CONFERENCE PAPER

Skilling and reskilling for our (greener) future

Tom Karmel
National Centre for Vocational Education Research

NCVER

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ABN 87 007 967 311

Level 11, 33 King William Street, Adelaide, SA 5000

PO Box 8288 Station Arcade, Adelaide SA 5000, Australia

ph +61 8 8230 8400 fax +61 8 8212 3436

email ncver@ncver.edu.au

<http://www.ncver.edu.au>

<http://www.ncver.edu.au/publications/2235.html>

About the research

Skilling and reskilling for our (greener) future

Tom Karmel

This paper was presented at the Economic and Social Outlook Conference, 5–6 November 2009, at the University of Melbourne. It takes a sceptical view of the push for 'green skills', arguing that skills required in the labour market evolve relatively slowly, and that the way business operates is driven by changing costs, new technologies and new regulations, with sustainability being only one of many factors.

In addition, the presentation provides some data on 'sustainable' courses in tertiary education and then looks at three areas which have implications for the public investment in education and training: the levels of skill acquired through apprenticeships and traineeships, the pay-off to undertaking VET qualifications, and the role of diplomas in the labour market.

Tom Karmel
Managing Director, NCVER

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Introduction

When I was invited to present at this conference, the blurb for the session was:

> In this session we will explore the general issues of skills formation as a major policy challenge for the coming decade, though with a particular sub-emphasis on the challenges posed by the needs of the emerging green economy. The subsidiary focus on the green economy is intended to both recognize the importance of the specific issue at this juncture and to illustrate the general principle that we need education and training systems in place that are responsive to changing technological and market needs.

My immediate response to this was that I was probably not the right person to speak on this because of my scepticism of the 'green skills' movement. Despite this, or because of it, I was prevailed on to speak.

The push for green skills has certainly grabbed policy-makers' attention. In the world of vocational education and training (VET)—I'm not so familiar with what has been going on in higher education—there has been a plethora of reports and action groups. The Prime Minister and Deputy Prime Minister, the Ministerial Council for Tertiary Education and Employment, multiple federal and state government departments, the National Quality Council and the industry skills councils have all got into the act. Major green initiatives have included:

- a request in November 2008 by the Ministerial Council to the National Quality Council to incorporate a green skills strategy into its 2009 work plan
- an announcement by the Prime Minister of:
  - 10 000 places for young job-seekers to build their skills through participating in an environmental work experience and training program
  - 30 000 apprentices in carbon-exposed industries to graduate over the next two years with qualifications that include clean and green skills
  - all new apprentices commencing after 1 January 2010 to graduate with a core set of green skills, knowledge and training
- each state and territory has its own policy requirements for training providers
- an action plan from the Department of Environment, Water, Heritage and the Arts—*Living sustainably: Australian Government's National Action Plan for Education for Sustainability 2009*, with one objective being that the VET sector incorporates sustainability in all national training packages and implements sustainable campus management
- *Environmental sustainability: An industry approach* produced by the industry skills councils, which identifies over 120 specific units of competence relating to sustainability in 25 training packages
- the National VET Sector Sustainability Policy and Action Plan (2009–2012), auspiced by the Ministerial Council and produced by the National VET Sector Sustainability Action Group
- a National Green Skills Agreement to be considered by the Ministerial Council this November
- The National Quality Council undertaking a project to 'analyse the work of Industry Skills Councils, State and Territory Course Accrediting Bodies and Registered Training Organisations to incorporate environmental sustainability into Training Packages Units of competency, VET qualifications, Accredited Courses and Skill Sets' (Precision Consultancy 2009).

There is no doubt that the sustainability and green agenda has been embraced by policy-makers in the education and training sphere. My scepticism revolves around three areas. The difficulty of isolating 'green' skills, my scepticism about the new green jobs that are going to be created, and a view that education and training, particularly vocational education and training, should be focused on providing individuals with the skills which the labour market values in the most efficient manner, rather than responding to a particular issue. I am not arguing with the science behind climate change, nor with the fact that sustainability issues will impact on business. Rather, I am arguing that the green movement potentially may do the sector a disservice by distorting the way the education and training naturally evolves as the economy develops. That is, the policy-makers are putting too much emphasis on one specific issue.

