

Towards a new approach to mid-level qualifications – case studies

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Introduction to the case studies

In 2010 the National Centre for Vocational Education Research (NCVER) funded a three-year research program to explore how to improve flows within and between education and work. The research program, entitled *Vocations: the link between post-compulsory education and the labour market*, has three strands:

- Strand 1 is exploring the nature of vocational education in senior school certificates and how it can be enhanced to support pathways to post-school vocational education (including apprenticeships) and higher education. Strand 1 is being undertaken by the Education Policy Leadership Unit in the Melbourne Graduate School of Education, at the University of Melbourne.
- Strand 2 is exploring the role of educational institutions in fostering vocations. It is researching how to improve occupational outcomes and educational pathways within tertiary education, and between vocational and higher education. Strand two is being undertaken by the LH Martin Institute and the Centre for the Study of Higher Education, both in the Melbourne Graduate School of Education at the University of Melbourne, and by RMIT.
- Strand 3 is exploring the nature of vocations today. It is researching how to improve the development and use of skills within core sectors of the labour market, how to improve vocational pathways and the changes that are needed to the institutional arrangements that mediate vocational pathways. The Workplace Research Centre at the University of Sydney is undertaking Strand 3.

In order to link the strands together, they have analysed the same four industry areas: agriculture, electrical trades/engineering, the finance industry, and health and community services. The third stage of Strand 2's part of the project consisted of, firstly, producing discussion papers for each of our four case studies and a broader discussion paper for senior members of vocational education and training (VET) interest groups that synthesised our findings from the first two stages and presented proposals for a way forward for mid-level education in each field. Second, we distributed these discussion papers to a range of participants in each field and discussed our proposals with them. Third, we synthesised our findings from these discussions with previous findings from the first two years of the project. These comprised a range of document analyses, participant interviews and quantitative survey and educational institutional data. The quantitative data were updated and augmented where appropriate.

This support document reports on the outcomes of Strand 2's research in each of the case studies in 2013. The main report for Strand 2 draws from these case studies, and the main report also includes the outcomes of interviews with senior VET officials in state governments and government agencies. Each of the discussion papers in this stage of the project used vocational streams and the capabilities approach as its conceptual framework. Vocational streams consist of families of linked occupations where there are commonalities in the core underpinning concepts and practices within an industry - for example, care and care work. A vocational stream groups related clusters of knowledge and skills that allow individuals to progress and/or specialise within a field of practice, or to move laterally into related occupations.

The capabilities approach links individuals, education and work by identifying the individual, social, economic and cultural resources that individuals need to develop as autonomous, innovative and creative workers within broad vocational streams. Capabilities are contextualised by the knowledge, skills and attributes that individuals need to work within broad vocational streams so that the

capabilities needed in engineering differ from those needed in health and community services, although there may be some overlap. Philosophically, it is premised on the capabilities approach developed by the economist and Nobel Laureate Amartya Sen (1999, 2009) and the philosopher Martha Nussbaum (2000, 2011).

Each discussion paper identified the ‘hollowing out’ of the middle of the skill distribution within the labour market as a key factor that inhibited both the development of occupational pathways that link lower and higher skilled occupations, and educational pathways that are designed to support those occupational pathways. The discussion papers followed the research’s focus on mid-level qualifications, which were defined as those that prepare graduates for para-professional occupations: diplomas at Australian Qualifications Framework (AQF) level 5 and advanced diplomas and associate degrees at AQF level 6. The discussion papers noted that mid-level qualifications have three roles, to:

- 1 Prepare graduates for entry to the labour market;
- 2 Support transitions to higher level qualifications; and,
- 3 Widen participation in higher level qualifications by expanding access for students from disadvantaged backgrounds.

The discussion papers note that all mid-level qualifications should fulfil each function, but the balance between them would differ according to students’ interest, the labour market served by the qualification, and decisions by educators.

The discussion papers analysed the key challenges of each industry, employment outcomes for VET and higher education graduates within that industry, the link between qualifications and occupations within the industry and the nature of occupational pathways within each industry. They presented proposals for the potential for vocational streams within each industry.

