaced due to the low numbers reaching working age in the next few years (caused partly by the relatively low number of births in the 1990s).

Australia's older population structure will be similar to some other developed countries, such as the US and the UK, but is expected to have a smaller effect than most OECD countries. But there are uneven impacts from population changes in different parts of

⁷ ABS (2008) *Population projections, Australia, 2006 to 2101*, Cat no. 3222.0, p. 39.



Australia, cross-cutting patterns of internal migration between states, regions and coastal, urban and rural areas. According to ABS projections, Queensland is projected to increase more quickly than any other state and will overtake Victoria as the second most populous state by the mid-21st century.

Access Economics modelling underscores the substantial contribution of migration in sustaining Australia's growth over the forecast period and contributing to the supply of qualifications. However, they point out that, even with higher levels of migration, the supply of persons with qualifications is unlikely to meet the projected requirements in the period to 2015 and other interventions will be needed to add to the increased supply of skills if good progress towards targets is to be achieved. Such interventions are noted further below, and are also addressed in more detail in Background Paper Two.

1.2 Modelling outcomes

Changes in industry and occupational employment

The Open Doors scenario sees Australia's economy grow at an average rate a little above global GDP. Net migration to Australia is at a very strong rate, as implied by Open Doors, providing strong support to population growth, while labour productivity growth is in line with long term projections outlined by the Australian Treasury. Overall labour force participation is set high, and if achieved it would offset the predicted dependency impact of older people no longer participating in the workforce over the next 15 years and more.

This scenario is considered to be more effective in creating sustainable employment growth, and unemployment moves down towards the rate achieved in the last cycle. In this scenario of greater global openness, Australia becomes a more trade-exposed country, with higher exports coming from traditional sectors of mining and agriculture, as well as high-end services. A global agreement to mitigate climate change is seen to moderate employment growth in key affected industries such as coal mining and electricity generation.

The employment growth in this scenario follows trends of recent years where services have accounted for the growth in new jobs created. It is seen as strongest in areas such as business services (finance, real estate, professional services) and social services (health care, education and public administration). The occupational structure emerging in this scenario by 2025 is characterised by strongest growth among professional and sales workers with more modest growth in technical and trade workers.

The Low-trust Globalisation scenario sees Australia's economic growth soften from its performance over the past decade, roughly in line with the expected moderation in working-age population growth over time. The rate of net migration declines from recent levels to around the average over the past decade, while labour productivity growth is more moderate, in line with the performance over recent years.

Employment growth in this scenario shows a similar industry structure to the Open Doors scenario, but with a lower rate of growth on average. The occupational structure in this scenario is similar to Open Doors, though with a lower rate of growth on average. That is, professional, sales, clerks and community and personal service workers have more prominent growth compared to technical and trade workers.



The Flags scenario, characterised by social division and protectionism, would be less dynamic, leading to low economic growth for Australia and curtailment of Australia's migration program. Productivity growth still occurs, but at a more moderate rate compared with the other scenarios. The unemployment rate in this scenario remains above that of recent experience. A move to protectionism produces a change in Australia's industry structure towards production for the domestic market and away from exports, particularly service exports. This scenario anticipates stronger growth in Australia's manufacturing sector. There is a decline in education to foreign students and in tourism.

This scenario presents a different industry and employment growth pattern relative to the others, with stronger performance for manufacturing and utilities as Australia's economy moves back towards one based more on domestic production. The services sectors show only modest employment growth in this scenario. The occupational structure emerging in this scenario by 2025 sees a stronger growth in professionals and also labourers.

The Open Doors scenario anticipates the highest requirement for qualifications over the period from 2010 to 2025 of approximately 790,000 per annum, compared to 640,000 in the Low Trust Globalisation world and 520,000 under the Flags scenario.

The long-term industry and occupational growth projections for each scenario are shown in Tables 3 and 4 below. Shaded occupations and industries are those that show the highest growth in each world.

Table 3: Average employment growth per annum 2010 to 2025 by industry in three worlds

	Open doors %	Low-trust globalisation %	Flags %
Agriculture, forestry and fishing	1.1	-0.2	-1.8
Mining	1.0	0.5	-0.7
Manufacturing	0.0	-1.0	2.3
Electricity, gas, water and waste services	-0.3	-0.6	3.2
Construction	1.8	1.0	0.5
Wholesale trade	1.2	0.2	-1.2
Retail trade	2.2	1.7	0.6
Accommodation and food services	2.3	1.6	0.5
Transport, postal and warehousing	3.1	2.3	1.1
Information media and telecommunications	2.4	1.7	1.1
Financial and insurance services	2.3	1.6	0.5
Rental, hiring and real estate services	2.8	2.2	1.1
Professional, scientific and technical services	3.1	2.5	1.3
Administrative and support services	2.7	2.1	1.0
Public administration and safety	2.8	2.2	1.0
Education and training	2.2	1.5	1.0
Health care and social assistance	2.9	2.4	1.3
Arts and recreation services	2.4	1.8	-0.4
Other services	1.9	1.2	0.3
All industries average	2.1	1.5	0.9

Source: Access Economics (2009) *Economic modelling of skills demand*, Tables 6.1 to 6.3.



Table 4: Average employment growth per annum 2010 to 2025 by occupation in three worlds

	Open doors %	Low-trust globalisation %	Flags %
Managers	2.0	1.2	0.7
Professionals	2.4	1.7	1.0
Technicians and trades workers	1.7	1.0	0.9
Community and personal service workers	2.3	1.7	0.9
Clerical and administrative workers	2.3	1.7	0.8
Sales workers	2.4	1.8	0.8
Machinery operators and drivers	1.9	1.1	0.9
Labourers	1.9	1.2	1.1
All occupations average	2.1	1.5	0.9

Source: Access Economics (2009), *Economic modelling of skills demand*, Tables 6.4 to 6.6.

Industries that grow the fastest and most consistently in all three scenarios are:

- transport, postal and warehousing
- rental, hiring and real estate services
- professional, scientific and technical services
- health care and social assistance.

Likewise, professionals, and community and personal service workers are the two occupations with strong growth whatever scenario eventuates.

So far the discussion has referred to the high level of aggregation represented by the ANZSIC and ANZSCO major groups. At a more detailed level, the following industry and occupational sub-sectors show the strongest growth across all scenarios to 2025:

Table 5: Growth industries and occupations – modelling outcomes – average of all scenarios

Industries	%per annum	Occupations	%per annum
Storage	6.5	Welfare associate professionals	2.8
Community services	4.0	Carers and aides	2.6
Services to finance and insurance	3.7	University and vocational teachers	2.3
Water transport	3.0	Computing professionals	2.0
Scientific research, technical and computer services	2.7	Process workers and elementary Clerks	1.9

Source: Access Economics (2009), *Economic modelling of skills demand*, Tables D1 and D2.

The projections also show that some occupations will experience below-average or negative employment growth, and will have their share of employment decline under all three scenarios. Industries showing employment decline include:

- the textile, clothing and footwear sector is expected to decline across the board for both machine operators (-2.2 per cent under Low-trust globalisation to -0.8 and -0.7 per cent per annum under Open Doors and Flags)
- tradespersons (from -1.2 to -0.3 and -0.6 per cent, respectively).



The occupations which show the greatest divergence in terms of employment growth under the different scenarios are found in agriculture and manufacturing. These include agricultural and horticultural labourers, and skilled agricultural workers (both of which are projected to increase by at least 1.5 per cent under Open Doors but decrease by nearly -1.0 per cent under Flags); and farmers and farm managers (with a range of 1.1 per cent to -1.8 per cent).

Most manufacturing sub-sectors decline under the Open Doors and Low Trust scenarios but, with the exception of the textile, footwear and clothing sector, grow under Flags. Fabrication engineering tradespersons show slow growth under both Open Doors and Low trust globalisation (1.0 per cent and 0.1 per cent in each case); but grow by 2.4 per cent per annum under Flags.

The balance of demand and supply of qualifications

As noted above, the differing economic scenarios exert a range of influences on the demand for, and supply of, skills. Demand for qualifications is affected by increases in employment, and the changing structure of employment and supply is largely driven by demographic changes in population and migration. In addition, the factors of net replacement (turnover or retirement) and skills deepening affect demand as discussed earlier.

The modelling also takes into account that many people hold more than one qualification, for example, a Certificate IV or Diploma that they then translate into a university degree. The qualifications achieved en route are counted separately. The supply of people with qualifications in the three scenarios is calculated on the basis of a formula including the following factors:

- demographic trends
- trends in age-specific participation rates and completion rates for different qualifications at university and at vocational and education levels I to IV
- projected Year 12 completion rates
- unemployment rates by State or Territory
- a relative wage measure which captures the attractiveness of education-intensive areas of the economy
- trends in multiple qualification-holding.⁸

The modelling of both demand and supply of qualifications is presented in the Access Economics report. The balances – namely, projected demand minus expected supply – are as follows:

⁸ Access Economics (2009) *Economic modelling of skills demand*, draft report p. 24.



Table 6: Three scenarios – difference in qualifications needed (supply of students less labour market demand)

	Open Doors '000		Low-trust Globalisation '000		Flags '000	
To 2015	Demand	770	Demand	645	Demand	540
	<u>Supply</u>	<u>530</u>	<u>Supply</u>	<u>525</u>	<u>Supply</u>	<u>505</u>
	Balance	-240	Balance	-120	Balance	-35
To 2025	Demand	830	Demand	645	Demand	500
	<u>Supply</u>	<u>660</u>	<u>Supply</u>	<u>620</u>	<u>Supply</u>	<u>555</u>
	Balance	-170	Balance	-25	Balance	+55

Source: Access Economics (2009), *Economic modelling of skills demand*, Tables 9.1 to 9.3; rounded figures.

Note: The figures represent the annual average number of qualifications projected in the five years prior to 2015 or 2025.

As well as this aggregated figure, the analysis projects different balances for each type of qualification.

Most of the qualifications deficit is made up of deficits of Diploma, Advanced Diploma and university-level qualifications. Certificate IV and below qualifications are in balance or surplus in all scenarios by 2025.

All scenarios assume skills deepening based mainly on trends over 2001-2008 in the proportion of employed persons with qualifications and partly on the level of productivity increase in each scenario. These assumptions result in varying degrees of mismatch between demand and supply occurring in each scenario.

Open Doors

Open Doors produces a very high level of demand for qualifications from the labour market, and the projected supply of students remains well short of demand, in spite of higher population growth anticipated in that scenario. Excess demand is estimated at 168,000 qualifications in 2025, and a notably higher level of 237,000 in the period to 2015. This excess is largely due to the shortfall in the 18-22 age cohort of students which moderates over the period. The demand for qualified people is not likely to be met based on existing demographic trends in the supply of students, particularly at the higher education end of the spectrum. A significant skills contribution is required from net migration and, beyond that, a structural lift, or intervention, in student participation and completion rates.

Low-trust Globalisation

Low-trust Globalisation also produces an undersupply of qualifications` over time at the higher education end of the spectrum. However, in this scenario, as labour force participation tails off over time (relative to Open Doors), it contributes to slower growth in labour market demand for skills. In the five years to 2025 overall projected supply and demand are seen to move closer towards a balance. Excess demand is estimated at a negligible 25,000 in 2025.



Flags

Flags produces an over-supply of qualifications over the long term to 2025, with an estimated excess of 56,000 qualifications. In the near term to 2015, the slower growth in labour market demand, coupled with relatively less change on the supply side compared to the other scenarios, sees only a moderate level of excess demand of 34,000 qualifications.

Main conclusions

The different scenarios indicate some plausible variations in Australia's economic and social long-term trajectory. The different futures have contrasting implications for both the demand for skills in the economy and the supply of educational qualifications. Demand varies more than supply between the scenarios, with a difference of some 40 per cent or 330,000 qualifications between the Open Doors and Flags worlds by 2025. Supply varies by some 16 per cent in the same period, or just over 100,000 qualifications.

These differences underscore the uncertainties attached to skills planning and suggest the need for an emphasis on the adaptive capacity of our educational institutions. The need for a 'risk minimisation' approach, involving setting priorities and maximising access to information for all parties concerned, is explored through subsequent Sections of this Paper.

In each of the scenarios there appears to be a shortfall in the supply of qualifications which is most pronounced in 2015 and reduces somewhat by 2025. The scenarios do not factor in the qualification targets established by governments (see Appendix A, Table A1), but the analysis suggests that the demand for most targets will exist and many will be achieved within current settings. However, the modelling found relatively weak demand for Certificate III and IV qualifications and below under each scenario with an excess supply predicted at both 2015 and 2025 for all scenarios. In 2025 this oversupply for Certificates I to IV ranges from 112,000 under Flags, 93,000 under Low Trust Globalisation and 38,000 in the Open Doors world.

The degree of mismatch between the supply and demand for qualifications is most marked in the Open Doors scenario. However, the employment growth projection of 2.1 per cent for this scenario is ambitious compared to an average annual growth rate in employment of 1.95 per cent per year during the last three decades. In addition, the Australian Government (Department of Education Employment and Workplace Relations) projections discussed in the next Section anticipate employment growth in the period 2009 to 2014 to be around half of the previous five years growth (see Table 7). On the other hand, employment growth in the past has been constrained by skill shortages, and the recent high migration rates would be continued under Open Doors to support the high employment growth projected. Furthermore, it would seem prudent to plan for something closer to this scenario as it is probably closest to Australia's current policy settings in relation to migration, export orientation, productivity trends and openness in international relations.

The mismatch in the scenarios between demand and supply for skills also provoke questions about the sort of policy interventions that may be appropriate in terms of:

- *Participation levels:* Alternative approaches to attract a greater supply of qualifications/skills other than from young people through the participation of those with lower skills, older students, or discouraged learners



- *Reward*: Consideration of the level and nature of reward for increased skill levels – either in wages, or other flexibility in terms of work conditions
- *Migration solutions to the supply of skills*: The role of the skilled migration component may need to be revisited so there is more direct offsetting or ‘ramping up’ to counteract predicted under-supply of qualifications
- *Demand side responses*: Greater intensification in the effective use of skills and the introduction of alternate solutions to produce high performing work practices.

Possible policy responses to some of these issues are explored in Background Paper Two, *Powering the workplace: Realising Australia’s skills potential*.

A review of government settings for skilled migration (the Migration Occupations in Demand List) is underway.



Section 2: Narrowing the focus on skill needs

This Section narrows the focus from the broad directions of Section 1 to the recent past and shorter-term future.

The Australian Government's (Department of Education Employment and Workplace Relations) occupational and industry projections forecast the shorter-term future from past trends, with adjustments that take into account anticipated changes such as the economic recession, cycles within industry sectors, new initiatives, or regional factors that impact on some industries more than others.

Thus job growth for the five years from May 2009 to 2014 is expected to be just half of the total job growth in the five years to 2009.⁹

Unlike scenarios, they assume the continuation of historic patterns, modified to take into account major events such as the economic recession, or a significant new area of government spending such as the National Broadband Network. Because they are forecasts, a five year time-frame is considered reasonable as opposed to the long-term 15-year projections used in the scenario modelling in Section 1.

The data presented in this Section considers the historical shifts in the structure of Australian employment, and notes some of the key drivers of change and implications for skills. Retail, health care and social assistance, construction, and manufacturing are Australia's largest employing industries, but they have grown at different rates in the last five years, and divergent growth patterns again are expected coming out of the recession into the recovery.

Health care and social assistance, and retail, are expected to continue their role as Australia's major new job generators. They will be joined by education and training, which is expected to account for over 100,000 new jobs to 2014 to become Australia's second-fastest growing industry. Professional, scientific and technical services are also expected to continue their fast growth trajectory, but from a smaller base.

When we look at occupational change, professionals are the key growth group. Rapid growth in recent years makes them the largest occupational category today, and strong growth is projected to continue. There is some evidence that the 'hour-glass' shaped workforce emerging in recent decades is being consolidated, with intermediate-level technician and trades, and clerical and administrative jobs declining relative to both the high and low ends of the workforce.

⁹ Over the period to 2012 to 2013, the Australian Treasury projects annual average employment growth of approximately 1 per cent, with employment forecast to contract by 1½ per cent through 2009 to 2010, then increase by ½ a per cent through 2010 to 2011. Employment growth is then projected to increase annually by 2½ per cent through 2011 to 2012 and 2012 to 2013. DEEWR employment by industry projections to 2013 to 2014 also project annual average employment growth of approximately 1 per cent.

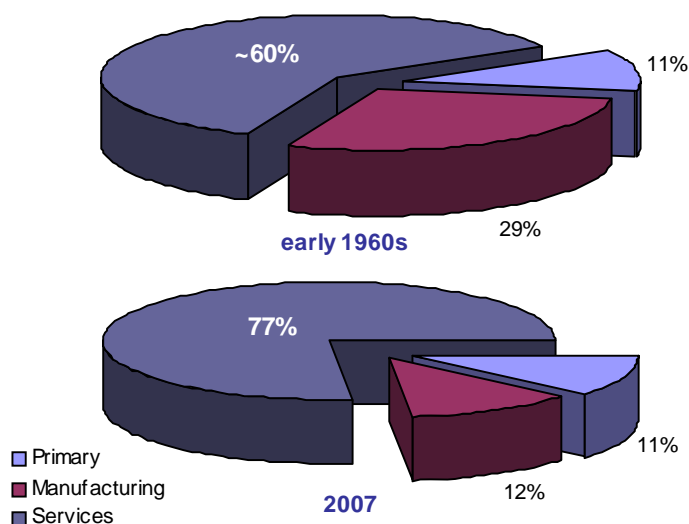


2.1 The shape of Australian industry

Sectoral change

Australia has a strongly services-based economy. Recent decades have seen a decline in the economic contribution of industries producing goods, specifically manufacturing, and an increase in industries that mainly provide services. Graph 1 below shows that the GDP contribution of the primary industries—defined by the ABS as the agricultural and extractive industries—has changed little since the 1960s. This is a common trend in Western countries, and is pronounced in the English-speaking world, as Graph 2 shows.