My issue is that the fundamental skills that are required in the labour market evolve relatively slowly and that it is wrong to think that we need to shake up the system in any dramatic way. For example, plumbers may need to be able to install grey water systems but they are still plumbers. The new techniques they use will be driven by the way technology is changing and this is occurring independently of any sustainability issues. The way business operates is driven by changing costs, new technologies and new regulations. For example, less copper piping is now used in houses with much of the pipe work being flexible plastic. This change is not about sustainability; it is about the relative costs of plastic and copper. At the other end of the scale, similar arguments apply. There are now modules on environmental economics and environmental law, but these are essentially the application of standard disciplinary approaches to new areas. Sustainability issues (for example, an emissions trading scheme or a carbon tax) will change relative costs and may involve specific legislation covering environmental degradation, but sustainability is only one of many factors. For many businesses, the change in relative costs implied by an appreciation of the Australian dollar from 60 US cents to 95 US cents will have a greater impact on the way business is done than the imposition of an emissions trading scheme.

In order to keep things in perspective, it is useful to look at the courses currently on offer in VET and higher education. Both sectors have been offering relevant courses for many years. The National Centre for Vocational Education Research (NCVER) has almost completed a report for the Department of Education, Employment and Workplace Relations on existing 'environmental sustainability' courses. Relevant courses were identified by means of a number of key words: *sustainable, environmental, environmentally, renewable and climate change*. Courses with these key words were then combined with courses identified by the National Centre for Sustainability at the Swinburne University of Technology and Industry Skills Councils (2009).

Table 1 shows that the number of courses has grown to over 40, although the course enrolments are still relatively modest. As a point of comparison, there were around two million enrolments in publicly funded VET in 2008.

Table 1 Number of VET courses and course enrolments in 'sustainability', Australia, 2003–2008

	2003	2004	2005	2006	2007	2008*
Number of VET courses	17	21	27	31	30	47
Course enrolments	1144	1378	1419	1523	1922	2647
Course completions*	105	127	146	150	188	156

Note: * The number of courses completed in 2008 is preliminary and will be updated in the 2009 VET students and courses collection.

Source: NCVER, National VET Provider Collection, 2003–2008.

While the number of courses is relatively modest, there is a large number of units of competency and modules which we classified as being in the sustainable category (table 2).

Table 2 Number of enrolments by units of competency and modules, Australia, 2003–2008

	2003	2004	2005	2006	2007	2008
Units of competency						
UoC enrolments	34 907	43 791	51 974	67 520	79 637	83 315
No. of units	164	221	221	245	231	255
Modules						
Module enrolments	15 803	17 023	16 352	15 855	18 080	16 902
No. of modules	229	231	223	199	203	205

Source: NCVER, National VET Provider Collection, 2003–2008.

Table 3 gives the flavour of the units. We see that the most popular unit is in automotive; a unit which no doubt has been created because of tighter environmental regulations on the disposal of waste in the industry. This is a good example of the sort of change that you would expect as a matter of course.

Table 3 Top 10 enrolments in 'environmental sustainability' units of competency/modules, Australia, 2008

Unit/module ID	Unit/module name	2003	2004	2005	2006	2007	2008
AURT271781A	Implement and monitor environmental regulations in the automotive mechanical industry				8 926	12 578	**14 462**
RTC2702A	Observe environmental work practices	1 288	4 176	7 774	7 577	10 056	**9 553**
BCG1011A	Handle construction materials and safely dispose of waste	7 758	8 569	6 631	4 061	4 339	**4 912**
BSBCMN215A	Participate in environmental work practices	1 518	1 417	1 693	3 263	2 936	**4 699**
RTC2401A	Treat weeds	535	2 385	3 539	3 320	4 351	**4 572**
19013	Environment and other considerations				1 300	3 941	**3 234**
AURC172003A	Identify environmental regulations and best practice in a workplace or business				2 571	3 815	**2 248**
AURV371481A	Implement and monitor environmental regulations and best practice in the body repair industry				913	1 523	**1 968**
BCCCM2004B	Drain and dewater site		6	874	1 387	1 493	**1 867**
RTE3605A	Troubleshoot irrigation systems		158	683	1 135	1 499	**1 717**

Source: NCVER, National VET Provider Collection, 2003–2008.