The team asked similar questions of interviewees. However, the broader discussion paper for senior VET officials asked slightly different questions. Each industry case study discussion paper used the following questions as a framework for the semi structured interviews:

- 1 Given the nature of skill formation within your industry, what should the main purpose of mid-level qualifications be?
- 2 What should be the ‘logic’ of qualifications in your industry? All qualifications need to achieve three purposes: as a labour market entry qualification, to progress to higher level studies, and to widen access to higher level studies for students from disadvantaged backgrounds. What should be the balance in your industry and why? What is the best way to achieve this balance?
- 3 Is there potential for basing qualifications on vocational streams in your industry? Are there occupations that are linked by commonalities in knowledge, skills and attributes? If there are, could you please elaborate on which occupations you are thinking of and how they are linked?
- 4 Is there potential for qualifications to be based on capabilities in your sector? In particular, can the capabilities approach help devise relevant, quality qualifications for mid-level jobs?
- 5 How could qualifications be developed and implemented? What would they look like? Who needs to be involved?
- 6 What would need to change to implement this approach? Who would need to be involved? What strategies would you recommend?

The outcomes of each case study are reported in the chapters that follow. This includes an explanation of the methods used in each case study and an indication of the number and type of

interviewees who were interviewed. Strand 2 did not identify interviewees in reporting on the case studies because this was an undertaking given to them at the start of the interviews, and because the issues we canvassed with them were quite controversial. A commitment for anonymity allowed interviewees to speak freely about their views on these issues. In contrast, Strand 3 was able to identify interviewees in their report because of their different focus and the different kinds of questions they explored with interviewees.

Each case study reports on the enrolment, employment and further study outcomes at two levels. It includes an analysis of the broad field of education that incorporates our case study industries, and the specific narrow field of education that is associated with our case study industry. The broad and narrow fields of education for each case study are as follows.

In the health and community services industries:

- Health is the broad field of education and nursing is the narrow field of education;
- Society and culture is the broad field of education and human welfare and services is the narrow field of education which is associated with many community services jobs.

In agriculture:

- Agriculture, environmental and related studies is the broad field of education, while agriculture is the narrow field of education.

In engineering:

- Engineering and related technologies is the broad field of education, while the two narrow fields of education are process and resources engineering, and electrical and electronic engineering and technology.

In the financial services industry:

- Management and commerce is the broad field of education, while banking and finance is the narrow field of education.

Analysis of these data allowed us to answer the following questions in the case study: To what extent do mid-level qualifications within the field of study provide students with a qualification -

- 1 They can use in the labour market? A subsidiary question is: to what extent do qualifications in the field of study allow students to enter occupations associated with their qualification?
- 2 That will allow them to undertake further studies?
- 3 That supports equity and social mobility by widening access to higher level studies for students from disadvantaged backgrounds?

In addressing the last question, the case studies use the Australian Bureau of Statistics Index of Education and Occupations in the Socio-Economic Indexes for Areas to measure the percentage of students from low socio-economic backgrounds. This particular index is used because it is the same as the index used in higher education to determine the socio-economic background of higher education students. The case studies explore the extent to which students from the lowest 40 per cent, or the two most disadvantaged socio-economic quintiles, are represented in qualifications in the broad and narrow fields of education.

Health and community services

This case study explores the nature of vocational streams and the potential for the capabilities approach in the health and community services industries. It focuses on nursing in health, while it focuses on a range of occupations in community services including aged care, disability support, and related care occupations. Strand 3 analysed all types of occupations within health and community services and the broad relationship between occupations that require higher education and vocational education qualifications as the labour market entry requirements. Strand 2's analysis therefore complements Strand 3's analysis.