Graph 1: Sectoral change within the Australian Gross Domestic Product

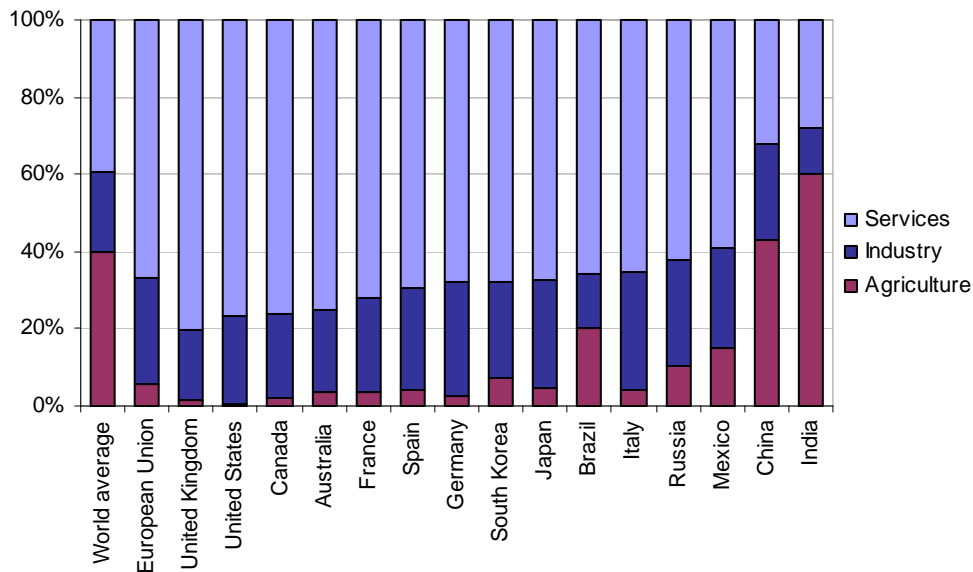


Source: ABS, 5220.0, State Accounts, 2006-07; ABS (2009) *Australian national accounts: national income, expenditure and product*, Cat. no 5206.0.

Note: excludes contribution to GDP by ownership of dwellings and taxes. 'Primary' is agricultural, forestry, fishing and mining; 'services' are all other industries except manufacturing.



Graph 2: Sectoral composition of the workforce, selected countries



Source: CIA (2009), *The world factbook*. All estimates are for 2008 with a few exceptions.

Note: 'Industry' is mining, manufacturing and construction; 'services' are all other industries except agriculture, forestry and fishing.

Factors influencing industry composition

Key drivers of structural change are technology, changes in the pattern of demand as incomes increase, and the forces of competition and trade in an increasingly interconnected global economy. Structural change can also be driven by demography, such as population ageing with its associated demand for health and community services.

Changes imposed by government in response to economic or social conditions also play a part.¹⁰ A current example would be the impact of the Carbon Pollution Reduction Scheme and renewable energy targets on various sub-sectors within energy and resources industries, although the shift to a low-carbon economy could equally be seen as structural change induced by nature.

At the broadest level, the shift from an economy where manufacturing and primary industry are large employers to an economy dominated by services has had immense impacts on the skills needed in the workplace. Pappas¹¹ has mapped Australian skills trends from 1975 to 1995 and found that the use of cognitive and interactive skills has grown rapidly since the mid-1980s, while the use of motor skills has declined. There have also been changes in the type of interactive skills demanded. The growth of hospitality, retail and personal services work has brought about a new emphasis on workers' appearance, personal style and how they manage the emotional demands of relating to customers – so-called 'soft skills' which are typically acquired outside the classroom and have a controversial place in the formal education and training system.

¹⁰ Richardson, Sue and Tan, Yan (2007) Forecasting future demands: what we can and cannot know, NCVER, p. 22.

¹¹ Pappas, Nick (1998), 'Changes in the demand for skilled labour in Australia', in Sheehan, Peter and Tegar, Greg (eds), *Working for the future: Technology and employment in the global knowledge economy*, Victoria University Press, Melbourne.



Lowry et al¹² argue that the trend to more use of cognitive and interactive skills is likely to increase, based on assigning skill type scores to growth occupations and industries, although they also note the complexity and diversity *within* each industry.

Another way of viewing broad industry trends is to consider their relationship to the global economy. In the early 2000s, Shah and Burke¹³ (following Maglen) investigated the 'vulnerability' of different types of jobs, meaning the extent to which jobs were at risk of being substituted for by work located elsewhere in the world. They argue that some occupations (such as those of scientists, or managers and professionals in the finance, property services, media and creative industries) are advantageously exposed to international competition, leading to growth. Others, such as tradespeople and routine clerical workers, are vulnerable to having overseas-produced products and outsourced services substituted for their work.

A third group supplies personal services to a domestic market and is not easily substituted. This group ranges from doctors and teachers to real estate agents, bus drivers and sales assistants. Shah and Burke forecast that job growth would be greatest in 'globally advantaged' and 'insulated' industries, where four out of five new jobs were anticipated.¹⁴

Richardson and Tan note that increased global competition tends to reduce the demand for low-skilled work in Australia, spawning part-time jobs, while Toner shows that global pressures even on the relatively insulated construction industry operate to alter the size and structure of firms, and the quality and security of employment.

Overall globalisation may well have a positive effect on the number of Australian jobs. The transfer of jobs to developing countries leads to an increase in incomes and demand in those countries. Their imports can then be expected to rise as fast as their exports unless their savings rise faster than their investment, but in the long run such an imbalance between savings and investment is unlikely to be sustained. So, among the developed countries, it can be expected that the job losses from rising imports would be replaced by new jobs in the rising export industries. Furthermore, the experience of globalisation and the lowering of trade barriers is that it has a dynamic impact on economic growth. Thus the main impact of globalisation is faster economic growth and a shift in the structure of jobs in favour of those where Australia has a comparative advantage, which tends to be in those industries employing higher-level skills.

Finally, it is important to note the significant but complex impact of technology on industries and occupations. The impact of information and communication technologies (ICTs) has in particular been associated with greater demand for skilled workers, especially analysts to use the new information made available, while at the same time de-skilling other jobs. In manufacturing, job loss has been strongly associated with improved productivity resulting from technological change, while the administrative work of middle managers and advanced clerical workers is vulnerable to substitution by computer-based systems.

The centralisation of authority and reduction in the number of organisational layers (usually middle management) is often facilitated by computerisation in enterprises studied

¹² Lowry, Diannah, Molloy, Simon and McGlennon, Samuel (2008), 'Future skill needs: projections and employers' views', *Australian Bulletin of Labour*, Vol 34, Issue 2, pp. 213-215.

¹³ Shah, Chandra and Burke, Gerald (2003), *Changing skill requirements in the Australian labour force in a knowledge economy*, CEET Working Paper No. 48, Monash University.

¹⁴ Shah and Burke (2003) p. iii.



by researchers. However, research studies tend to produce divergent conclusions about how ICT affects the roles of managers who remain, showing that sometimes, management jobs become more complex and varied, while in other cases, they become more routinised and less skilful.¹⁵ There is substantial agreement that new technology's impact on work in any instance is dependent on a broad set of factors, including the reason for its introduction, how the technology is developed and implemented, and management philosophy.

In 2000, Productivity Commission modelling found that the more technology intensive an industry, the more likely it is to have high skilled workers making up a large proportion of its total wages bill. Research and development intensity and capital intensity were used as proxies for the level of technology. However, the results showed considerable inter-industry variation, with the relationship between technology and skill most pronounced in the communications and manufacturing sectors. In other industries, such as government services and utilities, 'the adoption of technological change appears to be used primarily as a means of substituting for skilled workers'.¹⁶

2.2 Current industry trends

Recent and projected industry trends

Six industries accounted for nearly three-quarters of the new jobs created in the five years to May 2009. Today they account for half of total employment (see Table 5 over). Ranked from largest to smallest contributor to recent job growth, these are:

- health care and social assistance
- construction
- professional, scientific and technical services
- transport, postal and warehousing
- retail
- public administration and safety (including defence).

The other large industries in terms of current employment are manufacturing, and education and training. But these showed weaker recent growth, and in the case of manufacturing, job losses. The following industries also showed weak recent job growth:

- agriculture, forestry and fishing
- rental, hiring and real estate services
- information, media and telecommunications
- administrative and support services
- wholesale trade.

¹⁵ See, e.g. Pinsonneault, Alain and Kraemer, Kenneth (1993) 'The impact of information technology on middle managers', *Management Information Systems Quarterly*, Vol 17, no. 3, pp. 271-292; and Liker, Jeffrey, Haddad, Carol and Karlin, Jennifer (1999), 'Perspectives on technology and work organisation', *Annual Review of Sociology*, Vol 25, pp. 575-596.

¹⁶ De Laine, Craig, Laplagne, Patrick and Stone, Susan (2000), *The increasing demand for skilled workers in Australia: the role of technical change*, Productivity Commission Staff research paper, p. 51.



More detailed analysis would be needed to identify the proportion of the slower growth in employment that was due to technological change.

Government projections for future employment growth to 2013 to 2014 are also shown in Table 7. The industries expected to grow in the next five years in order of greatest to least contribution to overall job growth are:

- health care and social assistance
- education and training
- retail
- professional, scientific and technical services
- accommodation and food services.

Two of these – health care and social assistance; and professional, scientific and technical services – are projected by Access modelling as exhibiting long-term growth, regardless of which world eventuates (see Section 1).



Table 7: Past and future employment growth by industry

Industry	Employed May 2009 '000	Share May 2009 %	Five-year job growth			
			Past growth		Future growth	
			5 years to May 2009 '000	Share of past 5 years growth %	Future (to 2013-14) '000	Share of future growth %
Agriculture, forestry and fishing	358	3	0	0	35	6
Mining	157	1	55	5	-12	-2
Manufacturing	997	9	-54	-5	-61	-11
Electricity, gas, water and waste services	140	1	50	4	8	1
Construction	985	9	195	16	8	1
Wholesale trade	395	4	13	1	-9	-2
Retail trade	1,210	11	108	9	68	12
Accommodation and food services	712	7	55	5	50	9
Transport, postal and warehousing	602	6	116	10	40	7
Information media and telecommunications	223	2	5	0	9	2
Financial and insurance services	388	4	40	3	7	1
Rental, hiring and real estate services	178	2	1	0	8	2
Professional, scientific and technical services	767	7	140	12	54	10
Administrative and support services	347	3	8	1	16	3
Public administration and safety	685	6	91	8	23	4
Education and training	790	7	77	6	101	18
Health care and social assistance	1,172	11	208	17	182	33
Arts and recreation services	212	2	57	5	16	3
Other services	444	4	24	2	8	1
Total	10,763	100	1,188	100	551	100

Source: DEEWR analysis and projections using trend data, ABS Cat no: 6291.0.55.003

Population: Employed people.

Developed during the current economic recession, the five-year projections indicate areas of both continuity and discontinuity with past growth trends. The current recession is not expected to disrupt the continued expansion of the health and social assistance industry, or growth in professional services. Health care and social assistance is expected to provide one-third of all new jobs over the next five years to become Australia's largest employer.

Education and training is expected to grow at a much faster pace than in the recent past as a consequence of new government education and training policies. Employment in agriculture, forestry and fishing is anticipated to increase again following the easing of the drought in several parts of Australia and the growth of marine industries.

Although construction accounted for 16 per cent of total job growth in the period 2004 to 2009, it is expected to grow very little in the period 2009 to 2014. Mining is expected to

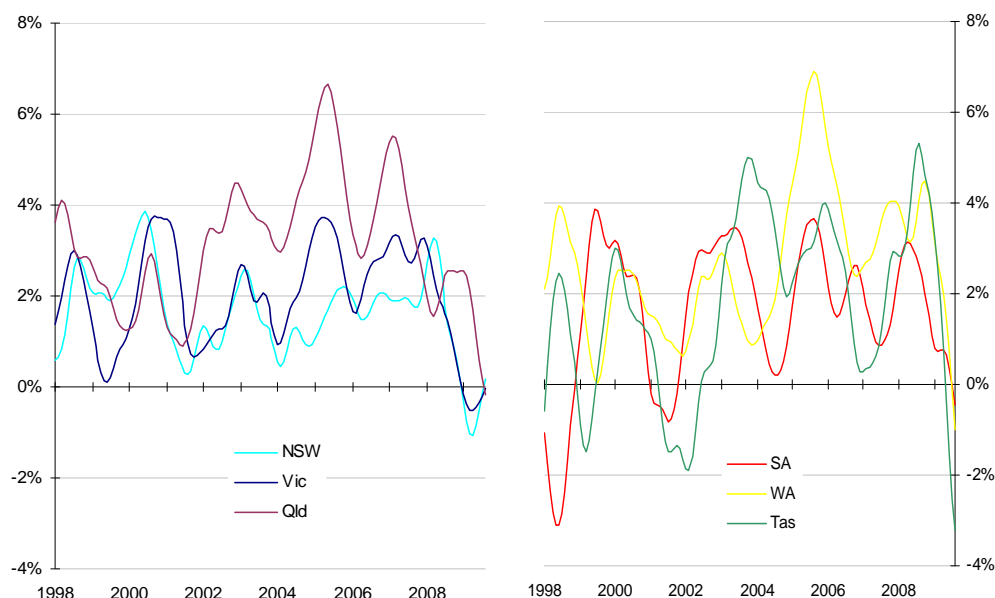


lose jobs, after the rapid growth of recent years. The retail industry's 12 per cent projected growth is similar to recent past trends.

These data reflect national, aggregate trends. There are marked State and Territory differences in patterns of industry change. Although the Queensland workforce is significantly smaller than that of NSW and Victoria, since 1998, more mining, manufacturing and construction jobs have been created in Queensland than in the other two states.

Western Australia and Queensland had the largest growth in mining employment, while in NSW and Victoria the richest source of jobs since 1998 has been in retail, health and social assistance and property and business services. NSW, and to a lesser extent Victoria, experienced major job loss in its manufacturing workforce. The drought adversely affected NSW and Queensland with severe agricultural industries job losses over the last ten years in the former and last five years in the latter. Analysis by the Reserve Bank reveals the variations in regional employment growth and economic performance since 2000 (see Graph 3).

Graph 3: Employment growth by State January 1998 – August 2009



Source: Australian Bureau of Statistics, *Labour Force*, August 2009, Australia (by State), trend estimates, Cat. no. 6202.0

Commentary during the recent resources boom period reflected on Australia's 'dual' economy. Treasury noted that this experience was not exceptional: 'Australia has long been a two speed economy as a result of the higher population growth in the mining states. Differences in state employment and output growth have been larger than average in recent years'.¹⁷ The Reserve Bank of Australia noted the recent period of economic expansion to 2008 was broadly experienced and shared across the states, but the spending growth in the resource-rich states of Western Australia and Queensland mostly reflected the stimulus of higher commodity prices over this period and the associated reallocation of resources.¹⁸

¹⁷ Australian Treasury (2008), 'The resources boom and the two speed economy', *Economic Roundup* Issue 3.

¹⁸ Reserve Bank of Australia (2008), *Regional Economic Performance*
http://www.rba.gov.au/PublicationsAndResearch/Bulletin/bu_may08/reg_eco_perf.html



These regional variations indicate the local dynamics necessitating the ongoing role of the finer grained workforce planning analyses prepared by States and Territories to respond to particular regional economic and social trends.

Recent and projected occupational trends

Section 1 reported that the scenario modelling found professionals, and community and personal service workers, to be the two occupations showing strong growth to 2025 whatever scenario eventuates. The Australian Government's (Department of Education, Employment and Workplace Relations) forecasts show a similar picture for the next five years and also show strong growth for managers (see Table 8).

Table 8: Past and future employment growth by occupation

Occupation	Employed May 2009 '000's	Share May 2009 %	Five-year job growth			
			Past growth		Future growth	
			5 years to May 2009 '000s	Share of past 5 years growth %	Future (to 2013- 2014) '000s	Share of future growth %
Managers	1,413	13	241	21	89	15
Professionals	2,194	20	280	24	193	33
Technicians & trades workers	1,630	15	183	16	40	7
Community & personal service workers	977	9	156	14	95	16
Clerical and administrative workers	1,679	16	175	15	72	12
Sales workers	1,008	9	28	2	43	7
Machinery operators & drivers	695	6	49	4	27	5
Labourers	1,148	11	45	4	29	5

Source: ABS *Labour force survey, Australia*, quarterly, Cat. no 6291.0.55.003, DEEWR trend data.

Population: Employed people aged 15 years and over (ANZSCO major groups)

Professionals have been the fastest growing occupation in the five years to 2009, accounting for nearly one-quarter of recent job growth (see Table 8). It is today Australia's largest occupational group, and fast growth relative to other occupations is expected to continue. More detailed data show that this growth has been driven primarily by an increase in the number of business, human resources and marketing professionals. Professionals, and particularly those working in finance and health, are again expected to contribute the most to future occupational growth in the next five years. The Australian Government's commitment to increase the proportion of 25 to 34 year olds with bachelor level or above qualifications to 40 per cent by 2025 is likely to reinforce this trend. In addition the high replacement rate of older workforces in industries such as education and training will also impact on this trend.

The individual professions where the most new jobs are expected in the period 2009 to 2014 are (in order):

- registered nurses
- accountants
- high-school teachers.



The occupational group of managers has also grown quickly over the last five years, while the lower-skilled occupations: sales workers; machinery operators and drivers; and labourers, showed lower growth. The lowest-skilled occupational groups (sales workers, machinery operators and drivers and labourers) account for 26 per cent of the workforce today, while the two highest-skilled groups (managers and professionals) account for 33 per cent. The two largest groups in size after managers – technicians and tradespeople, and clerical and administrative workers – remained more or less stable relative to other groups.