There are also considerable numbers of higher education courses that satisfied our selection criteria. As can be seen from the table below, in 2008 there were almost 13 000 students undertaking over 600 courses. The majority of these courses are 'bracketed', such as Bachelor of Science (environmental science). That is, they are natural extensions of basic science and other disciplines.

Table 4 Number of higher education courses and course enrolments in 'environmental sustainability', Australia, 2005–2008

	2005	2006	2007	2008*
Number of higher education courses	622	612	607	614
Student enrolments	12 168	11 527	11 862	12 981
Course completions	3 000	3 082	2 969	na

Note: * The number of courses completed in 2008 is preliminary and will be updated in the 2009 VET students and courses collection.

Source: DEEWR, Higher Education Statistics Collection, 2005–2008.

I certainly would not argue with the proposition that we need an 'education and training system that is responsive to technological and market needs'. In fact, responsiveness is something in which NCVER is particularly interested. We are currently undertaking detailed work looking at how a number of specific industry work practices have changed and whether VET has kept up with these changes.

I would now like to look at a number of issues related to up-skilling the workforce. While the future needs of the labour market are difficult if not impossible to forecast—who predicted the resources boom or the global financial crisis—there are some very clear trends in how the labour market is changing. One obvious one is that the more skilled occupations—professional and managers in particular—are growing at a faster rate than other occupations. Thus it is not surprising that governments are pushing for higher qualification levels. The Council of Australian Governments have agreed on targets that would see, by 2020, the number of diploma and advanced diploma completions double and the proportion of 20–64-year-old Australians without at least a certificate III halved. The Deputy Prime Minister has announced a target of 40% of 25–34 year olds having a degree by 2015.

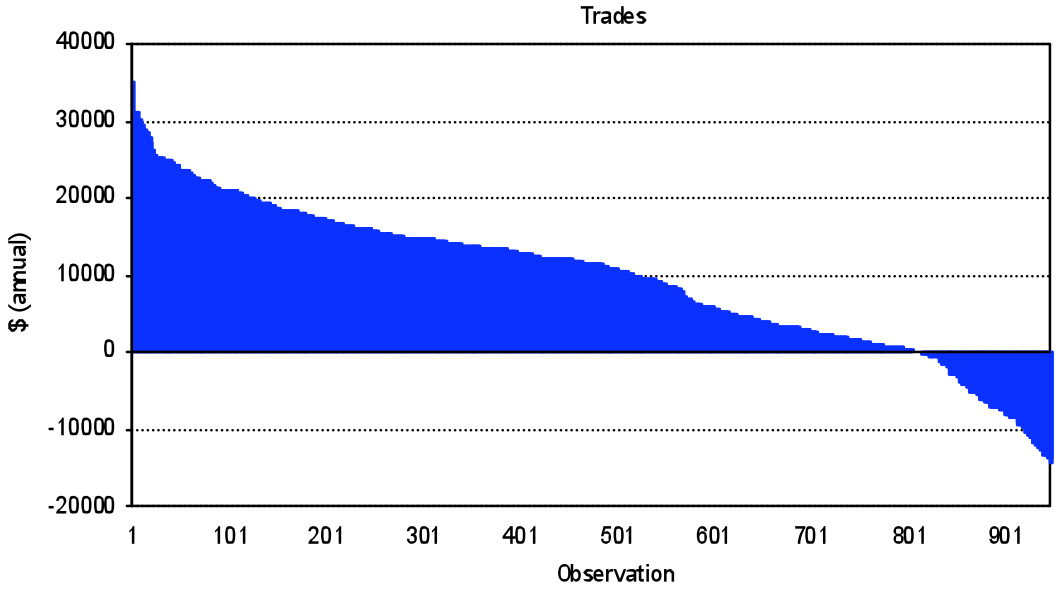
However, in pushing for increased qualification levels, we need to be mindful that education and training does not necessarily lead to increased productivity levels. While education and training is good, it does not necessarily follow that more education and training is better. We can invest in education and training that is not very profitable.