The first section analyses the challenges facing the health and community services industries, and this includes a discussion of the structure of the labour market and its long-term trajectory. This is followed by a discussion of employment rates for vocational education and training graduates in different occupations within these industries, the extent to which they work in the occupations directly associated with their qualifications, and the extent to which VET graduates proceed to further study. The next section explores whether there is support for vocational streams and the capabilities approach within the health and community services industries. The particular dilemma it addresses is whether there is support for a general 'care' vocational stream that includes nursing and occupations such as aged care, disability support, mental health support and related occupations or whether nursing should be considered as a vocational stream separate from other general 'care' occupations.

The methods used in this case study include desk-top research of policy and industry documents and relevant research, statistical analysis of NCVET's students and courses reports and student outcomes surveys, and the higher education student statistics collection. It included 10 interviews with employers of graduates in health and community services, professional bodies, and educators in higher education and VET in these industries. The interviews were held either in person or by phone. Interviewees included:

- A representative from a large union who is also on the board of a relevant industry advisory body;
- A representative of a relevant professional body with responsibility for accrediting professional courses in higher education and continuing professional development for its members;
- A manager of a large youth support service in regional Australia;
- The director of VET in a large aged care provider that specialises in dementia and aged care, palliative care, rehabilitation and older persons' mental health;
- Two senior TAFE teachers, one of whom teaches in community services while the other teaches in nursing;
- Two senior academics in nursing in Australian universities, one of whom is a head of school of nursing and midwifery, while the other is a senior academic in nursing who has had a leadership role in the Australian Nursing and Midwifery Accreditation Council and is now a dean of a faculty that includes nursing;
- A pro-vice chancellor at a regional university with responsibility for health and community services; and
- An academic teaching in the social sciences in a regional university.

The interviews conducted in Strand 2 in the health and community services industries complement those conducted by Strand 3, which included:

- The Community Services and Health Industry Skills Council (CSHISC);
- Health Workforce Australia (HWA);
- The Victorian Department of Health;
- The NSW branch of the Australian Medical Association (AMA); and
- The Victorian branch of the Australian Nursing Federation (ANF).

Challenges facing health & community services

The health and community services industries are confronting major upheavals with increasing demand for care as the population ages. This ageing is accompanied by increases in the number of people with multiple and complex needs as the incidence of physical and mental disabilities increases with aging (CSHISC 2013,p.6). Several Government reforms are contributing to the changing care models within the health and community services industries, such as the introduction of the National Disability Insurance Scheme from 2014, the Living Longer Living Better Aged Care Reform Package introduced in 2013, the Closing the Gap National Indigenous Reform Agreement implemented in 2009 and revised in 2011, and the National Health Reform Agreement implemented in 2011. The reforms have in common 'person-centred' models of care, which requires integrated and holistic approaches to care of individuals to support their multiple needs.

Other challenges confronting the industry include the Fair Work Australia equal pay case, which gives pay rises of between 19% - 41% over eight years to over 150,000 workers. The equal pay case reflects the historical and currently inadequate recognition and recompense for paid care work which has characterised the industry and which will continue to limit occupational pathways and opportunities for workforce development (Leahy 2013). Employment in the industry is increasing faster than average for all industries and there is difficulty in recruiting skilled workers in regional and rural areas (CSHISC 2013). While demand has been increasing within the health and community services industry at all levels, according to the Community Services and Health Industry Skills Council (2013,p.11), the 'growth has been strongest in those [occupations] with VET qualifications'. Access to the support of informal or unpaid carers will continue to decline as the population ages and women's participation rates in the labour market increase (Leahy 2013,p.3). The Community Services and Health Industry Skills Council (2013,p.11-12) reports that while demand for services increases, government funding overall is decreasing as the Commonwealth and state governments attempt to contain public expenditure.

The structure of the labour market

There are significant barriers in the structure of occupations within the health and community services industries that will need to be addressed if more cohesive occupational pathways are to be constructed to facilitate greater horizontal and vertical occupational progression. Arguably this will be needed if person-centred models of care are to be developed (CSHISC 2013). However, a key problem for the health and community services industry is the siloed nature of each industry. Moreover, silos exist within the health industry and within the community services industry. In community services these silos are partly a construct of Australia's federal system of government, with aged care being primarily a Commonwealth responsibility, while disability support services are

primarily funded by the states and territories. Differences in funding bodies, reporting and accountability frameworks, regulatory and quality assurance frameworks can promote different philosophies and cultures as well as different models of provision and funding.