Projections to 2013 to 2014 also show divergent trajectories for the occupational groups. Much lower growth is forecast for technicians and tradespeople. Clerical and administrative workers and salespeople will roughly maintain their share of employment. Community and personal service workers will contribute 16 per cent of job growth, although they currently account for 9 per cent of the workforce.

These data and projections demonstrate continuation of the gradual longer-term trend that has seen growth in high-skilled jobs. Between 1997 and 2007, people employed in occupations associated with high-level skills and qualifications (managers and professionals) increased from 25 per cent to 28 per cent of the employed workforce. Those employed in the lowest skill level occupations (labourers, and elementary sales, service and clerical workers) decreased from 20 to 18 per cent.¹⁹ However, Australia's industry trends and the occupational projections indicate that lower-skilled work will continue to grow as well.

There are signs that the polarisation of the skill distribution characteristic of the last two decades will continue. The emergence of an hour-glass shaped or bifurcated workforce has been identified by researchers who have studied job skill levels and those focusing on Australia's income distribution. Keating found that the widening dispersion of earnings is principally due to changes in the composition of employment in favour of more skilled jobs and that this has increased in the last 25 years.²⁰ Cully also notes:

*Income inequality has risen. Jobs in the middle of the income distribution have fallen while those at either end of the distribution have risen substantially.*²¹

He observes in relation to Australia's changing job composition between 1986 and 2001 that 'there is a real cleavage in the range of jobs on offer, with full-time, high-paid work concentrated at the top end, and part-time, low-paid work concentrated at the bottom end'.²²

The following two graphs overleaf, 4 and 5, show more high skilled jobs in the 'high growth' than in the 'low growth' group but also show that there are jobs of diverse skill levels in each group. They also show the non-linear nature of job growth and decline.

High growth occupations included judges, chief executives and carers and aides; while low growth ones include farm managers and secretaries, as well as process workers and labourers. In the future, carers and aides, waiters, sales assistants, and some drivers and store people are the lower-skill occupations expected to grow most quickly.

¹⁹ ABS (2008) *Australian social trends*, Cat no. 4102.0, Work summary.

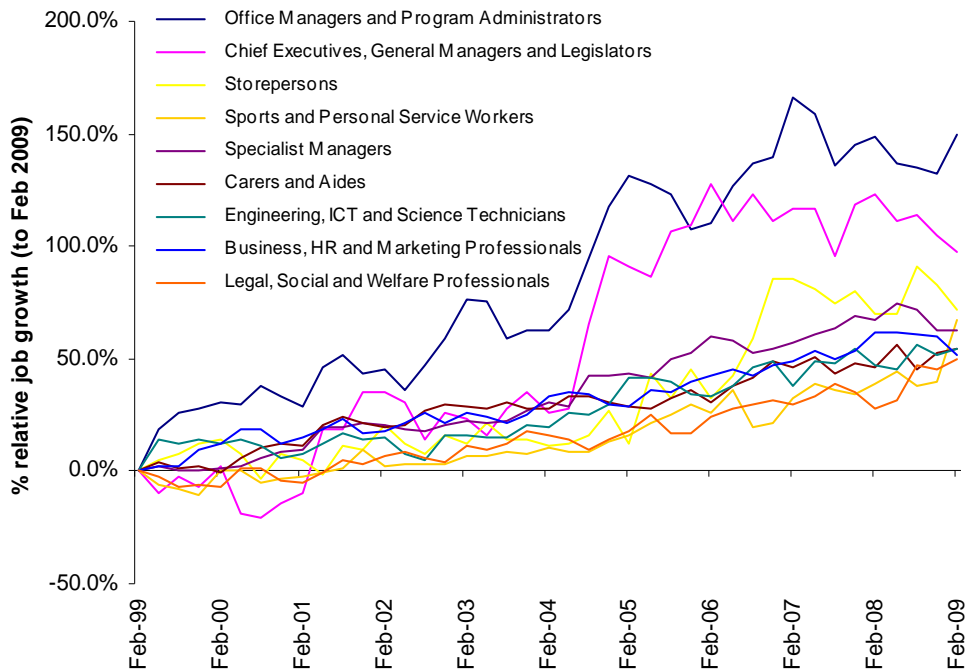
²⁰ Keating, Michael (2003) 'The labour market and Inequality' *The Australian Economic Review*, Vol 36, no 4, pp. 374-96.

²¹ Cully, Mark (2003) *Pathways to knowledge work*, NCVET, p. 46.

²² Cully, (2003) p. 10.



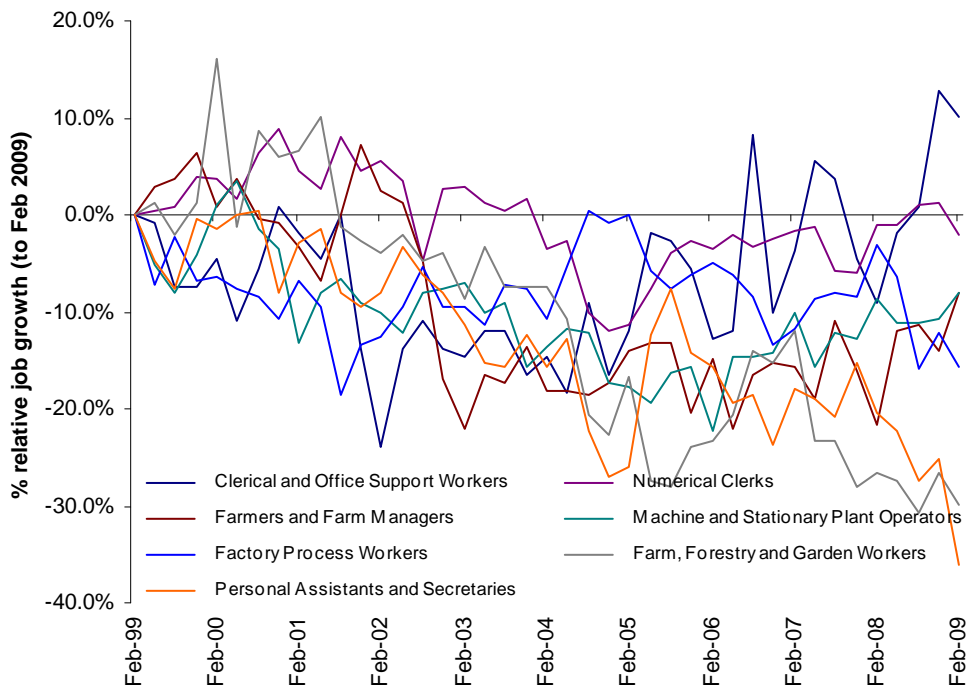
Graph 4: High-growth occupations February 1999 to February 2009



Source: ABS *Labour force survey, Australia*, Detailed, Quarterly, Feb 2009, ABS Cat. No. 6291.0.55.003.

Population: Employed people aged 15 years and over.

Graph 5: Low-growth occupations February 1999 to February 2009



Source: ABS *Labour force survey, Australia*, Detailed, Quarterly, Feb 2009, ABS Cat. no. 6291.0.55.003.

Population: Employed people aged 15 years and over.



Main conclusions

Looking at what jobs have grown and reduced relative to others casts a helpful light on the overall shape of the Australian economy and the direction in which it is travelling.

Already strongly services-centred, recent and projected trends over the next five years suggest that this feature of the Australian economy will continue. The loss of intermediate jobs that commentators have observed in recent decades also seems likely to continue, and is evident through the slower growth in technical and tradespeople, and clerical and administrative jobs, compared to others. It is also clear that high-skilled professional and manager jobs will continue to grow quickly.

However, these trends, like the ones described in Section 1, should be understood as broad indicators rather than a guide to planning. They are like the global weather systems such as the Gulf Stream and El Niño that have long-term, but variable effects. Local weather observations, reporting and predictions are also required.

One reason is that there is more variation *within* any broad occupational group than there is *between* groups. Technicians and tradespeople, for example, are projected to grow by 11 per cent in the period 2009 to 2014. However, as documented in Job Outlook,²³ air-conditioning and performing arts technicians, specialised building and engineering technicians, electrical engineering draftspersons, wall and floor tilers and sign writers all perform well and current projections for their growth are of over 40 per cent.

A second equally obvious reason is that the industries and jobs, and demand for skills, are unevenly distributed around Australia. Local, state and regional needs will differ significantly from the national aggregate figures.

Issues for discussion

The question ‘which jobs and skills should we plan for?’ therefore needs to be accompanied by other questions such as:

- ***do the key agents in educational planning have access to the type and amount of information they need, and the know-how to use it?***
- ***what is the appropriate division of responsibilities and roles between all of those who influence educational offerings and choices?***
- ***are our systems sufficiently adaptive to respond effectively to continuing change?***

The next Section describes some indicators of our current educational and training performance before returning to the question of most appropriate responses for government policy regarding Australia’s skill needs in the future.

²³ DEEWR Job Outlook at www.joboutlook.gov.au is an online data base containing current and projected future information on jobs.



Section 3: Current trends in education and skills

This Section presents a snap shot of the education and skills of Australia's workforce. It describes student enrolments and how the qualifications profile of the population is changing.

Educational participation has been growing in recent decades, with the result that today's workforce is more qualified than in the past. University enrolments and qualifications have grown substantially since 2001. By 2008, over 50 per cent of people in the 15 to 64 year age bracket and 60 per cent of employed people had a post-school qualification. Despite this rising educational participation, functional literacy and numeracy levels in the population and the workforce are low and have improved little since 1996.

Clearly, gaining a qualification is not the main or only way that people learn work-related skills. The high-level cognitive and interpersonal skills many employers desire are only imperfectly linked with qualifications. And much of the skill and knowledge needed to perform effectively in a job is learned in the workplace from managers and co-workers, over time. There it may be supplemented by more formal, but not necessarily accredited, training and also by education that people pursue outside work.

This Section reviews some of the available data on adult learning and work-related training, noting that this simple term has a variety of meanings. Australians aged over twenty-five generally participate strongly in continuing learning, although some data suggests a recent decline in employer-provided training levels and, over a longer time-frame, in the average duration of courses.

Access to work-related learning is greater for those who are already better-educated and in higher status jobs. The growing numbers of people in non-standard forms of employment – part-time and casual work – have relatively fewer continuing learning opportunities, as do employees in small workplaces. This is a particular concern given the anticipated growth in industries such as the health and social assistance industry, where currently over half a million people work part-time.

A summary is provided of Australia's current tertiary education and training outlays by the federal government as a backdrop for any future discussions about the allocation of funds. A key issue is whether the total funds available are adequate to meet demands in terms of numbers. Equally important is whether public spending is sufficient to provide high quality education and training outcomes, and to meet the needs of different groups in the population. Efficiency, and the appropriate division of responsibility across individuals, government and employers, are also important considerations. Current employer spending on training is not available, but data from the last (2002) ABS survey on the topic is included.



3.1 Formal education and training

Participation

The proportion of young people at school after the compulsory years grew between 1970 and 1990, with growth virtually ceasing in the late 1990s and early 21st century.

In 1971, just 48 per cent of 16 year olds were attending school compared to 84 per cent in 2006. Similarly, 40 per cent of 17 year olds were at school compared to the 2006 figure of 67 per cent.²⁴

The educational participation of 15 to 24 year olds in further education rose slightly by 3 per cent to 24 per cent in the ten year period to 2006, with the increase due to more people studying at university.²⁵ Enrolments in vocational education and training have changed little in recent years, domestic student numbers in university have increased on average by over 1 per cent per annum and overseas student number have grown over 7 per cent per annum as shown in Table 9.

Table 9: Domestic and overseas student enrolments in higher education and VET 2001 to 2007

	2002	2004	2006	2008	Change 2002 to 2008
Higher education	000's	000's	000's	000's	2008
Domestic	712	716	733	772	8%
Overseas (includes-off shore)	185	229	251	294	59%
Total higher education	897	945	984	1,066	19%
Vocational education and training					
Domestic	1,662	1,585	1,651	1,657	0%
Overseas fee paying ¹	21	21	25	39	86%
Total VET	1,683	1,606	1,676	1,696	1%

Sources: DEEWR, Higher Education Statistics Collections, *All students by state, higher education provider, citizenship and residence status*; and NCVER, *Students and Courses 2008 and 2001 for VET statistics, Major funding of VET training by provider type*

1. This is only a small proportion of the total overseas student population – see Table 10.

Discrepancies in totals are due to rounding

More so than in the past, people's participation in further education and study traverses their whole life course. In 2007, the majority – 55 per cent of currently enrolled VET students and 40 per cent of domestic university students – were aged over 25.²⁶

²⁴ ABS (2009) The Statistician's report: a picture of the nation, Cat no. 2070, p. 117.

²⁵ ABS, Census data 1996, 2001 and 2006 – includes people studying in technical and further education (including TAFE) and higher education.

²⁶ HILDA, Release 7. This paper uses unit record data from the Household, Income and Labour Dynamics in Australia (HILDA) Survey. The HILDA Project was initiated and is funded by the Australian Government Department of Families, Housing, Community Services and Indigenous Affairs (FaHCSIA) and is managed by the Melbourne Institute of Applied Economic and Social Research (MIAESR). The findings and views reported in this paper, however, are those of the authors and should not be attributed to either FaHCSIA or the MIAESR.



Young adults (20 to 29 years) in particular have increased their participation in full or part-time study. Census data shows over a third (35 per cent) of 20 to 24 year olds and one-sixth (15 per cent) of 25 to 29 year olds were studying in 2006.²⁷

It is expected that student numbers in universities will expand noticeably in the next few years with the removal of caps on the number of places as recommended in the Bradley report. Total student numbers in the VET sector are likely to be at least 10 per cent higher in 2009 and after as the Productivity Places Program is fully implemented. It provides places for job seekers and for existing workers. This program initiated and funded substantially by the Commonwealth, and also supported through State and Territory funding, provides for an additional 711,000 places over four and a half years to 2011-12 (see Appendix B, Table B2). From July 2009 it is administered through the States and Territories.

The very rapid growth in overseas students is also shown in Table 9. While domestic students in higher education grew by 8 per cent over the period, the increase in overseas students was nearly 60 per cent. Overseas students now make up over one quarter of the higher education student body.

Table 10 shows the number of international students on visas. In the VET sector, as in higher education, there has been an especially rapid increase in international students since 2006 but most of them are with private providers and not recorded in the NCVET statistics in Table 9.

Table 10: Onshore international students to November of year, 2002 to 2008

	2002	2004	2006	2008	Change 2002–08
	'000	'000	'000	'000	%
Higher education	115	151	170	183	59
VET	53	58	82	173	226
Schools	23	27	24	29	24
ELICOS ¹	56	61	75	122	117
Other	24	26	26	31	30
Total	271	322	377	538	98

Population: Excludes people with off-shore visas. Source: Australian Education International.

1. English Language Intensive Courses for Overseas Students

Changes in migration policy early in 2009 may affect the size of skilled migration in the near future, including the number of international students who obtain permanent residence.

Course completions

Course completions since 2001 have grown slightly faster than the increase in total enrolments described above. Higher education completions increased by 32 per cent and VET by 5 per cent in the 2001 to 2007 period (see Table 11).

²⁷ ABS (2009) p.125.



However, within higher education most of the growth is in post-graduate courses. In the VET sector the main growth has been at Certificate III with small decline in graduate numbers at the diploma level and at Certificate II.

Table 11: Course completions, Australia 2001 to 2007

	Number of students				Change
	2001	2003	2005	2007	2001–07
	'000s	'000s	'000s	'000s	%
Higher education					
<i>Domestic students</i>					
Graduate qualifications	43	48	52	54	26
Undergraduate qualifications	103	109	111	111	8
Total	146	157	163	166	14
<i>Overseas students</i>					
Graduate qualifications	19	29	35	38	102
Undergraduate qualifications	22	29	34	43	95
Total	41	58	69	82	98
<i>All students</i>					
Graduate qualifications	62	77	87	93	49
Undergraduate qualifications	125	138	145	155	24
Total	187	215	232	248	32
VET (all students)					
Advanced diploma	7	9	9	7	0
Diploma	26	30	30	25	-4
Certificate IV	46	53	54	44	-4
Certificate III	83	96	108	99	19
Certificate II	73	63	59	64	-12
Certificate I	15	16	17	21	40
Total	249	267	280	261	5

Source: NCVET for the VET data; DEEWR for higher education data.

Population: Domestic and overseas students.

Apprenticeships and traineeships

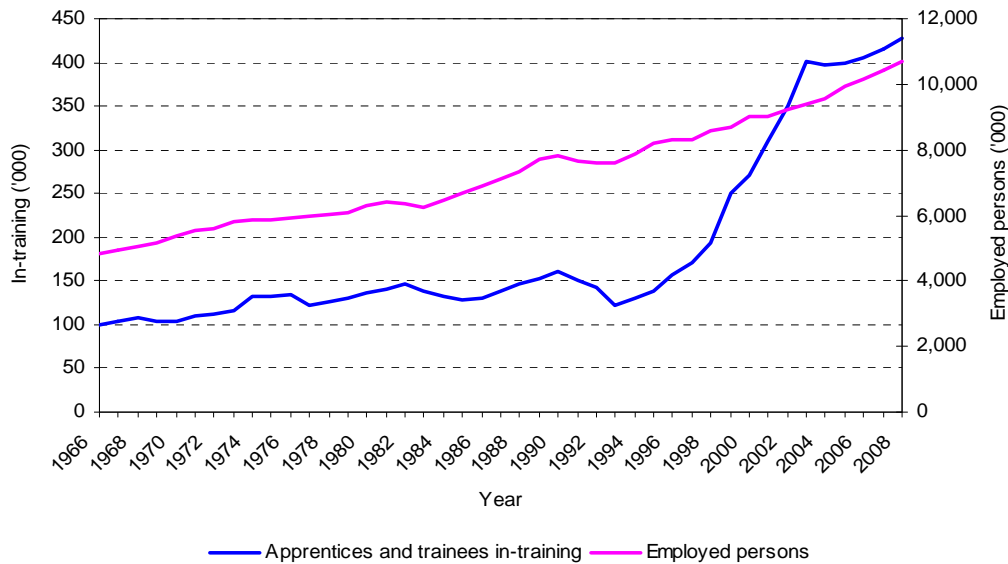
Apprenticeships are perhaps the best known form of vocational training. Their distinctiveness lies in the following:

- the contract of training and employment
- their outcome (a Certificate II or III qualification)
- the formal, regulated relationship that exists between the workplace and the educational institution.