I would like to point to three areas which I think have implications for the public investment in education and training: the levels of skill acquired through apprenticeships and traineeships, the pay-off to undertaking VET qualifications, and the role of diplomas in the labour market.

Skill acquisition through apprenticeships and traineeships

I am a simple-minded economist and therefore I look to relative wages to gather evidence of skill levels. If wages are not positively related to qualification levels, then my prima facie conclusion is that undertaking the qualification has not led to increased skill levels relative to those who have not undertaken the qualification. In one of the projects on which I am currently working, I have used data from the recent NCVER Apprentice and Trainee Destinations Survey to estimate the wages that an apprentice or trainee gets if he or she completes the apprenticeship or traineeship or, alternatively, if he or she does not complete it. The wedge between these two wages provides an indication of the value of completing the training. In figure 1, I show the wedge for apprentices.

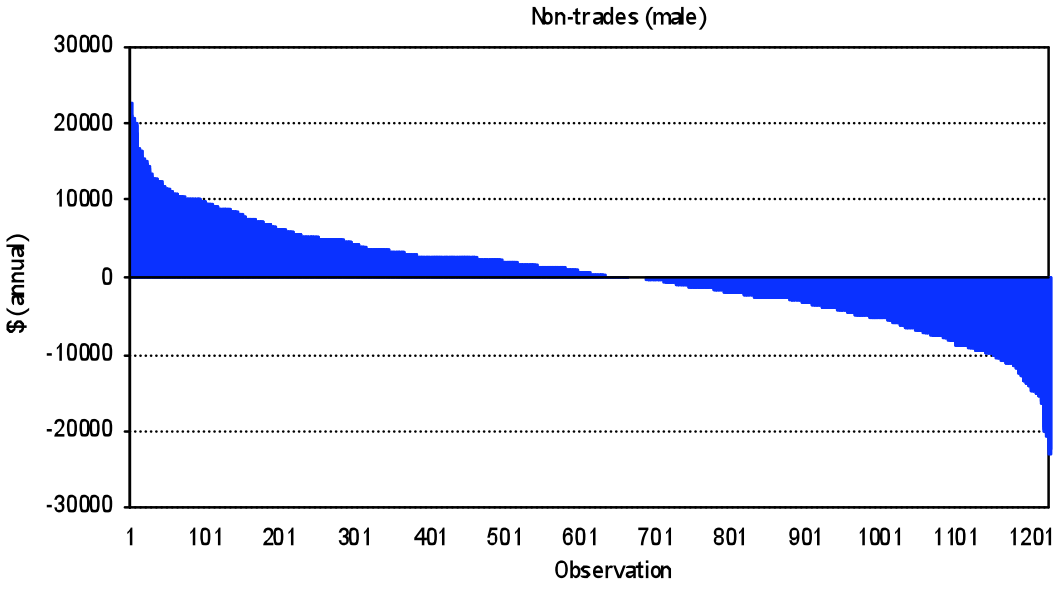
Figure 1 Wedge between expected wage on completion and expected wage in alternative employment, trades



Source: Karmel and Mlotkowski (forthcoming).