Yu *et al.* (2013) found health and community services to be characterised by very strong commonalities in practices within the vocational field of practice, but had very disparate, fragmented and often hostile relations among social partners within sectors in the industry. A particular problem for community services is low cost funding, which makes the construction of occupational pathways and career progression very difficult. Yu *et al.* (2013,p.12) explain that:

significant barriers to skill formation and career development exist in community services. Foremost of these barriers include the prevalence of low-cost funding models, high levels of casualised, part-time or agency-based employment, and poor job perception in care work. Ultimately, these barriers have manifested themselves in severe staff recruitment and retention issues, high workloads, limited access to training and development, and in the not-for-profit sector, low pay. These conditions limit the notion of occupational pathways at both ends of the skills spectrum.

In contrast, while there may be limitations in occupational pathways *between* different occupations within the health industry, occupational pathways exist *within* broad occupational fields (such as nursing, medical practitioner, dentistry etc.), and this in part reflects the regulated nature of these occupations where the occupational bodies specify what qualifications individuals must hold, and where these bodies accredit qualifications offered by educational institutions. The health industry is consequently structured by *occupational labour markets* defined by occupational pathways with entry and exit points, where qualifications are used to broadly specify the knowledge, skills and attributes required of practitioners.

The situation is different in community services industries. While regulation is increasing within the aged care and disability support industries, the qualifications needed by staff are minimal and generally low level, and generally lower than those needed in health (Yu *et al.* 2013,p.12). Unlike the structured occupational labour markets in the health industry, Yu *et al.* (2013,p.12) explain that there is 'limited mobility between low and medium to high-skill work' in the community services industry.

Interviewees in this case study generally recognised that problems arise from funding models in health and community services, the structure of the industry and workforce, and levels of pay. The employer representatives argued that it was hard to keep staff, even the most committed, when workloads were high and pay very low. Many interviewees stated that workers in aged care and disability support could make more money in unskilled jobs in supermarkets. Education can't 'solve' these problems, rather they must be addressed by government policy and by industry leaders. One senior higher education academic explained that:

...it sounds simple, but the thing you need to do is change reality. You're not going to get young people to change their minds [and want to work in the industry] by being brainwashed through propaganda that aged care is exciting and worthwhile; it's when they go and work there they go and see it.

Long-term picture

The Community Services and Health Industry Skills Council (2013,p.6) argues that the key priorities in the health and community services industries are to:

- Help workers and managers develop ‘new skills to adapt to the client-led model of care, particularly within autonomous care environments’;
- Create more sustainable workforce development models that make more efficient use of occupations that require VET and higher education qualifications and provide more fluid educational pathways for workers to move between these roles;
- ‘Create a common pathway of competencies’ in aligned sectors such as mental health, disability support services and aged care to support individuals with complex needs. They argue that the development of common pathways has ‘the potential to increase the retention of skilled workers, [which] may assist career planning and development with the industry, provided cultural issues and hierarchies are considered’; and
- Improve and support management and leadership within these industries to help drive ‘future workforce development and job redesign’.

They note that within the health industry Health Workforce Australia is leading a project to restructure the workforce to align occupations and their scope of practice with emerging needs within the industry, but this work ‘has largely been focussed on the professional degree qualified workforce’ (CSHISC 2013,p.14). Arguably, the scope of work such as this needs to be extended to focus on the VET qualified workforce within health, and on the community services industries more broadly as part of the implementation strategies within the various reforms governments are seeking to implement in these industries.