Graph 6 shows the overall trends in apprenticeships and traineeships over the decades since the 1960s, and shows the increase since 2002 in relation to employed persons. Within traditional trades, apprentice training rates have grown steadily since the lows of the late 1990s, and are shown in Appendix B Table B3.

Graph 6: Apprentices and trainees in training and employed persons 1966 to 2008



Source: Woyzbun, Kirsty, 'A brief history of apprenticeships and traineeships in Australia', unpublished draft, NCVET.

Although apprenticeships traditionally are associated with young people, collectively apprenticeships and traineeships are today a form of training undertaken by people of all ages. In 2008, 47 per cent of apprenticeship and traineeship completions were achieved by people aged 25 years and over (Graph 7).²⁸

Apprentices and traineeship completions represent more than half the completions in vocational education annually. The completion rate of apprentices and trainees who started training in 2003 was a little under 50 per cent.²⁹ Precise data on completion rates in other vocational courses are not available but appear to be lower than for apprentices and trainees. State plans for vocational education stress the importance of apprentices and trainees to skill provision and also the need to lift completion rates.

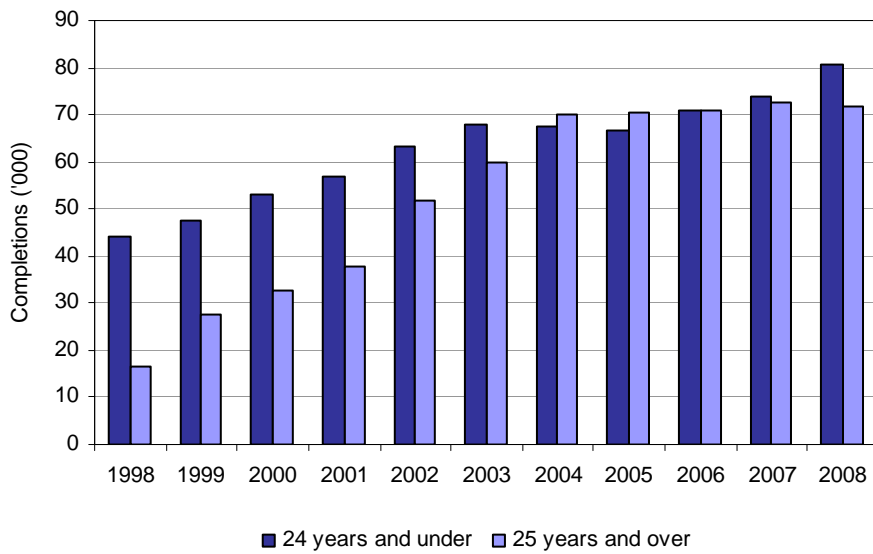
As noted in Section 3.3, Table 20 expenditure on apprenticeships and traineeship incentives now exceed \$1 billion a year and supports the employment and workplace training of about 400,000 apprentices and trainees. This mode of structured work-based training for both new entrants and existing workers and the significant national effort it represents, presents a potential avenue to progress a broader based approach to workforce development. In those workplaces where such contracts of training exist it could be possible to consider aligning whole of workplace diagnostics with the development of individual training plans. The alignment of programs is discussed further in Background Paper Two.

²⁸ NCVET (2009) Apprentices and trainees, December quarter, 2008, Table 16.

²⁹ NCVET (2009) Australian vocational education and training statistics: Apprentices and trainees, 2008 - Annual.



Graph 7: Apprentice and trainee completions by age 1998 to 2008



Source: NCVET unpublished statistics, Apprenticeship collection.

Population: Numbers of people ('000s) completing an apprenticeship or traineeship by age per year.

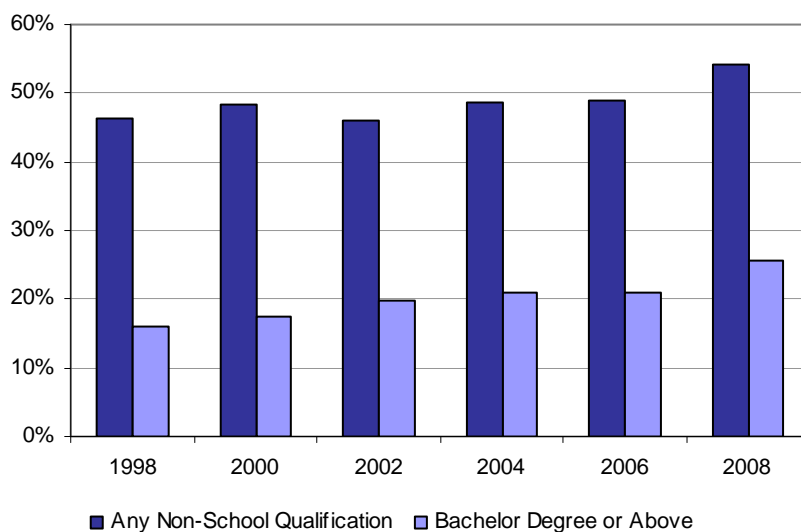
Educational attainment

The percentage of people in the 20 to 64 age group who had a post-school educational qualification rose from 46 per cent to 54 per cent over the decade to 2008. The share with a university bachelor degree or higher grew most quickly, increasing from 16 per cent in 1998 to 26 per cent in 2008. This rise is considered to result from the increase in domestic students who complete courses, the large increase in overseas student completions (of whom about one-third have remained in Australia)³⁰ and other skilled migration (see Graph 8).

³⁰ Birrell, Bob (2009), personal communication, 4.9.2009.



Graph 8: Percentage of the adult population with qualifications 1998 to 2008



Population: People aged 20 to 64 years. Source: ABS *Education and work* Cat no. 6227.

Fields of study

Table 12 below shows the fields in which people have obtained tertiary qualifications ranked from most to least numerous. The data relate to the fields in which people have qualified, and consequently, they reflect diverse completion rates across the different fields of study, as well as student interest in different courses and the capacity of educational institutions to offer places.

Management and commerce is the most common field at all levels except the trade and intermediate levels (Certificates III and IV). Engineering and related technologies are the next most frequent area of qualification (this mainly reflects male outcomes). Architecture and building are comparatively infrequently studied at university level, but pursued at the trades level where construction trades form the second most common choice. With the natural sciences, the situation is reversed – they are well-represented among higher education qualifications, but not at VET level.

The strong level of completions in management and engineering technologies, and the construction trades, are consistent with the occupational and industrial trends described in Section 2, and with the Government's stated priority areas such as space, marine, the sustainability of the built environment, energy, water, digital and clean energy.

However, age-differentiated data indicates that course completions in engineering and related technologies are falling. While 38 per cent of older men (55 to 64 years) had engineering and related qualifications, fewer (31 per cent) of younger men (25 to 34 years) had these same qualifications. While the average higher education completion rate is 72 per cent, it is 48 per cent for engineering.



Table 12: Field and level of highest non-school qualification, 2008

<i>Field of study</i>	Level of highest non-school qualification					<i>Total^(b)</i>
	<i>Bachelor degree or higher</i>	<i>Advanced diploma/diploma</i>	<i>Certificate III-IV</i>	<i>Certificate I-II</i>	<i>Other^(a)</i>	
	%	%	%	%	%	'000
Management and commerce	21	32	15	39	27	1,682
Engineering & related technologies	9	9	35	18	16	1,333
Society and culture	18	12	9	7	12	987
Health	14	12	5	4	11	738
Education	14	7	2	0	4	571
Architecture and building	2	3	15	5	7	486
Food, hospitality and personal services	0	6	12	13	8	473
Creative arts	6	7	2	2	4	329
Natural and physical sciences	8	2	0	1	2	280
Information technology	5	5	1	4	3	278
Agriculture, environmental and related studies	2	3	3	6	3	204
Field not determined	2	1	0	1	2	102
Mixed field programs	0	0	0	1	1	10
Total (%)	100	100	100	100	100	-
Total ('000)	3,037	1,235	2,233	596	371	7,472

Source: ABS (2008) *Survey of education and work 2008*, Cat no. 6227.0.

Population: People aged 15-64 years with non-school qualifications (educational attainments other than those of pre-primary, primary or secondary).

(a) Includes people with other types of non-school certificates and qualifications (where level is not determined, or certificate is not further defined).

(b) Includes people whose field is not stated or inadequately described. May not sum exactly due to rounding.

Among women, education, health and society and culture are equally popular after the most commonly studied field, management and commerce.³¹ This is consistent with the growth in these areas in recent years.

Again, however, there is some contrary evidence. Health and education are of declining comparative interest, reflecting the broadening of women's vocational options over time. Women with qualifications in the field of education made up 17 per cent of those aged between 55 and 64 years, but only 8 per cent of the younger age group.³² Table 13 below also shows the lower than average growth in education over the last decade; a point of relevance given the projection in Table 7 for a significantly enlarged education workforce by 2014, the largest after health care occupations, with an anticipated 18 per cent share of growth.

³¹ ABS (2008) *Australian social trends 2007*, Cat no. 4102.0, p 101.

³² ABS (2008), p 103.



Table 13 indicates the fields of study where higher education and VET course completions have grown the most over the last several years. Higher education course completions showing increases include the creative arts, health and building while those showing a decline or least growth are information technology, agriculture and engineering. VET course completions experiencing recent increases are architecture and building and mixed field programmes. Information technology reduced significantly in the period by 66 per cent

Table 13: Course completions and fields of study, higher education 2002 to 2007 and VET 2002 to 2008

Higher education course completions (domestic students) ¹	2002	2007	%Change 2002 to 2007
Field of study	000's	000's	
Creative arts	9,753	12,353	27
Health	20,585	25,493	24
Architecture and building	2,860	3,520	23
Society and culture	34,432	40,973	19
Natural and physical sciences	12,561	13,851	10
Education	21,837	23,803	9
Management and commerce	34,291	36,612	7
Food, hospitality and personal services	26	27	4
Engineering and related technologies	7,686	7,941	3
Agriculture, environmental and related studies	3,473	2,938	-15
Information technology	9,494	5,606	-41
Total	151,552	165,930	9
Vocation education and training course completions (all students) ²	2002	2008	%Change 2002 to 2008
Field of study	000's	000's	
Architecture and building	9,100	16,100	77
Mixed field programmes	12,900	19,000	47
Food, hospitality and personal services	26,900	32,800	22
Engineering and related technologies	39,500	47,600	21
Management and commerce	80,800	95,500	18
Natural and physical sciences	1,300	1,500	15
Society and culture	46,700	47,900	3
Creative arts	9,300	9,200	-1
Health	13,800	12,200	-12
Education	17,100	14,900	-13
Agriculture, environmental and related studies	13,600	11,300	-17
Information technology	18,800	6,300	-66
Total	289,900	314,300	8

1. Source: DEEWR, Higher Education Statistics Collections *Award Course Completions for All Students by Citizenship and Broad Field of Education, 1996 to 2007*. (Discrepancies in totals may be due to rounding. Discrepancies in totals may be due to double degrees made up of two different fields of study. Both fields are counted however only one completion is counted in totals.) Population: Domestic higher education students who completed their course of study on 2002 or 2007.

2. Source: NCVET VET collection, unpublished statistics. Population: Vocation education and training students who completed a course in 2002 and 2008, all students.



Literacy and life skills

The literacy skills needed in the workplace are varied and range from understanding product specifications and management directions, to reading graphs, catalogues and emails, searching the Internet and interpreting more complex documents. Prose and document literacy scores³³ test these foundation or basic skills.

ABS surveys indicate that Australians' scores in these domains are relatively low and have changed little from decade 1996 to 2006. Level 3, which is identified internationally as 'the minimum required for individuals to meet the complex demands of everyday life and work in a knowledge-based economy' was reached or exceeded by just over half the population in 2006. Among employed people the scores for both prose and document literacy are higher – around 61 per cent were at levels 3 or above.³⁴

In the decade to 2006, scores improved by just one to two percentage points for the whole adult population, and did not improve at all for employed people.³⁵

Numeracy and problem-solving scores were lower, as follows:

- 47 per cent of the total population and 56 per cent of the employed population were at level 3 or above for numeracy in 2006. This score measures the knowledge and skills required to effectively respond to diverse mathematical situations in every day life.
- 30 per cent of the total population and 36 per cent of the employed population were at level 3 or above for problem solving. This score evaluates goal-directed thinking and action in situations for which no routine solution is available.

However, understanding and defining literacy is not straightforward and is understood to be more than the basic ability to read and write. People's self-assessed proficiency differs markedly from the scores attained by testing. For example, while over seven million people were at less than level 3 on prose literacy scores, only 2.1 million people assessed themselves as having 'poor' or 'moderate' English reading skills on a four-point scale of poor, moderate, good, excellent. Many people function socially and in the workplace despite low measured literacy.

Townsend and Waterhouse found Australian employers they interviewed rejected the idea of 'foundation skills' that were fixed or of a particular level. Rather they recognised the need for skills that are 'fit for purpose' within the particular workplace and are able to adapt to organisational changes and differing demands. The research indicated that people may not lack basic skills, but rather those skills may be contingent or latent in the workplace context.

They may be present in the workplace but not demonstrated and, consequently, not developed. There may be a complex web of historical, political, industrial, cultural, and managerial reasons why skills available in the workplace are not

³³ The ABS defines *prose literacy* as the ability to understand and use information from a range of narrative texts. *Document literacy* involves the ability to locate and use information in various non-narrative formats such as charts, schedules and maps. ABS (2008) *Adult literacy and life skills survey*, Australia, Cat no. 4228.0 p. 4.

³⁴ ABS (2008) *Adult literacy and life skills survey*, Australia, summary results, Cat no. 4228.0. People aged 15 to 74 years are included.

³⁵ ABS (2008) Table 16.



utilised. Virgona et al. (2003, p.53) note that these skills do not flourish if the environment is not conducive.³⁶

International comparisons

Australia performs well above the OECD average in terms of secondary and tertiary attainment. Australia is consistently above the OECD average in the PISA³⁷ assessment of scientific, reading and mathematical literacy skills among 15 year olds, and is among the top countries, ahead of the USA, Germany and the United Kingdom.

The percentage of the 25 to 64 year old population with a tertiary qualification was 33 per cent in 2006, compared with the OECD average of 27 per cent.³⁸ Australia is ranked ninth, with countries such as Canada, Finland, the US and Japan ahead, and Korea, Sweden and the UK behind.

Australia ranks average for literacy scores overall. However, it fared better among the older age groups than the younger ones. Among the seven countries participating in the 2006 international survey,³⁹ Australia's level 3 ('minimum required') and above levels were similar to other countries for people over 45 years, but some countries have much higher levels for younger age groups. The United States and Italy had consistently lower levels than Australia at all ages.

Australia's average rankings in literacy need to be viewed in the context of its relatively high immigrant population. People whose first language was not English were over-represented among people with low scores. For example, they made up 27 per cent of people with low prose literacy in 2006 compared to 19 per cent of the total survey population.

Issues for discussion

- ***How can the government's goals and targets for higher educational achievement better co-ordinate with the need to improve the foundation skills of the workforce?***
- ***What are the implications of the faster growth in university as opposed to vocationally qualified graduates over the last decade?***
- ***How can the government's tertiary education targets best be implemented to ensure an improvement in the foundation skills of the workforce?***

³⁶ Townsend, Ray and Waterhouse, Peter (2008) Whose responsibility? Employers' views on developing their workers' literacy, numeracy and employability skills, NCVET.

³⁷ Programme for International Student Assessment (PISA). See Thomson, Sue & De Bortoli, L *PISA In brief from Australia's perspective*, ACER, at: http://www.acer.edu.au/documents/PISA2006_PISAinbrief.pdf.

³⁸ OECD (2009) Factbook 2009: Economic, Environmental and Social Statistics.

³⁹ ABS (2008) Table 7. The seven participating countries were Australia, Canada, Bermuda, Italy, Norway, Switzerland and the United States.



3.2 Continuing adult learning

Australia has a comparatively high percentage of the adult population who are engaged in learning activities at any point in time. In 2007, 38 per cent of Australians over 25 years reported having undertaken formal and/or non-formal learning in the last 12 months.⁴⁰ Seventy-four per cent reported having taken part in informal learning activities. Non-formal learning – structured, non-accredited courses – are more prevalent than formal learning for all age groups, as Table 14 shows. But the two types of learning are closer in frequency among young adults.

People engage in educational activities for a range of reasons. From a workforce development perspective, it is important to understand how much continuing learning activity is *work-related* and to what extent this work-related learning is meeting the needs of employers and employees. Work-related training can be employer-provided or pursued separately by workers, and may or may not physically take place in the workplace. Information on all of these aspects of work-related learning is explored below.

Table 14: Participation in different types of learning in the last 12 months, 2006–2007

Type of learning	25 to 64 year olds		
	Total %	Youngest cohort ¹ %	Oldest cohort ¹ %
Formal learning	12	25	3
Non-formal learning	30	31	16
Informal learning	74	77	64
Didn't take part in learning	21	16	34

Source: ABS *Adult learning Australia* 2006-7, Cat no. 2070, adapted from Table 5.

Population: Civilian population aged 25 years and over.