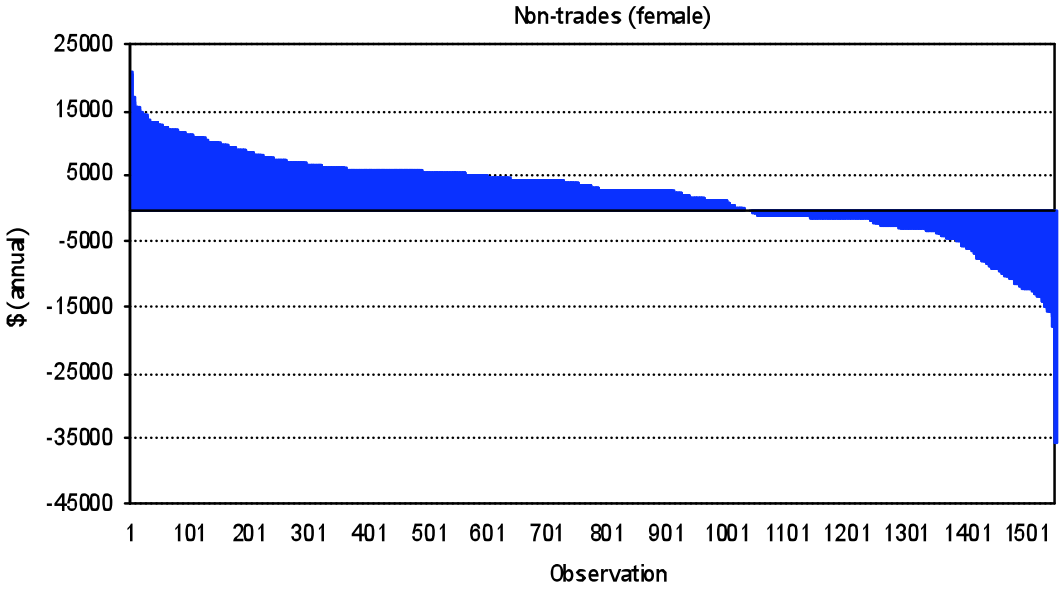
It is fairly obvious that, for almost all apprentices, the wages on completion exceed the wages in alternative employment. This is clear evidence that the apprenticeship does deliver increased skills, but the evidence is rather ambiguous for traineeships. Figure 2 shows the corresponding figure for males undertaking a traineeship, and figure 3 for females.

Figure 2 Wedge between expected wage on completion and expected wage in alternative employment, non-trades (male)



Source: Karmel and Mlotkowski (forthcoming).

Figure 3 Wedge between expected wage on completion and expected wage in alternative employment, non-trades (female)



Source: Karmel and Mlotkowski (forthcoming).

For males, there is no clear evidence that on average the wage on completion is higher than the wage in alternative employment. It is higher for some and lower for about an equal number. For females, the wages on completion are higher for a greater proportion, but the results are not so clear cut as for apprenticeships. My conclusion is that only some traineeships are actually delivering skills. Therefore, we need to be careful in putting too much resource into traineeships if their aim is to increase skill levels.

Returns to VET qualifications

While there has been a fair bit of work on the return to a qualification, my interest is in how those returns differ by field of study. I am arguing that if we think it is important to expand the education and training system, we should be mindful of where there are returns and where there aren't. Using data from the ABS Household Income and Expenditure Survey, I have calculated these in a couple of ways. First, I fitted simple wage equations allowing for level and field of study. Table 5 shows the results comparing certificates I/II with leaving school at Year 11 or below and completing Year 12.

Table 5 Weekly wages for full-time wage and salary earners, certificate I/II and field of qualification, 2005

	Full-time wage and salary earners	
	Weekly $s	Relative to Year 12
Year 11 or below	687	0.90
Year 12	765	1.00
Certificate I/II		
Science, IT, engineering	715	0.93
Architecture, building, agriculture	667	0.87
Health, education, society and culture, creative arts	723	0.94
Management and commerce	734	0.96
Food, hospitality, personal services	770	1.01

Notes: Calculated for a male, age 30, working 40 hours (for the hourly rate). The relativity to Year 12 is not affected by this assumption.

Source: Author's calculations based on ABS Household and Income and Expenditure Survey data.

It is clear that completing a certificate I/II does not lead to higher wages than completing Year 12. Possibly this sort of certificate is better than just leaving school at Year 11. This result does not give any comfort to those arguing that completing a certificate I/II is equivalent to completing Year 12.