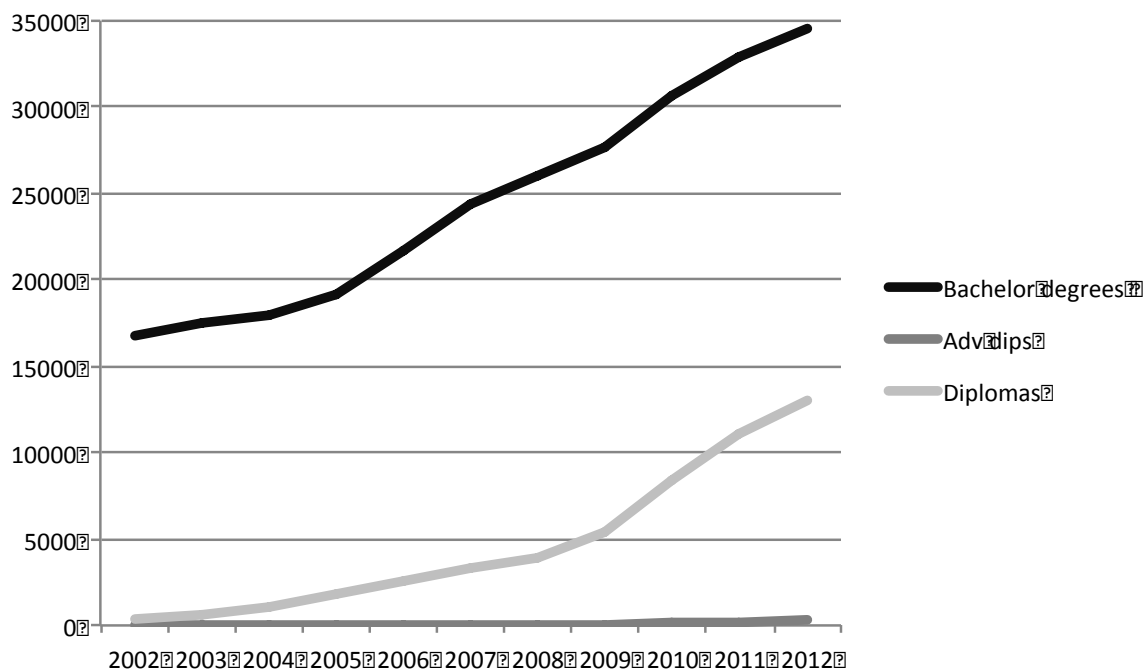
Enrolments, and employment and further study outcomes

This section examines enrolments and employment and further study outcomes for graduates in VET and higher education. It also examines the extent to which graduates obtain employment in the fields associated with their qualifications. This allows us to address the three questions about the relation between qualifications, the labour market, further studies and equity identified in the introduction.

Enrolments

Moodie and Fredman (2013) explain that enrolments in diplomas and advanced diplomas vary between fields of education, and this in turn is a consequence of the relation between qualifications in individual fields of education and the occupations with which they are associated. Figure 1 shows the change in the number of equivalent full time students in diplomas, advanced diplomas and degrees in nursing from 2002 to 2012. While there have been steep increases in enrolments in degrees and diplomas in nursing, enrolments in advanced diplomas are relatively flat with minimal numbers. This reflects the structure of occupations in those industries, with occupations tied to qualifications so that registered nurses require degrees to enter the labour market, whereas enrolled nurses require diplomas. The marked increase in enrolments in nursing diplomas from a very low level in 2002 reflects the change in the entry level qualification from a certificate IV to a diploma in all states in Australia.