1. Youngest cohort is 25 to 29 years, oldest is 60 to 64 years.

As noted above, many Australians report that they continue to take part in learning activities through their life-time. In 2007, the bulk of *structured* learning activity (85 per cent of formal and 73 per cent of non-formal learning) was work-related.⁴¹ 'Work-related' in the survey meant that people's stated motives for undertaking learning activities were either:

- job-focused – to help with getting a job or promotion
- work-focused – the training or education was a requirement of the job or provided extra skills for the job; or

⁴⁰ *Formal learning* is structured, taught learning in an educational institution or other organisation that leads to an AQF qualification. *Non-formal learning* is structured, taught learning in an educational institution or other organisation that does not lead to an AQF qualification. *Informal learning* is unstructured, non-institutionalised learning for work, family, community or leisure where there is an intention to learn.

⁴¹ ABS (2007) *Adult learning Australia*, 2006-7, Cat no. 4229.0, Tables 7 and 8.

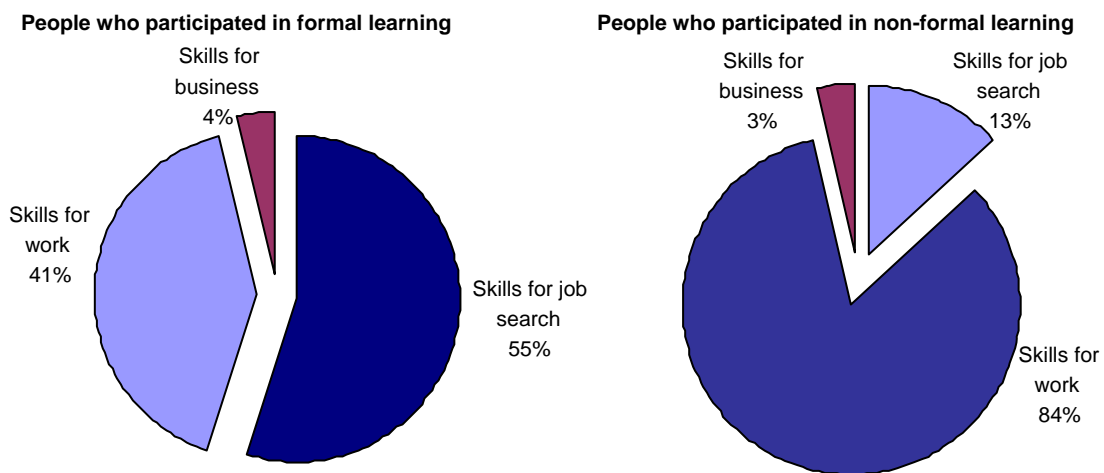


- business-focused – it provided skills to start or develop one’s own business.

Another ABS survey found that in 2005, 38 per cent of people aged 25 to 69 years had undertaken one or more work-related courses in the last year, supporting the view that a significant number of people regularly pursue work-related continuing learning.⁴² This survey found that the number of such courses undertaken by people in or marginally attached to the labour force has been steadily increasing, since the early 1990s.

Graphs 9 and 10 show how people’s reasons for engaging in formal and non-formal learning differed. Most formal learning was in order to find a job or get a promotion, while non-formal learning was mainly undertaken to improve skills in an existing job. (See Appendix B Table B4 for details of male and female responses).

Graphs 9 and 10: People who participated in formal and non-formal learning, 2006–07



Source: ABS, *Adult learning Australia 2006-7*, Cat no. 4229.0.

Population: People aged 25 to 64 years who undertook formal or non-formal work-related learning (excludes non work-related reasons for study)

Employment-based training

A significant proportion of work-related learning is provided through the workplace. Information about the training employers make available through the workplace is an aspect of working life that helps with understanding the dynamics of workforce development in Australia today.

Around two-fifths of workers engage in structured employment-based training each year (Table 15).⁴³ There appears to be a recent downward trend, and a fall in 2007 to 36 per cent, which new data will help clarify as it becomes available.

⁴² ABS (2005) Education and training experience survey, Cat no. 6278.0 Table 20.

⁴³ The last ABS survey of employer expenditure on training found that total employer expenditure at that time (2002) was not much lower than public expenditure on vocational education and training.



Table 15: Participation in employment-based non-formal education and training, the last 12 months

	2003	2004	2005	2006	2007
Percentage of employees who received training	43	42	45	43	36

Source: ABS (2007) *HILDA Release 7*. Note that in 2007, this question was asked of all employed persons, but results here are restricted to employees for backward compatibility.

Population: people over 25 years who were employees in any job in the past twelve months.

Note: Data weighted by personal cross-sectional population weights. Question: *In the last 12 months, have you taken part in any education or training schemes as part of your employment? We are only interested in structured training courses the respondent has received. Do not include courses they might have participated in as a trainer.*

The figures in Table 15 come from individuals. NCVER's employer surveys provide reports from employers. They indicate that around one-fifth of employers provided formal training in 2007; and like the employee data above, they suggest a slight fall in recent years (see Table 16).

Table 16: Provision of employment-based training in the previous 12 months

	2005	2007
Employers who provided formal training %	24	22
Employers who provided non-formal training %	54	49

Source: NCVER *Employers' use and views of the VET system 2005 and 2007*. Note that these training responses are in addition to any apprentices or trainees employed. In 2007 29 per cent of employers claimed to have one or more trainee or apprentice, a similar proportion to 2005.

Population: organisations with at least one employee (not including owner/operators).

ABS surveys show that the total number of hours across the workforce and the average duration of courses has been falling, as shown in Table 17. Hours for employer-provided training are not shown separately, but the fact that in 94 per cent of such courses the employee incurred no costs suggests most were employer-provided.

Table 17: Average duration of training courses in hours, selected years

	1997	2001	2005
Average course length for full-time employees	20.6	17.4	14.7

Source: ABS (2006) *Education and training, Australia, 2005*, Cat no. 6278.0, p.8.

Population: employees aged 15 to 69

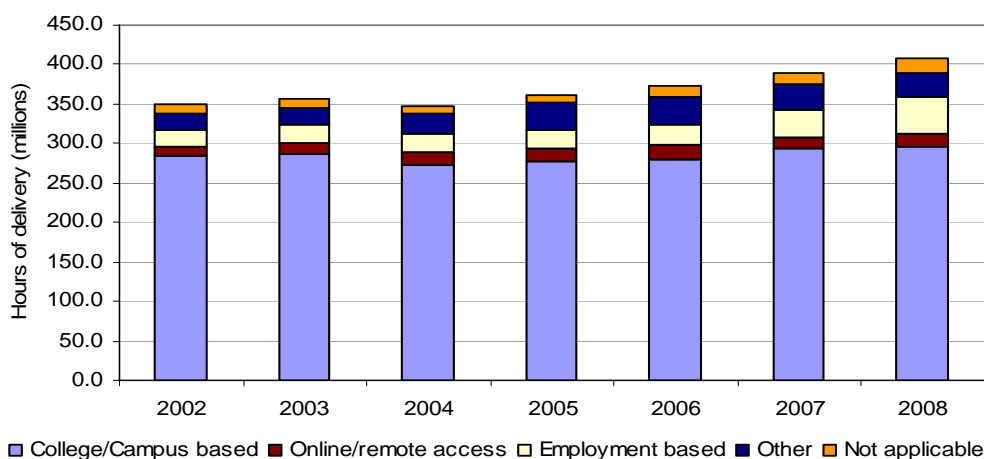
Another way of investigating the amount of training taking places in workplaces is to look at where training physically happens. This is possible only for publicly funded training, which is a sub-set of all work-related structured training.

The amount delivered in workplaces, as opposed to in educational institutions, has increased in recent years (see Graph 10). It remains small in terms of hours per person in training in relation to courses of training delivered in educational institutions.

But as shown in the next Section on expenditure the total amount of training provided by employers for their employees could well be as large as that provided by the public VET system.



Graph 11: Hours of vocational education and training by delivery type, 2002 to 2008



Source: National VET provider collection, 2008.

Population: Publicly funded vocational education and training delivered by public and private providers (not schools).

Who has access to work-related learning?

Today in Australia, social and economic status exerts a strong influence on whether people take part in adult learning, including employment-based education and training. People with higher education qualifications, higher incomes and higher status occupations undertake more learning activities of all types.

Looking at all continuing adult learning, over 90 per cent of people 25 years and older with a bachelor's degree or higher engaged in some type of learning in the past year, compared to around two-thirds of people without a post-school qualification. Unemployed people are more likely to be involved in formal (accredited) courses than others, but are less likely to be taking part in other learning activities.

The likelihood of taking part in employment-based training varied markedly according to industry, occupation, whether the employment is full-time, part-time, permanent or casual and whether employers have systematic or informal methods for identifying learning and development needs.

In 2007, nearly half of employees in the following industries received work-related training in the previous twelve months (see Appendix B, Table B5 for earlier years):

- utilities
- government
- education
- health and
- finance and insurance.



In contrast, one-third to one-quarter of employees in other industries took part in such training.⁴⁴

Professionals and service workers were most likely to receive training, with sales, clerical, labourers and operators far less likely to have had training.

ABS data indicates under eight per cent of all work-related training hours completed by people in 2005 were undertaken by casual workers, who made up some 27 per cent of the workforce at that time. Casual workers undertake courses of shorter duration (average 10 hours compared to 15 hours for on-going workers) and not surprisingly, incurred fewer personal costs associated with training.⁴⁵

HILDA data from 2005 also found casual workers were disadvantaged in relation to training, but detailed analysis showed that not all casuals suffered the same fate. The following factors notably improved access to structured training for casual workers:

- having a VET qualification
- working full-time
- working in the mining or health and community services industries
- working in a workplace of 20 people or more
- being a trade union member.⁴⁶

Industries which show high levels of training, and which rate highly in terms of employees reporting opportunities for skills enhancement, are the same industries inclined towards more systematic means of identifying employees' skill needs and planning for them in a strategic way.

More than 50 per cent of organisations in mining, utilities, government, education, health and personal services had systematic methods of deciding on training needs.⁴⁷ In other industries, informal methods predominated.

While access to training and to related practices such as performance management and skills appraisal is in part linked to organisation size, there may be scope to extend these positive employer practices to increase the access of workers who are currently denied work-based training.

In addition, the shift away from on-going to non-standard forms of employment has implications for how existing workers will update their skills, and workplace learning more generally.

International comparisons

When considering adult learning overall, more Australians had engaged in formal learning between 2006 and 2007 than in any other European country except Sweden. Australians also had the third highest frequency of taking part in non-formal learning.⁴⁸

⁴⁴ HILDA, Release 7.

⁴⁵ ABS (2006) *Education and training, Australia*, 2005, Cat no. 6278.0, Table 25.

⁴⁶ Watson (2008) p. 27.

⁴⁷ Watson (2008) p. 65.

⁴⁸ ABS (2007) *Adult learning Australia*, 2006-7, Cat no. 4229.0.



In terms of work-based training, Australia's rate of 45 per cent in 2005 can be loosely compared to the following European training participation rates for employees who received training in the previous year:⁴⁹

- Ireland 49 per cent
- France 46 per cent
- Finland 39 per cent
- European Union 34 per cent
(average 25 countries)

Issues for discussion

- ***What are ways in which more equal access to work-related learning could be achieved across industries, occupational groups, and for part-time and casual workers?***
- ***How do we know if the incidence of work-related adult learning in Australia is appropriate? What should we aim for?***
- ***Much employer-provided training is structured but not accredited. What are the implications of this?***
- ***How can we bring together governments' interest in higher levels of qualifications with employers' interest in more informal approaches to work based learning and partial qualifications or skill sets?***
- ***Do we need to encourage employers to take up systematic ways of identifying employee skill needs?***
- ***How can we ensure that casual workers don't miss out on work based learning opportunities?***

⁴⁹ CVTS Survey 2005 Eurostat database extraction using:
<http://epp.eurostat.ec.europa.eu/portal/page/portal/education/data/database>. Note that these data are from employer and not household surveys, and the data do provide exact comparisons.



3.3 Expenditure and sources of finance

Public funds expenditure

Institutional funding

The provision of education and training and its quality can be enhanced by better use of the resources available. But expansion of participation is still likely to require additional resources and an improved capacity to focus on workforce development will require consideration of how public funding can best support this direction. The levels and sources of finance will be given more detailed consideration in forthcoming work by Skills Australia. This Section provides a short overview of the public and private resources available to higher education and VET, the provisions for less advantaged and an illustration of the extent of employer provision of training outside the formal education and training system.

Expenditure on universities and public VET (in constant prices) since the late 1990s is shown in Table 18. Expenditure has risen markedly in real terms in universities but has fluctuated in vocational education without any strong overall growth. It has been roughly constant as a percentage of GDP for universities but has fallen for VET.

Table 18: Operating expenses education, \$ millions, 2007–08 prices

	1999–00	2003–04	2007–08
University education	11,770	13,896	15,235
% of GDP	1.34	1.39	1.35
Public vocational education and training	4,913	5,072	5,157
% of GDP	0.56	0.51	0.46
Total universities and public VET	16,684	18,968	20,392
% of GDP	1.90	1.90	1.80
GDP \$ millions	879,165	998,148	1,132,172

Source: derived from ABS 5518.0, 5204.0.

Note. Deflated using implicit price deflator of GDP. This table includes the public and private funds of public providers but *excludes the expenditure of private providers other than that publicly funded*. It also excludes expenditures not made on education and training delivery—such as incentives for employers and student assistance.

Over 50 per cent of university revenues and over 20 per cent of vocational education and training revenues come from sources other than government grants for education and training. The main source of the funding expansion of higher education has been private funding through student fees including those from international students. In the VET sector fee for service revenues including international student fees has risen but domestic student fees for publicly supported courses have remained around 5 per cent of total revenues.

The Bradley Review found that Commonwealth funding per subsidised student in 2008 in universities was about 10 per cent lower in real terms than it was in 1996. It



recommended a return to more complete indexation of grants and this is to be implemented and a 10 per cent increase in per student funding that has not yet been implemented.⁵⁰ However, a number of other funding changes are in train for the higher education sector which will increase the total funds and in some cases provide an addition to the funds available per teaching place. The most notable change is demand driven funding, removing the cap on funded places by allowing them to increase in line with student applications, fully implemented from 2012. Proposed increases to research funding are seen by the universities as reducing the cross subsidisation of research from teaching funds. Additional support will be provided for the teaching of disadvantaged students.

The VET sector has experienced a fall in funding per hour of publicly funded training. Expenditure per hour fell in the late 1990s and has fallen again by nearly 9 per cent in the years 2003 to 2007 as shown in Table 19.

Table 19: Government recurrent expenditure per publicly funded annual hour of training, 2003 to 2007, 2007 prices

	2003	2004	2005	2006	2007
Expenditure per hour \$	14.23	14.17	13.8	13.46	13.03
Change from 2003 %		-0.4	-3.1	-5.4	-8.5

Source: DEEWR 2008, Annual National Report on the VET System.

Whereas the Commonwealth has the responsibility for public funding in higher education, in the VET sector the states are responsible for about two thirds of public grants and the Commonwealth one third. Various intergovernmental initiatives will support an expansion of enrolments in the VET sector, notably the entitlements to an education or training place for young Australians and retrenched workers agreed by COAG. Some states, notably Victoria⁵¹, have also introduced policy changes to guarantee access to subsidised training places. However, there are no stated plans to lift expenditure per student training hour or for better indexation of grants. On current information it seems possible that the teaching funds per VET student could decline relative to the funding per student in higher education.

The Productivity Places Program for job seekers and existing workers was initiated by the Commonwealth in 2008. It will add about 10 per cent to the annual student numbers in VET and will boost the total level of expenditure. The program from July 2009 is being administered through the states and partly funded by them.

In contrast to the concerns about the level of teaching funds per student, there has been a massive expansion of funds for infrastructure and for sustainability initiatives, partly as a result of the stimulus to the economy after the global economic downturn. For example, the following initiatives add perhaps 10 per cent to total tertiary funds for 2009 to 2010:

- the Teaching and Learning Capital (TLC) fund for VET fund which provides \$500 million during the 2009 to 2010 financial year distributed through initiatives focused on modernising and improving the quality of teaching and learning

⁵⁰ Australian Government (2008) Review of Australian Higher Education, Final Report, p. 143.

⁵¹ The Victorian Training Guarantee, see Skills Victoria (2008) *Securing your jobs for the future*.



- the TLC fund for higher education provides \$500 million to eligible higher education institutions across Australia to target new infrastructure as well as the upgrading of existing facilities
- approaching \$1000 million from the Education Investment Fund for University and TAFE infrastructure and sustainability projects.⁵²

Support for the less advantaged

Participation of people from low socio-economic backgrounds, with disabilities or who are Indigenous is much higher in the vocational education than in the higher education sector.

For example 36 per cent of enrolled university students in 2007 came from the top 20 per cent of Australian households in terms of disposable income compared with about 19 per cent of VET students. About 10 per cent of university students came from the lowest quintile compared with 19 per cent of VET students.⁵³ Indigenous students make up a relatively low proportion of university students but a relatively high proportion of VET students, though often in low level courses.

The Commonwealth government provides a range of programs to support less advantaged students in both higher education and VET. A new initiative resulting from the Bradley report is additional funding to support the increased enrolment of low SES students in higher education. This will include funding for various partnerships with schools and VET but is mainly a higher education initiative.

State Governments give special funding loading for three main groups of VET sector students: students from culturally and linguistically diverse backgrounds, students with disabilities and Indigenous students. Programs and funding explicitly to support low SES students are less notable, though low income students are provided with fee exemptions or concessions.

Means tested Commonwealth funding through Youth Allowance, Austudy and Abstudy supports nearly a quarter of full time undergraduates and VET students—though as only about 10 per cent of VET students are full time, the numbers eligible for assistance are much lower than in higher education. Several reforms recommended in the Bradley report are being implemented.

Non-institutional funding including incentives to employers

Government funding to training providers for apprenticeships and traineeships amounts to perhaps a third of all public VET expenditures. In addition to the public funds directly devoted to education and training delivery, are a range of other programs to support people to acquire skills including programs for the unemployed through Job Services Australia where some of the services result in job seekers engaging with the VET sector.