Table 6 gives the analogous results for certificates III/IV.

Table 6 Weekly wages for full-time wage and salary earners, certificate III/IV and field of qualification, 2005

	Full-time wage and salary earners	
	Weekly $s	Relative to Year 12
Year 11 or below	687	0.90
Year 12	765	1.00
Certificate III/IV		
Science, IT, engineering	798	1.04
Architecture and building	873	1.14
Agriculture	630	0.82
Health	745	0.97
Education, society and culture, creative arts	719	0.94
Management and commerce	800	1.04
Food, hospitality, personal services	760	0.99

Notes: Calculated for a male, age 30, working 40 hours (for the hourly rate). The relativity to Year 12 is not affected by this assumption.

Source: Author's calculations based on ABS Household and Income and Expenditure Survey data.

The picture here is quite mixed, with three fields giving a better return than Year 12 and four an inferior return. It is interesting to note that the best remunerated field is architecture and building. This field of study would capture some of the traditional trades for which we showed earlier a healthy return to completion.

Now part of the return to a qualification is that it enables an individual to get into a particular occupation. So perhaps our aggregated data is masking improvements to wages and productivity within occupations. For example, a retail certificate III may give better wages in retail jobs, but we know that on the whole retail jobs are not well payed. We fitted wages equations within occupations to look at this possibility. Table 7 presents the results for two occupations which are important for traineeship—clerical and sales (table 7).

Table 7 Weekly wages for full-time wage and salary earners, selected occupations by qualification level, 2005

	Full-time wage and salary earners	
	Weekly $s	Relative to Year 12
61+81 clerical workers		
Left school before Year 12	**697**	0.97
Year 12	**721**	1.00
Certificate I/II	**717**	0.99
Certificate III/IV	**708**	0.98
Diploma or degree	811	1.12
62+82 sales workers		
Left school before Year 12	700	1.03
Year 12	678	1.00
Certificate I/II	651	0.96
Certificate III/IV	725	1.07
Diploma or degree	651	0.96

Notes: Bold signifies a statistically significant difference relative to an individual with a diploma or degree.
Calculated for a male, age 30, working 40 hours (for the hourly rate). The relativity to Year 12 is not affected by this assumption.

Source: Author's calculations based on ABS Household and Income and Expenditure Survey data.

The results for clerical occupations are quite striking. There is nothing between any of the qualification levels except for those people with diplomas or degrees. It is apparent that a high level of general education leads to better clerical jobs than specific technical training. The picture for sales occupations is less clear cut. Here there is some evidence that those with a certificate III do earn more. Interestingly, there is no return to a degree or diploma here.

While the above results suggest that there may not be much return to many certificates, I am not suggesting that skill does not matter in the relevant occupations. What I am arguing is that most of these skills can be learnt on the job. This point is made in table 8, which shows the return to experience in various occupations.

Table 8 Increase in weekly wages due to 10 years experience by selected occupations, 2005

	Increase in weekly wages	
	($s)	%
5 Advanced clerical and service workers	148	17.6
61+81 Clerical workers	165	25.5
62+82 Sales workers	173	36.2
63+83 Service workers	107	17.0
71+72 Machine and plant operators	131	19.5
73+79 Transport workers	159	26.1
9 Labourers and related workers	148	34.5

Notes: Compares expected earning of a 30-year-old male with a 20-year-old.
Source: Author's calculations based on ABS Household and Income and Expenditure Survey data.

The point here is that public investment in formal qualifications aimed at many of the lower skills occupations may not have much of a pay-off, and that training on the job may be a more efficient approach. The obvious point is formal qualifications are generally heavily subsidised by the taxpayer, while the cost of on-the-job training is borne by the employer and the employee.

The role of diplomas

Governments have been emphasising, as I noted earlier, the importance of higher-level qualifications. Part of this emphasis has been on increasing the number of VET diplomas, and it is on this point I want to sound a warning. My warning is based on an observation about the relative importance of diplomas and degrees in the labour market. Table 9 shows the changes in qualification levels by occupation between 1997 and 2005, using data from the ABS Survey of Education and Training (SET).