The provision of incentives to employers of apprentices and trainees and funding of apprenticeship centres to assist in their employment now exceeds \$1 billion a year (see

⁵² See: www.deewr.gov.au/HigherEducation/EIF/Pages/Round2SuccessfulProjects.aspx.

⁵³ Watson, Ian (2009) *SES background of VET students compared with university students*, Table 3.5, unpublished research for Skills Australia. Data referred to are from *HILDA Release 7*, Wave 7 respondents only and the reference household is the one they lived in 2001.



Table 20 overleaf). This funding supports the employment and workplace training of about 400,000 apprentices and trainees.

Alongside these Commonwealth schemes are various state government incentives some of which involve cash payments to employers and or an exemption from state taxes or charges.

In later work consideration could be given to the effectiveness of the existing state and Australian Government support schemes and the extent to which workforce priorities are addressed. This can include the extent to which funding effectively supports the education and training needs of older workers in the workplace.

Table 20: Selected Australian Government support programs for apprenticeships, \$ million

	2008–09 Revised Budget	2009–10 Budget	2010–11	2011–12	2012–13
Australian Apprenticeship Centres	187.9	194.8	199.5	204.0	205.8
Support for New Apprenticeships (employer incentives)	816.5	895.1	894.3	881.5	903.4
Australian Apprenticeship Access Program ¹	155.2	223.3	179.8	167.6	163.3
Total program expenses	1,159.6	1,313.2	1,273.6	1,253.1	1,272.5

DEEWR 2009 Budget Statements – Outcomes and performance – Outcome 3.

1. This item also includes a component of funding that does not relate to support for apprenticeships such as the WELL and ALLN programs.

Employer training expenditure

None of the statistical collections on tertiary education and training measure the training activity by employers except for the minor part that is delivered through the public tertiary sector.

Employers undertake considerable investment in training but little is currently known about the shape and size of this and how it relates to public expenditures. Skills Australia has drawn attention to this in Recommendation IV in *Foundations for the Future* (2009):

Australian Governments develop an investment framework for the tertiary sector based on more comprehensive and consistent data on the scale and nature of employers' expenditure on training. This evidence will enable more informed decisions for the effective use of public and private expenditure on skills, which plans for and ensures this investment meets national priorities.

The ABS has carried out a number of surveys of employer training expenditure in the past. However because of the cost and the quality of the data collected, the last survey was in 2002 and there are no plans for further collections. Other countries regularly undertake studies to estimate employer training expenditures and these are discussed by Smith et al (2008).⁵⁴

⁵⁴ Smith, Andrew, Burke, Dumbrell and Long (2008) Approaches to measuring and understanding employer training expenditure, NCVET.



Data from the last ABS survey for 2001 to 2002 indicated that employer expenditure on structured training, approaching \$4 billion, was approximately as large as government spending on the VET sector. On average employer expenditure on structured training equalled about 1.3 per cent of wages though there was considerable variation across industries, consistent with the data on incidence of work-based training discussed above. For example in retail and construction spending on structured training equalled only a 0.6 per cent of wages. And those industries were more reliant on government subsidies than for example manufacturing and health and community services where spending was over 1 per cent of wages and closer to the 1.3 per cent average for all industries.

International comparisons

The OECD (2008) shows that Australia spent about 5.8 per cent of GDP on educational institutions in 2005, about the same as the average for other OECD countries but with a higher percentage of private expenditure and a lower percentage of public expenditure.

The Bradley report noted that for higher education the total expenditure as a share of the GDP was above the OECD average. The expansion of expenditure on higher education had lagged in recent years and the increases that occurred were mainly due to private expenditure.⁵⁵ The OECD classifies much of VET enrolment and expenditure to the school sector so comparisons across countries just for VET are not feasible.

The OECD data do not include expenditure outside educational institutions e.g. it does not include employers' expenditure on training except for that part directed to educational institutions.

Issues for discussion

- ***Are tertiary funds appropriately allocated, including support activities such as incentives and the administration of apprenticeships and traineeships?***
- ***Is the VET sector, which makes the greatest provision for the less advantaged, adequately funded to provide the more intensive monitoring and teaching required for its diverse clientele to succeed?***
- ***How effectively is tertiary education funding structured to address improved use of workplace skills for those in and out of the workforce? What has to change? What could be done differently to help achieve better outcomes from government investment?***

⁵⁵ Australian Government (2008) pp.146-47.



Section 4: What should we plan for?

This Section returns to the question of what it is feasible and realistic to plan for.

The concept of ‘match’ is often used in educational and skills planning to refer to the matching of the demand for skills from industry with their supply through the education and training system.

There is sense in this, to the extent that education providers want to avoid training people in redundant skills, and employers want to avoid shortages of skilled workers who are critical to their profitability. However, on closer investigation, the idea of a ‘match’ doesn’t speak well to the fluid and dynamic way labour markets, employers or individuals behave. For example, nearly half (45 per cent) of the workforce changes their employer every three years, and many people change not just their employer but also their industry and occupation.⁵⁶

The relevance of people’s first post-school qualifications fades as people progress through their careers, often retraining and upskilling along the way. Many people work in fields for which they have acquired skills and experience over time, rather than through formal education. Less than one-third of managers and administrators have a university degree although management is regarded in many forecasts as a highly skilled occupation with which such a degree is associated.

It follows that the complexities of how employees, employers and labour markets actually behave need to be kept in mind in government efforts to identify and meet Australia’s future skill and workforce needs. This Section attempts to negotiate a route to achieving this balance.

It proposes a set of criteria to identify those occupations where government skills planning and intervention is most appropriate. The criteria, and an associated methodology, are then applied using recent data to identify areas where government and the community have an interest in preventing either high levels of wastage or harmful shortages in the coming decade.

The daily decisions made by individuals, employers, educational providers, recruitment firms, professional associations, migration agents and a host of other institutions will continue to collectively shape Australian labour markets and employment opportunities. This Background Paper seeks feedback on the most useful role for governments and other stakeholders within this mix.

⁵⁶ ABS (2008) *Labour mobility Australia*, 2008, Cat no. 6209.0.



4.1 Considerations on workforce planning

Past models of planning for skills have generally assumed a more direct relationship between the completion of a certain volume of qualifications of particular kinds and the use of those qualifications in the workplace. That is, people will enter the jobs to which their qualifications are suited and skills shortages will be avoided.

The global scenario modelling demonstrates the multiple factors that may influence the economic need for skill, and the variety of interventions that may be required to influence supply, as well as demand. 'Mechanistic' workforce planning approaches are now being questioned, with more nuanced observations raised about the relationship between skill development and employment.⁵⁷

Recent experience of skill shortages in Australia have seen a range of solutions develop in certain industries other than the arguably narrow, skill supply alternatives which look to government provision of training as the way forward. These have included wages, flexibility in workplace conditions to suit new pools of workers, and new forms of work organisation and multi-skilling. Some industries are in a position to respond effectively, others less so in these circumstances – a point that is taken up later in Background Paper Two. An important question to consider is the type of role governments and others play in assessing future skill needs.

The role of governments in planning future skills

Governments take a prominent role in planning for tertiary education provision – the Australian Government has a primary role in the higher education sector and States and Territories have prime responsibility for the VET system. Recent intergovernmental agreements in COAG have brought greater policy and planning consistency across states in the VET sector, notably on targets for qualifications and for participation by Indigenous groups and for young people. Australian Government funding agreements affect the size and direction of state activities. States however undertake varied approaches to the fine grained planning of educational provision, to cater for particular regional influences and the demographic suitability of services.

All states and territories use detailed labour market information in their development of their states' skills plans and strategies. In most cases this involves projections of employment by industry and occupation and the likely qualification structure of future employment. In some cases it involves a forecast of supply of qualified persons from training and migration, to be considered in relation to expected job openings. States in their planning give attention to the numbers to be trained but also to the composition of training, especially training through apprenticeship and traineeships, to the capacity of the VET system to provide quality training and the interaction with industry necessary to improve skill use.

⁵⁷ Hoeckel, Kathrin, Field, Simon, Justesen, Troy R and Kim, Moonhee (2008) *Learning for jobs – OECD reviews of VET in Australia*, Organisation for Economic Co-operation and Development; Warhurst, Chris, Grugulis, Irena and Keep, Ewart (eds) (2004) *The skills that matter*, Palgrave/Macmillan.



While state governments use similar data sources the emphasis they give to different elements in the planning process can vary considerably, reflecting the diverse policy settings in which planning occurs. Governments and industry also draw on the intelligence gathered by Industry Skills Councils and by the state industry training advisory bodies. The Councils have wide ranging methodologies, but are generally more sensitive to workplace and industry practices. In several states there is close integration of planning of skills supply and planning for workforce development. Approaches to planning for workforce development are not as widespread as systems for skills planning (see Appendix C).

A forum of states and industry bodies facilitated by Skills Australia found:

Given the different types and purposes of planning and the different audiences that agents of planning are accountable to it is important to recognise that there is a need for diversity in practice. There is no one 'true' way for improved planning. There is a pressing need to have diversity with some limited, but vital, common standards. Such standards would facilitate dialogue and coordination.⁵⁸

The following Section outlines a framework to inform discussion about the categories of occupations and criteria that might be used by governments where planning is most appropriate to meet skill demands.

A more nuanced approach to planning

Between 2004 and 2008, a suite of twelve projects was undertaken by NCVET to examine the relationship between Australia's future skills needs and vocational education and training. The conclusion was that a 'well-skilled future' meant having good relationships and information flows between government, education providers and industry. But, the research suggested, it did not mean eliminating uncertainty. Nor did it mean government taking over the role played by labour markets in balancing the demand and supply of workers and skills.⁵⁹

The principal researchers argued:

Governments should focus on areas where markets do not work well; skills that take a long time to learn or train; or shortages that cause major bottlenecks.

The research studies showed that multiple factors create a demand for or supply of people with specific skills at any point in time and many are not subject to educational planning or control. Some of these complexities are as follows:

- *Training relevance is uneven:* The job destinations people arrive at are often quite different to their educational starting points, that is, the jobs for which they initially trained. The relevance of initial qualifications begins to fade as people move through their employment careers.
- *Employer requirements change:* Labour market conditions – such as an abundance or shortage of potential recruits – lead employers to adapt their requirements for

⁵⁸ Buchanan, John and Evesson, Justine (2008) 'Categories, Standards and Analytical Capacity: the pre-requisites for improving skills planning in contemporary Australia', Skills Australia unpublished report.

⁵⁹ Richardson, Sue and Teese, Richard (2008) A well-skilled future, tailoring vocational education and training to the emerging labour market, NCVET.



workers, varying the quality of those they are prepared to employ, and increasing their tolerance for people learning on the job.

- *Informal learning is as important as formal education:* New skills are often learned on the job, through experience and training, rather than by formal study for a qualification. In 2008, 38 per cent of technicians and tradespeople in Australia had no qualification or a Certificate I/II level qualification only.⁶⁰
- *Skills deepening:* The changing nature of the workplace in terms of technological and social changes indicates the interactive and cognitive components of most, if not the majority of job roles, will grow and require workers to use those attributes.⁶¹
- *Vacancy rates do not always reflect low supply:* Turnover rates, and hence the number of vacancies, vary significantly across industries. In some cases, skill shortages are, on closer examination, recruitment or retention problems.
- *Low certainty of projections and forecasts:* Projections usually involve high margins of uncertainty, limiting their value in terms of planning educational capacity at specific skill or regional levels.⁶² An OECD review of projections found that they were most accurate in projecting retirement and replacement rates, and weaker in projecting future growth.
- *Decentralised engagement can be more effective:* New skill demands may flow from the changing skill composition of existing occupations, resulting from new technology, services or products, rather than from industry or occupational growth and decline. Such demands will vary from firm to firm, depending on their innovation capacity and business strategy. Here it is the responsiveness of education providers to changing industry needs, and on-going dialogue between education and industry that is important rather than centralised planning efforts.

For these reasons, the idea of matching education and training to the labour market is unrealistic if it is conceived as a mechanical process of identifying skill needs and then filling them. Richardson and Tan note:

It is a misunderstanding of how the labour market adjusts to believe that there is a direct, one-to-one relation between an expansion in output, the associated increase in skills needed to produce that extra output, and a requirement for [educational and training] systems to provide those extra skills.⁶³

4.2 An approach to minimising risk

Rationale

The rest of this Section considers options for a risk minimisation approach. This approach would see the federal government taking action to mitigate serious skill risks, whilst supporting the work of state and territory governments, providers and other stakeholders in negotiating day-to-day planning and provision.

⁶⁰ ABS (2008) *Education and work, Australia 2008*, Cat no. 6227.0, Table 12.

⁶¹ Lowry, Diannah, Molloy, Simon and McGlennon, Samuel (2008) *Future skill needs: Projections and employers' views*, NCVER

⁶² Richardson and Teese (2008) pp. 131-2.

⁶³ Richardson, Sue and Tan, Yan (2007) *Forecasting future demands: what we can and cannot know*, NCVER, p. 33.



The approach is based on identifying those occupations and skills that it is important to plan for nationally, in tandem with ensuring that high quality information and resources are available to the many other stakeholders who need specialised information about industry at a local and regional level.

It takes into account the key role played by state governments and industry bodies, including industry skills councils, in identifying and taking action in response to industry and workforce needs. Appendix C (Planning activities by stakeholders) summarises the work of state and territory governments in vocational education and training and lists some of their key priorities. It also gives examples of the type of detailed industry intelligence which skills councils make publicly available on an annual basis.

Following Richardson and Teese,⁶⁴ and the work of the South Australian Training and Skills Commission,⁶⁵ Skills Australia invites comment on the criteria and methods that could identify key occupations where government should focus planning efforts.

Proposed criteria

- *A: Long lead time*
The skills are highly specialised and require extended learning and preparation time over several years.
- *B: High use*
The skills are deployed for the uses intended (that is, good occupational 'fit'). This is most likely to be the case where there are few people who have the essential technical skills not presently using them and the employment prospects for people with those skills is high.
- *C: High disruption*
The opportunity cost of the skills being in short supply is high. They either cause downstream bottlenecks in supply chains, or they impose significant economic or community cost by their absence.
- *D: High information*
The quality of information about the occupation is adequate to the task of assessing future demand and evaluating criteria A to C.

Data on the rewards and growth rates for each occupation is included for consideration as part of the analysis.

A summary of indicators for each criterion is at Table 22, overleaf.

All indicators and measures are tentative, and need to be tested further. Data sources include ABS household surveys, and NCVER and Graduate Careers Australia data. All can be updated on a regular basis, and at the next iteration, it is intended to apply the measures to occupations at a 4-digit level. Data sources and indicators for Criteria D have yet to be finalised.

⁶⁴ Richardson and Teese (2008).

⁶⁵ The November 2009 version of the South Australia Skills Plan will include supply and demand analysis for those occupations considered critical to the State economy. Detailed work on methods and indicators for these occupations is underway. Information can be obtained from the South Australia Training and Skills Commission at www.tasc.sa.gov.au.



Table 22: 'Risk' Occupations – A proposed methodology for identifying them

Criterion	Description	Indicators	Scope	Measure	Source(s)
A. Long lead time	Skills are highly specialised and require extended learning and preparation time over several years.	Average training duration	'VET-related occupations' (ANZSCO 3-8)	More than 800 hours training duration (F/T equivalent) for 50% or more of people training in the occupation	VET collection (NCVER)
			'Uni-related occupations' (ANZSCO 1-2)	4 or more years course duration (F/T equivalent)	Advice from Universities Australia
B. High use	Skills are deployed for the uses intended (i.e. good occupational 'fit'). This is most likely to be the case where few people who have the requisite technical skills are not presently using them and where employment prospects for people with those skills are high.	Match between intended versus destination occupation There are relatively few people currently employed in the occupation without the requisite qualifications	VET-related occupations (ANZSCO 3-8)	Match at sub-major occupation group six months after completion of training is well above average (50 per cent)	Student Outcomes Survey (NCVER)
			Higher ed-related occupations (ANZSCO 1-2)	Match at sub-major occupation group four months after completion of training is above average (50 per cent or more)	Analysis by Universities Australia
C. High disruption	Opportunity cost of the skills being in short supply is high; causing either bottlenecks in supply chain; or imposing significant economic or community costs.	Occupations which have licensing or registration requirements Occupation is needed to deliver priority government policies	Occupations identified according to criteria A and B.	Licensing or registration requirement is in place for people to practice in a particular occupation. Confirmation from independent sources on industry views on effects of short supply.	COAG Skills Recognition Taskforce list (some 40 VET occupations); plus Professional licensing bodies (higher ed-related occupations)
				Occupation is significant within the industries or strategies the government identifies as important; ie to support innovation, industry, sustainability, defence and infrastructure policies.	Policies on resource development, manufacturing, space, marine, health, education, ICT, renewable energy, energy efficiency and construction.
D. High information	The quality of information about the occupation is adequate to the task of assessing future demand and evaluating criteria A to C.	Compelling evidence supports industry claims regarding the special significance of the occupation.		Industry, research and government agencies are able to provide advice about the occupation according to agreed questions.	Industry Skills Councils and industry associations, complemented by ABS data.



In addition: compile additional information on 'risk' occupations

	Description	Indicators	Scope	Measure	Source(s)
The rewards to the occupation	Skills are highly valued in the labour market – they are well paid.	Comparative earnings	All occupations	Salary is above full-time average wage of \$1000 per week (gross)	ABS <i>Employee earnings, benefits and trade union membership August 2008</i> (Cat no. 6310.0) as provided by DEEWR Labour Market Branch
Occupational growth	Recent or projected future growth is rapid.	High recent growth occupations - past three years and projected five year growth.	All employed persons	Employment growth in the occupation over past 3 years exceeds 10% Future growth projections for coming five years is at or above 10%	ABS labour force data as analysed by DEEWR Labour Market Branch



Using the risk methodology

Approach to analysis

In the preliminary stage of analysis (*Stage 1*), occupations were quantitatively assessed against the four criteria, and also considered in terms of the additional measures of 'high reward' and 'occupational growth' though these were not used to exclude or include. The term 'risk occupation' has been adopted to describe a potential risk to the economy or communities where, when a number of criteria combine, qualifications for those occupations are not readily supplied.