Table 9 Proportion of employed persons with a post-school qualification by occupation, 1997 and 2005

		Proportion with post-school qualification		Change in proportions between 1997 and 2005		
		1997	2005	VET	Higher education	Total
		%	%	% pt	% pt	% pt
1	Managers and administrators	62.1	70.5	-0.4	8.9	8.4
2	Professionals	89.1	91.6	-8.0	10.6	2.6
3	Associate professionals	58.4	68.5	1.6	8.5	10.1
4	Tradespersons and related workers	68.3	68.7	-0.5	1.0	0.4
5	Advanced clerical and service workers	53.3	57.1	-2.3	6.1	3.8
6	Intermediate clerical, sales and service workers	45.4	56.8	6.8	4.6	11.4
7	Intermediate production and transport workers	32.5	36.5	1.9	2.1	4.0
8	Elementary clerical, sales and service workers	27.8	37.4	6.7	2.8	9.6
9	Labourers and related workers	25.0	32.4	6.0	1.3	7.4
Total		**54.4**	**62.1**	**0.7**	**7.1**	**7.8**

Notes: VET post-school qualification defined as follows. For 1997: undergraduate and associate diplomas, skilled and basic vocational qualifications, certificates less than one semester, and qualifications with level of attainment not stated or inadequately described. For 2005: advanced diplomas and diplomas, certificates I to IV, certificate not further defined, and qualifications with level of attainment not stated or inadequately described.

Higher education post-school qualification defined as follows. For 1997: higher degree, postgraduate diploma, and bachelor degree. For 2005: postgraduate degree, graduate diploma/graduate certificate, and bachelor degree.

Calculations based on highest post-school qualification.

Source: ABS, Survey of Education and Training, CURF, 1997 and 2005.

A number of points stand out. The first is that the proportion of the workforce with a degree is increasing much more than the proportion with a VET qualification (a certificate or diploma).[1] But the more interesting point is that VET is losing relative share in the more highly skilled occupations: managers, professionals, associate professionals, and advanced clerical. The growth in VET qualifications is occurring within the less skilled occupations of clerical, sales and service, and labourers. If you look at particular labour markets in detail it is clear that we are seeing a professionalisation in many areas (see Karmel & Blomberg, 2009, for a study on the community services and health sector). Over time, qualification levels have been rising and we are going to see a three-year degree as the standard qualification in many occupations. This trend throws doubt on the government target looking to double the number of diplomas completions (unless we design structures that enable two-year diplomas to articulate simply into three-year degrees) but it also signals a challenge for the VET sector. If the sector fails to consolidate a hold in the higher qualification level (and I think this means offering degrees), then it will be left with training for the trades and the lower skilled occupations.

It's also worth noting that the data also show that people with degrees are beginning to work in lower skilled occupations. For example, there was an around 5% point increase in the proportion of people in intermediate clerical, sales and service occupations with a degree (table 9). In expanding the proportion of the degree, it needs to be realised that not all will get jobs in manager, professional and associate professional occupations.

Final comments

My general point is that in investing in skills for the future, we need to be aware that there is variation in the pay-off to different qualifications. We should be very wary of the 'all education and

[1] Part of this is because the survey records highest educational qualification.

training is good' mantra. All investments have an opportunity cost, and education and training is no different. For me, one of the big issues is the extent to which we invest in general education (which could well have a vocational bent) relative to specific, technical training. We should also not lose sight of the fact that much skills acquisition occurs on the job. Again, this points to governments investing in general education skills and leaving specific training to employers.

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National Centre for Vocational Education Research Ltd
Level 11, 33 King William Street, Adelaide, South Australia
PO Box 8288, Station Arcade, SA 5000 Australia

Telephone +61 8 8230 8400 Facsimile +61 8 8212 3436
Website www.ncver.edu.au Email ncver@ncver.edu.au