Occupations are listed as meeting the criteria for a 'risk' occupation if they meet the conditions of:

- A – 'long lead time' *or*
- B – 'high use' *plus* at least one further measure from 'high disruption' and/or 'high information'.

A second stage of analysis (*Stage 2*) would follow, with the short list of occupations yielded by the quantitative exercise validated against the qualitative information from consultation and research. This would include industry insights into factors underpinning demand and supply such as that available through Industry Skill Councils, a sample of which is at Appendix C.

Findings

Occupations within the design, engineering, science and transport professions were found to have high occupational fit and to require extensive study in higher education (four years or more). These include:

- 231 Air and marine transport professionals
- 232 Architects, designers, planners and surveyors
- 233 Engineering professionals
- 234 Natural and physical science professionals

There is indication of 'high use' of skills in all of these fields bar the natural sciences, with a strong match between the occupation students intend to pursue upon entering study, and their eventual employment. Most people (60 per cent or over) working in these occupations have the requisite qualifications, while air and marine transport professionals and architects, designers, planners and surveyors also require licensing and/or registration requirements to practice.

All of these four occupations are projected to have strong growth in the short- to medium-term, (over 10 per cent) though not in the previous three years. They are also central to the achievement of government policy priorities including the national infrastructure program, and the innovation and sustainability agendas.

All of the education professions, including schools teachers (241) and tertiary education teachers (242) and miscellaneous education professionals (249) generally met at least two criteria of risk occupations: that is, they generally have a long-lead time (course duration of four years or more); were required to meet government policy priorities; and



showed a strong match between intended and destination occupation (high use), with the exception of the miscellaneous group.

All of the occupations in the health professions met multiple criteria as risk occupations, particularly as occupations required for the delivery of government policy in essential health care ('high disputation') and in terms of their 'high use'. While duration generally varies between three and four years for university courses for health diagnostic and promotion professionals (251) and health therapy professionals (252), all four occupations health professions showed high recent growth (past 3 years); projected future growth (future 5 years); and above average salaries ('high rewards'):

- 251 Health diagnostic and promotion professionals
- 252 Health therapy professionals
- 253 Medical practitioners
- 254 Midwifery and nursing professionals

Information and communication technology (ICT) professionals generally showed 'high use', with lead time (studying for the occupation) varying between three and four years. Most people (60 per cent or more) working as ICT professionals have the requisite qualifications, and all have been identified as occupations needed to delivery government policies especially in relation to the national broadband network and the digital economy. Only two (262 and 263) indicate strong future growth:

- 261 Business and systems analysts, and programmers
- 262 Database and systems administrators, and ICT security specialists
- 263 ICT network and support professionals

Both minor groups of legal, social and welfare professional occupations also met a number of criteria for 'risk' occupations, namely 'long lead time' as well as indicating that most people within the occupation have the required qualifications ('high use'):

- 271 Legal professionals
- 272 Social and welfare professionals

All of the 'traditional trades' requiring apprenticeships (or other long-lead time training) met the criteria for 'high use', while a significant proportion also required licensing and/or registration prior to practice; or were flagged as key occupations to meet government policy priorities. Technicians and trade workers included in a Stage 1 short list include:

Automotive and engineering trades:

- 321 Automotive electricians and mechanics
- 322 Fabrication engineering trades workers
- 323 Mechanical engineering trades workers
- 324 Panel beaters, and vehicle body builders, trimmers and painters

Construction trades:

- 331 Bricklayers, and carpenters and joiners
- 333 Glaziers, plasterers and tilers
- 334 Plumbers

Electrotechnology and telecommunications trades:

- 341 Electricians
- 342 Electronics and Telecommunications Trades Workers



The remaining trades, such as food trades, skilled animal and horticultural trades, hairdressing, printing, and wood and textile trades did not meet a sufficient number or combination of criteria in order to be considered as risk occupations, although most showed a strong match between intended and destination occupation.

Among other technicians and trade workers at the 3-digit ANZSCO level (399), one occupation at the disaggregated 4-digit level was flagged as an important 'risk occupation', supported by both employment growth and licensing requirements: namely, Boat builders and shipwrights (3991).

Among community and personal service workers, those occupations associated with child care, personal care and education aides met the 'high use' and government policy criteria, but did not match any of the other main criteria (i.e. long lead time, high disruption or high information). While they all showed strong expected employment growth up to 2013 to 2014, they have nonetheless *not* been flagged as 'risk' occupations in this preliminary analysis.

Hospitality occupations, on the other hand, were found, in some instances, to require licensing and showed employment growth over the past 3 years, but lead (training time) tends to be very short and future growth in this sector is not expected to be as strong as in recent years. Consequently hospitality workers were not included in the final occupation list.

Within clerical and administrative occupations, a small number of specific occupations were identified as requiring licensing or registration. These were (at the 6-digit ANZSCO level): conveyancers (599111) and noxious weeds and pest inspectors (599514). Similarly, among sales workers, those associated with the property sector (for example real estate agents, property managers, auctioneers) were identified as requiring licences or registration to practice, but were otherwise found not to satisfy any further criteria to meet 'risk' occupation status.

Similarly, a number of machinery operators and drivers met a number of criteria within the 'high disruption' and employment growth categories, but did not meet either of the two requisite criteria ('long lead time' and 'high use'). There were no risk occupations identified among labourers.

Issues arising

Trialling the quantitative analysis of indicators to identify 'risk occupations' has raised a number of issues. The most important of these is that under the existing criteria, only two sub-major groups of occupations – the professions and the trades – had any jobs that were identified as risk occupations.

As the selection criteria were driven by the two primary categories, 'long lead time' and 'high use' (in combination with the 'high disruption' and 'high information' categories), a number of occupational categories were not identified. For example, occupations important to meet social needs and government policy – such as community and personal service workers (including child carers and aides, health support workers, defence personnel, fire fighters and police) – were not included on the final list of critical occupations, and this may be a question for discussion.

Similarly, occupations that were found to require long lead time or which met the high use criteria were not selected if they did not meet either of the other two main criteria (high



disruption or high information) – although they might have met one or more of the ‘additional’ categories of high reward and high occupational growth.

Analysis of the ‘high reward’ additional category also found that the reported salaries for trades was lower than other sources might suggest, and may not reflect an accurate measure of all income sources. The indicator for determining ‘high reward’ might therefore be improved by including other data sources in combination with other earnings data, such as starting salary for graduates under 25 years in first full-time job.⁶⁶

A risk-approach to skills planning

The preceding discussion has identified various types of information that are useful in charting Australia’s future skill needs. Occupational and industry forecasts are a way of projecting forward from past trends, with modifications that take into account anticipated changes such as cyclical trends within industry sectors, new government initiatives, or regional factors that impact on some industries more than others. The data presented imply that strong job growth in coming years will be in government-dependent sectors such as health, education and welfare, the high skill sectors involved in professional and scientific services, and the lower skilled areas of retail, accommodation and food services.

Occupational, industry and regional employment forecasts in more detail than this would obviously be needed by educational institutions, career advisers, or employment services and are available at the Government [Skillsinfo](#) and [Job Outlook](#) data web-sites.

Skills Australia’s exploration of alternative scenarios was designed to supplement this type of data by presenting several plausible directions that the country could go in. Scenarios seek to pick up some of the ‘imaginable’ alternative futures. It found that higher education teachers, welfare associate professionals and carers and aides grow rapidly in any future world; while the future for agricultural workers, some types of tradespeople and machine operators is dependent on which future course Australia takes.

Section 4.2 reminds us that, however precise the modelling, uncertainties remain in the complex world of changing organisations, fluid local labour markets and culturally diverse individual orientations. At this point, the question of who takes responsibility for what becomes crucial. An approach in which one of government’s roles is conceived as minimising risks for the economy and the community in relation to the supply of qualifications is outlined for discussion. A proposed matrix of criteria is applied to identify the ‘risk occupations’ that government should arguably focus most on.

The implementation of the ‘risk occupations’ matrix is not intended to be a purely quantitative exercise. The idea would be to take an occupation so identified (such as ‘ICT network managers’) and work with industry representatives to develop a comprehensive understanding of the skill and workforce needs. This would involve investigating labour market demand and educational supply information thoroughly, looking at indicators such as:

- past and future growth rates for the occupation and the industries in which it is found
- current vacancies and other indicators of skill shortages, such as wages growth

⁶⁶ University and VET graduate destination surveys (GradStats, Graduate Careers Australia) and the Student Outcomes Survey (NCVER) would be suitable data sources.



- labour turnover rates
- the age and gender profile of the occupation
- education and training completion rates
- trends in migration into the occupation
- industry views about global trends and implications for those jobs and skills in Australia
- patterns relating to the retention and mobility among certain groups in the occupation after qualification (for example, women, young people) or once employed.

An important aspect of discussions may involve current systems for the development and replenishment of the skills – including the respective roles of higher education, vocational education and workplace-centred learning and how they inter-relate.

The resulting analysis would provide a rationale to ensure investment in such skills is an agreed public priority and appropriate industry driven workforce development strategies are in place to minimise the risk of skill shortages.

Issues for discussion

- ***What are the implications of the information provided in this Section about the future directions for skills and their uptake?***
- ***Is there a strong case to take a new approach to how we address planning for the skills of the future, that is, by concentrating effort on determining those skills which could be considered ‘at risk’ if they are not readily available? Is the methodology proposed here adequate for this approach?***
- ***What are the particular needs and various roles of government, industry, employers and education providers in developing and using planning information?***
- ***Is there scope for better co-ordination or specialisation of planning efforts among various tertiary education stakeholders? Is there potential to reduce overlap/ duplication of activities? How might this occur?***
- ***How can skills planning information be used by industry to address more holistic responses to the demand for and use of skills? How can such responses be most effectively driven?***

4.3 A way forward on skills and workforce planning

Adopting a broader workforce development approach

Three elements

Skills Australia’s approach to conceptualising workforce development encompasses three interrelated elements:

- the demand for future skills and what planning for the future entails



- improving the value from the skills investments being made in the existing and future workforce, through greater attention to how skills are used in a workplace setting
- joining up separate areas of government action on workforce participation, social inclusion and innovation so policies on skills connect with wider economic, employment and social strategies.

This Background Paper has focussed on the first element. It has considered the evidence of current and future trends about employment and skills and the characteristics of Australia's education and training investment. This consideration has been undertaken against a backdrop of possible scenarios for the future. In discussing future skill priorities we have identified a methodology that might be adopted by government as a planning framework. The methodology identifies the element of risk as crucial when thinking about government's role in influencing the supply of skills. But this is just one dimension of Skills Australia's workforce development approach.

Background Paper Two primarily addresses the second and third elements. It discusses the vital work needed with enterprises, communities and industry and enterprises to develop a comprehensive understanding of skill and workforce needs. This involves not only understanding current systems for the development and replenishment of the skills – including the roles of education providers – but importantly, workplace-centred learning and how demand for and use of skill interact in the context of job roles and enterprise strategy. Background Paper Two articulates the case for a shared national approach to Australian workforce development.

Strategic priorities for a shared approach to workforce development

Skills Australia envisages four strategic priorities in conceptualising a concerted national approach to workforce development. We suggest actions that might take place at the national, industry and enterprise level to underpin them.

- Identifying and meeting Australia's skills and workforce needs into the future consistent with sustainable economic growth, but also adequately preparing for the risks of alternative economic, demographic and social scenarios.
- Establishing a shared national agenda on a comprehensive strategy for Australia's future workforce to support people to better connect with work, capitalise on our skills and position ourselves for future challenges in the globally community.
- Improving educational and workforce participation levels where barriers continue to exist – with a special focus on localities, or groups experiencing high levels of disadvantage.
- Promoting demand for and the full use of high skills in workplaces to complement public investment in education and training – powering the workplace to make the most of Australia's education revolution and innovation strategies.

Some next steps for consideration

This paper has focused on the first priority and the arguments and evidence considered lead to the following suggested actions. Further actions related to the other priorities are raised in Background Paper Two. Here, however, we offer a series of suggestions for what could come next.



Improving the national approach to planning and preparing for our skill needs

Past models of planning for skills have generally assumed a more direct relationship between the completion of qualifications of particular kinds and the use of those qualifications in the workplace than is actually the case. Our research shows past trends influence our skills trajectory, but Australia's future employment and skills demands are also subject to global developments that we need to have on our radar.

A key role for governments in addressing skills planning is to minimise some of the impact of uncertain futures, but not take over the role played by labour markets in balancing the demand and supply of workers and skills.

Possible responses include:

- **Common planning principles**
Recognition of common principles to guide skills and workforce planning and identification of the different roles and responsibilities for governments and other key players at a state, regional, local, industry and enterprise level
- **A regular national 'snapshot' of demand for skills**
The regular commissioning of broad-brush indicators of employment trends and related skill demands, using scenarios to consider the risks and opportunities of a range of plausible influences on demand and supply
- **Different planning for different purposes**
Ensuring coherence in skills planning – that individuals and organisations have access to timely and useful information appropriate to their needs; that they have the know-how to use it; and that streamlining of efforts is maximised and duplication is avoided
- **A new planning methodology**
Introduction of a suggested methodology to address how governments can identify those 'risk' occupations where it is important to take action to avoid shortages that cause major bottlenecks; where markets do not work well; or where skills may take a long time to develop. Such an approach would work in tandem with state governments, providers and other stakeholders in negotiating day-to-day planning and provision.

Using current investments to strengthen workforce development efforts

The proportion of Australian adults with post school qualifications has risen significantly in the decade to 2008, and a high proportion of Australians engage in formal and informal learning. We compare favourably with other OECD countries. Australia's expenditure on educational institutions is about average with other OECD countries. However, there are areas of imbalance – low levels of adult functional literacy, lower participation by casual workers in training and variations across industries in levels of employment based training. Australian outlays on tertiary education have been stable since 1999-00 to 2007-08 (ranging from 1.90% to 1.80% of GDP), however the public outlay as a percentage of GDP in vocational education and training has reduced from 0.56% to 0.46%.

Possible responses include:



- **Increased national efforts on foundation skills, especially on literacy and numeracy**

A renewed national focus on adult literacy, numeracy and foundation workplace skills is proposed for effective workforce participation and skill utilisation and work. This is important to improve engagement and productivity of the current workers, and also for the potential workforce. This could comprise steps such as:

- A high profile campaign to increase public awareness on the importance of core skills for lifelong learning and increased uptake of opportunities for improved language literacy and numeracy skills
- Work with employer groups, unions and education and tertiary providers on ways to improve and extend development of foundation skills relevant to employment and the improved use of technical and other work skills
- Trialling of programs with target groups such as younger people, non-English speaking background workers with low level foundation skills, or among industries or clusters where this is a characteristic.

- **Consideration of per/student spending**

It is important to understand whether public spending is sufficient to provide for anticipated demand, produce good outcomes, and meet the needs of particular groups, especially in the vocational education and training and community education sectors where less advantaged students are concentrated.

- **Dimensions of employer expenditure need updating**

These dimensions are not up to date, and are an important consideration in terms of an increased focus on workforce development and workplace based learning. Skills Australia has drawn attention to the need for a holistic framework for tertiary sector investment that takes account of public and private, and in particular, employer expenditure on training based on updated and comprehensive information. Other countries undertake studies of employer expenditure. In Australia this is estimated as approximately the same as governments, but the last national survey was in 2002.

- **Support for work based learning**

The large proportion of work based learning in vocational education and training is undertaken via new entrant and existing worker apprenticeships and traineeships. Work integrated learning is a growing, but not a predominant feature of higher education provision. There are uneven occurrences of work-based learning across industries and types of employees, especially among those working part-time and casually, or in smaller workplaces. The extent to which, and how best government can support work-based learning for existing workers, is an important consideration for strengthened public support for workforce development. Such examination could incorporate contracts of training, other formal work-based provision and informal learning. The flexibility of employer incentives and other support programs might also be considered.

- **Adaptation of provision**

The amount of education and training delivered in workplaces has increased in recent years, but it remains small compared to that delivered in educational institutions. The faster adaptation of provision to a changing occupational and workplace landscape is required to ensure contemporary relevance of teaching and learning. Expansion of workplace based delivery and work integrated learning is anticipated to address individuals' changing needs for flexibility and currency and also co-ordinate with whole of enterprise strategies to link learning to performance.



Appendices



Appendix A: Government targets

In November 2008, the Council of Australia Governments (COAG) signed a *National Skills and Workforce Development Agreement* that sets out the commitments towards increasing the skill levels of all Australians, including Indigenous Australians. It noted the need for action to:

- address gaps in foundation skill levels for the working age population to enable effective educational, labour market and social participation
- ensure the working age population has the depth and breadth of skills and capabilities required for the 21st century labour market
- ensure the supply of skills provided by the national training system responds to meet changing labour market demand; and
- ensures skills are used effectively to increase labour market efficiency, productivity, innovation and ensure increased utilisation of human capital.

The Agreement set out targets for people with Certificate III or above, diploma and university-level qualifications, and commits to monitoring the proportion of working age people with literacy levels at one, two or three. The Australian Government subsequently revised the higher education target and in the *Higher Education Support Amendment Act 2009* identified the following goals:

- forty per cent of all 25 to 34 per cent of people to have at least a bachelor's degree by 2025
- twenty per cent of higher education enrolments to be from students from low socio-economic background by 2020.

Table A1: Selected government educational qualification targets 2008 and 2009⁶⁷

Government target	Percentage point change from 2008	Change from 2008	Date to reach target
		Number	
40 per cent of all 25 to 34 per cent of people to have a bachelor's degree or above	8	285,000 additional people with qualifications ¹	2025
20 per cent of higher education enrolments to be from students from low socio-economic background	4	55,000 additional enrolments	2020
To halve the proportion of 20 to 64 year olds who do not have a qualification at or above Certificate III	24	3.6 million additional people with qualifications ¹	2020
Double the number of higher qualification completions (diploma and advanced diploma)	50	32,000 additional ²	2020

Sources: Calculations based on ABS data and Council of Australian Government's *Communiqués* and Australian Government (2009) *Mid-term progress report*.

⁶⁷ 1. Includes skilled immigrants who train overseas and people who train locally.
2. This is the 2007 number of diploma and advanced diploma completions.



Over 2008 and 2009, education funding was boosted to increase total Australian Government investment by some 50 per cent over the next five years. In April 2008, the new *Productivity Places Program* was introduced to fund 711,000 additional training places for jobseekers and people in the workforce to obtain qualifications, mostly at Certificate III and above. An additional 50,000 new university places (by 2013) and 5,900 additional *Language, Literacy and Numeracy Program* places were also funded in 2009.

New higher education and research infrastructure is being funded from a \$5 billion *Education Investment Fund* across 31 universities and 11 TAFE and other vocational education providers.

The 2009 to 10 Budget proposed to restore indexation for university places, but did not lift per student funding.⁶⁸ Many of the Bradley report's recommendations for changes in income support, a new program for outreach activities and a loading paid to institutions enrolling students from low socio-economic backgrounds are being adopted by the Australian Government.

⁶⁸ The appropriate rates of funding for different fields of study have not been considered here.



Appendix B: Additional data

Table B1: Projected population by age Australia 2009 to 2020

	0-14y	15-64y	65y +	Total
	million	million	million	million
2009	4.1	14.6	2.9	21.7
2010	4.2	14.8	3.0	22.0
2015	4.4	15.6	3.6	23.6
2020	4.7	16.4	4.3	25.3
Increase 2009–20 (million)	0.5	1.8	1.3	3.6

Source: ABS *Population projections, Australia, 2006 to 2101*, Cat no. 3222.0 Series B.

Population: All people.

Table B2: Planned allocation of PPP training places by type, year and AQF level, 2007 to 2012

	2007–08	2008–09	2009–10	2010–11	2011–12	Total	
	No.	No.	No.	No.	No.	No.	%
Existing Workers							
Certificate II	-	-	-	-	-	-	-
Certificate III	-	6,600	8,820	11,880	11,880	39,180	10%
Certificate IV	-	26,400	35,280	47,520	47,520	156,720	40%
Diploma	-	26,400	35,280	47,520	47,520	156,720	40%
Adv. Diploma	-	6,600	8,820	11,880	11,880	39,180	10%
Total	-	66,000	88,200	118,800	118,800	391,800	100%
Job Seekers							
Certificate II	15,000	41,400	18,130	21,420	21,420	117,370	37%
Certificate III	5,000	49,520	22,094 ¹	20,196	20,196	117,006	37%
Certificate IV	-	17,040	13,288 ¹	9,792	9,792	49,912	16%
Diploma	-	7,040	8,288	9,792	9,792	34,912	11%
Adv. Diploma	-	-	-	-	-	-	-
Total	20,000	115,000	61,800	61,200	61,200	319,200	100%
All places	20,000	181,000	150,000	180,000	180,000	711,000	-

Source: DEEWR.

1. These figures include 10,000 structural adjustment places distributed between Certificate III and Certificate IV. This is a notional allocation as the places are available at the Certificate III level and above.



Table B3: Training rates of trade apprentices and trainees by selected occupations, 1998 to 2008

Year	Occupation (ANZSCO) group										Total trades
	Engineering, ICT and science technicians	Automotive and engineering	Construction trades workers	Electro-technology and telecomms trades workers	Food trades workers	Skilled animal and horticultural workers	Hair-dressers	Printing trades workers	Textile, clothing and footwear trades workers	Wood trades workers	
1998	2.4	12.1	8.8	8.2	13.5	4.3	21.3	7.3	2.5	11.7	9.2
1999	2.0	12.6	9.5	8.5	12.5	5.1	18.5	6.0	4.1	11.5	9.2
2000	2.1	12.0	10.1	9.3	12.5	6.5	22.8	5.3	3.2	12.7	9.5
2001	2.1	11.2	10.1	10.0	12.7	6.9	21.3	8.2	3.4	11.5	9.5
2002	4.1	12.1	10.8	8.9	14.8	6.8	21.7	5.8	3.6	12.1	10.1
2003	2.3	11.9	11.6	9.8	13.2	6.2	23.6	5.8	4.0	13.3	10.0
2004	1.8	13.7	12.2	11.1	13.8	6.2	23.6	6.4	3.0	13.4	10.7
2005	1.7	14.8	13.2	13.2	13.9	5.6	23.1	6.9	2.7	12.7	11.3
2006	1.7	15.3	13.8	14.3	13.9	5.6	22.5	6.5	2.3	16.8	11.6
2007	1.7	15.3	15.0	15.5	12.7	5.8	20.6	5.9	2.5	14.9	11.9
2008	2.1	14.8	14.2	15.6	13.0	6.8	20.8	6.1	1.8	14.5	12.0

Source: Australian vocational education and training statistics: Apprentices and trainees, 2008—Annual, NCVET, 2009.



Table B4: Reasons for receiving training, 2007 (%)

	Male	Female	Total
To help get started in a job	9.6	9.4	9.5
To improve skills in current job	76.7	77.0	76.9
To maintain professional status	62.7	62.3	62.5
To help with future job or promotion	28.9	32.9	31.0
To develop skills generally	57.5	53.4	55.4
For health or safety concerns	25.7	29.2	27.5
For other reasons	3.2	3.6	3.4
Sample size (N)	1,025	960	1,985

Source: HILDA Release 7.

Population: Respondents aged 25 and older who were employees in any job in past 12 months.

Notes: Data weighted by cross-sectional person respondent population weights. Note that multiple responses were allowed, so percentages do not total 100%. Question: "Looking at SHOWCARD E7, what were the aims of any of this training."

Table B5: Work-related training tables by industry from HILDA

	Received training by industry, 2003 to 2007				
	2003	2004	2005	2006	2007
% receiving training					
Primary industry	46.6	38.2	45.4	41.0	31.7
Manufacturing	27.8	26.0	33.5	31.5	26.4
Utilities	62.2	45.7	54.6	46.4	56.8
Construction	28.3	37.3	30.8	29.5	32.5
Wholesale	33.6	28.0	34.7	27.0	20.4
Retail	29.1	29.0	28.7	26.9	23.6
Accommodation, cafes etc	23.9	24.8	23.3	17.7	24.0
Transport	39.0	38.1	39.1	33.7	31.5
Information services	53.6	43.2	50.8	45.9	32.5
Finance & insurance	52.3	54.8	52.1	54.9	44.2
Business services	39.1	39.0	44.9	41.0	34.2
Government	60.0	62.8	62.3	54.5	45.7
Education	56.9	54.8	55.0	57.8	47.6
Health & community	57.5	52.7	54.6	59.4	46.3
Other services	31.8	37.3	40.5	38.4	34.2
Total	42.8	42.1	44.6	42.8	36.3



Appendix C: Planning activities by stakeholders

State and Territory strategies and plans

The States and Territories have prime responsibility for the VET system. Australian Government policies and funding agreements affect the size and direction of state activities. Agreements in COAG have brought greater consistency across states, notably on targets for qualifications and for participation by Indigenous groups and for young people. An Australian Workforce Development Strategy has to be progressed in cooperation with the States and other stakeholders.

State governments vary in their approaches though there is some commonality in the broad objectives, in most of the strategies and in type of data analysed.

Economic and social context

Context factors bearing on the approaches in all states include:

- The recession
- Skill shortages
- Effects of technical change and globalisation on productivity, employment and skill needs
- Employer utilisation of skills
- Particular features of the state economy especially in the resource rich states
- The impact of climate change and mitigation policies
- Ageing and its effects on the labour force, with least effect in the fastest growing states
- Relatively low skills, qualifications and labour force participation rates among particular groups
- Disadvantage among Indigenous and persons from low SES background
- Agreements and targets developed with the Australian Government and COAG including the increased funding under the Productivity Places Program.

Objectives

The major objectives are

- provision of education and training to meet the needs of a changing industrial structure for a more skilled, flexible labour force
- provide for individual needs to support the acquisition of skills and qualifications that lead to higher labour force participation and promote social inclusion.



The objectives are spelt out in varying detail. All states are seeking to provide more training at higher skill levels. Attention is to be given to underpinning foundation skills and to literacy and numeracy. There is concern for youth and for older persons.

Strategies

Strategies and accompanying actions can be grouped into those directly concerned with increased delivery of skills and qualifications and those directed at improving the way the system operates.

Increased Delivery

All states have strategies for the increase in qualifications completed, particularly at higher levels. In most cases this involves specification of priorities for particular occupations and industries where shortages are noted, and for groups and regions. The quantitative expansion expected is stated in a number of reports.

There is concern for the delivery to particular groups including existing workers and persons not in the labour force. For young people the major actions are focussed on apprenticeships and traineeships e.g. Queensland (*Queensland Skills Plan 2008*) and Western Australia (*Training WA Planning for the Future 2009-2018*). WA, for example, has detailed proposals for provisions for Indigenous persons.

NSW has indicated that 'Industries that play a critical role in NSW through economic growth, employment, or regional development will be prioritised to receive publicly funded training support' (*NSW DET Delivering Skills for NSW Strategic Plan for Vocational Education and Training 2008-2010*).

In distinction Victoria is moving to a system where the distribution of the state supported training will largely respond to student demand for places, subject to the student taking a qualification at a level higher than one already held (*Securing Jobs for Your Future, Skills for Victoria 2008*). However, the right to limit expansion in some areas is reserved, considerable information and advice on job prospect will be provided and increased support will be given for firms to identify their skills development needs under a program called *Skills for Growth*.

South Australia has undertaken analysis of likely job openings and supply of labour. South Australia is concentrating its attention on identifying those occupations for which training is relatively long, where a deficiency in appropriate skills could have notable effects on productivity and where the skills are shown to be used (*SA Training and Skills Commission 2009, Skills for Jobs*). A plan to be released in November will include detail on this work.

Improving the efficiency and effectiveness of the VET system

The strategies developed by the States address the ways in which the functioning of the VET system can be improved.

■ Capacity of the VET sector

The capacity of providers and in particular their teachers is fundamental to improving the VET system. This includes the infrastructure, the quality of the teachers and the capacity of the providers to respond, including the independence of public providers.



- **Quality**

There is concern that minimum quality standards are being met (e.g. *Skills—Creating our Future: The Tasmanian Skills Strategy 2008-15* and NSW p.16). A range of activities jointly among states and Australian Government are being directed at this.
- **Workforce development**

Initiatives have been undertaken to increase the utilisation of skills through workplace development initiatives. These are considered in detail in Section 4 of this paper so not discussed here.
- **Competition**

One strategy fostered by COAG and agreements with the Australian Government is to open the provision of public funds to increased competition among public and private providers. This is evident in all state plans though the extent is highest in Victoria where all public funds will be open to competition within the next few years. Competition is seen to promote the responsiveness and relevance of training.
- **Improving completion rates**

Completion rates in apprenticeships and traineeships (at around 50 per cent) are considered too low. They vary by field of study across states. Data on completions in other areas of VET appear to be lower though less detailed data are available. Action to promote early completion and a higher rate of completion is indicated though not always the detail of the strategy.
- **Pathways for students**

Various Australian Government and COAG initiatives have fostered attention on pathways including transition to higher education. The Queensland Skills Plan has a section devoted to building bridges to the professions.
- **More efficient learning**

All states support expanded provision of RPL, some with additional incentives to support it. Increased provision in the workplace is advocated along with increased delivery by E learning
- **Information and guidance**

Increased provision of information to support and guide student choice receives attention in state strategies.
- **Increased investment**

The state strategies indicate increased public investment. The Victorian strategy indicates changes in the fees to be paid by students. The contribution of employers is not considered in detail.

Data and planning methods

All the states use detailed labour market information in their development of their training plans. In most cases this involves projections of employment by industry and occupation and the likely qualification structure of future employment. In some cases it involves a forecast of supply of qualified persons from training and migration, to be considered in relation to expected job openings.



The time period for these analyses varies. Some state plans are explicit for only three years. Others are concerned with short, medium and longer term, and undertake scenario planning work, e.g. *Training WA: Planning for the Future 2008-2018*.

The use of these analyses varies. In some states they are used alongside industry intelligence in setting priorities for the allocation of public funds for training. In general they have not been used to curtail numbers in apprenticeships or traineeships for which something approaching an entitlement system has operated for some years. Across Australia trade apprentices in particular have been limited more by capacity of providers than by state funding restrictions.

Victoria until recently used its analysis to underpin its discussions with public providers on the allocation of funding for the non-apprenticeship, non-traineeship component of training. Victoria is maintaining its labour market intelligence but this is now to support choice rather than to curtail or expand provision by public providers

Key documents

Training WA Planning for the Future 2009-2018

Queensland Skills Plan 2008

SA Skills for Jobs: The Training and Skills Commission's Five year Plan for Skills and Workforce Development, May 2009

Skills—Creating our future, The Tasmanian Skills Strategy 2008-15

ACT Skills Future, Key Initiatives in a Long Term Strategy to Address The Skills Challenge 2008

Training WA, Planning for the future 2009-2018

Securing Jobs for Your Future Skills for Victoria 2008

Job Plan 3, Jobs for the Future 2007-08, NT Department of Education and Training

Delivering Skills for NSW, Strategic Plan for Vocational Education and Training 2008-2010.



Industry Skills Councils Environmental Scans 2009

The environmental scans prepared by the Industry Skills Councils provide examples of how industry intelligence can add richness and depth to general trend data developed through forecasting or modelling. The scans are developed annually by the Councils for the coming year. They provide information on continuing and emerging skills issues at a sectoral level, as well as on their own activities. The full scans are available from the Skills Councils' web sites.

Examples of the types of information provided are below, drawn from scans developed in 2008 and focusing on 2009.

Immediate and short term industry pressures

Example: The Forestworks Skills Council reports:

The forestry sector is under considerable pressure, with falling demand for paper products, delays in the construction of two new mills, possible closure of two Tasmanian mills and the scheduled closure of one Victorian mill

Job losses being felt early as a result of the global financial crisis, with Tasmania sources predicting job losses of up to 30 per cent of which 10-15 per cent in downstream processing and some 20 per cent in forest growing and management

Changing industry structure and composition, and the factors influencing change in the medium term

Example: The ElectroCommunications and Energy Utilities Skills Council reports:

The ageing of Australia's energy infrastructure and the need to renew it, citing the Australian Bureau of Agricultural and Resource Economics' estimate that \$30-35 billion of new energy infrastructure will be required to 2020

The impact of climate change abatement measures, exacerbating skills shortages in energy sectors which it believes will intensify as Australia transforms itself to reduce carbon pollution and increase energy efficiency. Current measures are already significantly increasing the demand for trained and accredited renewable energy system designers, installers and smart meter technicians.

Example: Manufacturing Skills Australia reports:

Substantial growth and new opportunities in advanced manufacturing, rapid manufacturing, nanotechnology, photonics, integrated systems and green technologies.

How client needs are affecting skill requirements of jobs, or the occupations needed in an industry

Example: The Government Skills Council reports:

The ageing prison population, adoption of human rights legislation, and increasing demands related to offenders with mental health issues require adaptation and new skills among custodial officers and other staff



Increasing number of offenders being sentenced to supervisory orders within the community create a demand for staff with specialist skills in mediation and rehabilitation

Example: The Community Services and Health Skills Council reports:

In disability services, the shift towards home-based care is changing skills requirements and placing greater demands on staff in terms of responsibility, decision making and occupational health and safety.

Changes in work context that affects how skills are developed and used

Example: The Agri-Foods Skills Council reports:

In agriculture, there is increasing moves towards 'corporate cropping' continue to see high-powered investors and corporations buying multiple farms in prime cropping country with the intent of achieving economies of scale and better utilisation of plant, human capital and infrastructure

This scale of farming is starting to realise real career paths for those wishing to enter the industry and attractive job roles for those willing to gain higher level skills and qualifications.

Example: The ElectroComms and Energy Utilities Skills Council reports:

As the importance of renewables grows, new jobs and roles will emerge operating across convergent technologies and work practices. Relationships between tradespeople will be cooperative and symbiotic; there will be a tendency towards greater specialisation with entities concentrating on particular sectors: generation, distribution and retail, and increasing mergers within each sector.

Privatisation is increasing and has disrupted industry training practices in the past.

Specific regional and local circumstances

Example: The Property and Construction Skills Council reports:

In QLD, over \$100 billion is earmarked in the infrastructure fund for civil construction projects over the next eight years.

Example: The Service Skills Council reports:

The ACT had three times the average growth in service industries covered by the Council with high volatility in wholesale industry.

Example: The Agri-Foods Skills Council reports:

Lay-offs during the horse movement standstill that was a response to equine influenza in 2007 and the closure of race tracks at that time have made it harder to attract workers, with a sustained and chronic shortage of track riders.

Example: The SkillsDMC reports:

The wide geographical spread of mining enterprises, the lack of population centres close to operations and variations to work organisation such as fly-in fly-out systems, blocked work rosters and continuous shift patterns mean close to site training and assessment resources and facilities are needed.



Detailed advice about the occupations in short supply or in abundance

Example: The Transport and Logistics Skills Council reports:

Aeroplane pilots; air traffic controllers; flying instructors; airline ground crew and baggage handlers are in short supply in the aviation industry and

Deck hands; ships captains; marine engineers; marine engine drivers; deck officers in the maritime industry remain relatively in shortage.

Example: The Community Services and Health Skills Council reports:

Workforce supply is expected to increase as employees are being recruited from higher paying industries losing jobs; former employees are delaying or reversing retirement due to reduced superannuation incomes; and part-time workers (often female) are seeking to increase hours as a response to male job loss.