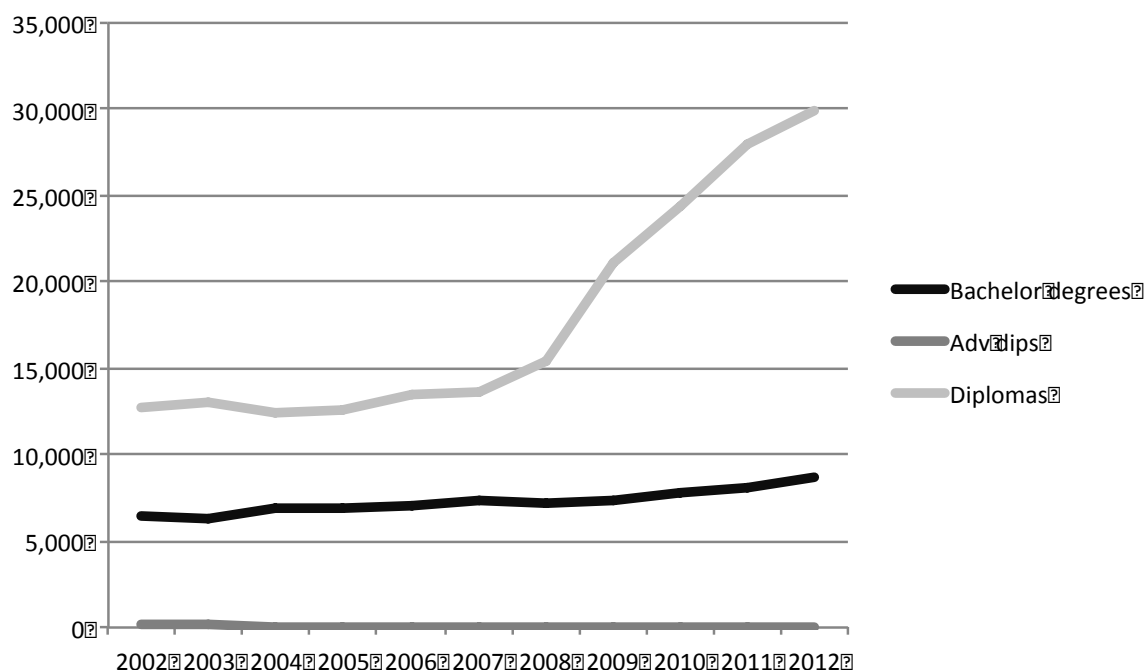
Figure 1 Full-time equivalent load in AQF 5–7 programs in mid-level nursing programs, 2002–2012



Source: VOCSTATS (www.ncver.edu.au/resources/vocstats/intro.html) extracted on 1/10/2013, and DIISRTE (2013) Table 4.4: Actual student Load (EFTSL) for all domestic students by State, higher education provider and broad level of course, full year 2012 and corresponding tables from previous years.

There has been a very big increase in equivalent full time enrolments in diplomas in the human welfare studies and services narrow field of education particularly since 2009, in contrast to the more modest increase in bachelor degrees over the same period. Enrolments in advanced diplomas are minimal as shown in Figure 2. While there have been increases in equivalent full time enrolments in a range of diplomas within human welfare studies and services, there have been steep increases in diplomas in children’s services, reflecting the increasing role of regulation within this industry which specifies qualifications for those working at particular occupations and levels within children’s services. There have also been large percentage increases in diplomas in disability support work, but from a much smaller base.

Figure 2 Full-time equivalent load in AQF 5–7 programs in mid-level human welfare studies and services programs, 2002–2012



Note: There was also a very small load in associate degrees, increasing from 2 in 2002 to 94 in 2009, with figures for higher education associate degrees not readily available after 2009.

Source: VOCSTATS (www.ncver.edu.au/resources/vocstats/intro.html) extracted on 1/10/2013, and DIISRTE (2013) Table 4.4: Actual student Load (EFTSL) for all domestic students by State, higher education provider and broad level of course, full year 2012 and corresponding tables from previous years.

Employment and further study outcomes

This section compares employment and further study outcomes in health and community services and the extent to which graduates obtain employment in occupations directly associated with their qualification. Table 1 shows that graduates in fields of education incorporating occupations in health and community services have employment rates that are similar to, or exceed, all VET graduates. Nursing has the highest employment outcomes when graduates of all levels are taken together. Overall, there is a higher proportion of graduates in human welfare and services and nursing who are employed six months following graduation compared to all VET graduates, but their employment outcomes are broadly similar to other graduates of diplomas and above.

Table 1 Percentage of graduates in employment six months after training, by level of qualification and broad and selected narrow field of education, 2012

Field of education	Cert I	Cert II	Cert III	Cert IV	Dips and above	All levels
Society and culture	59.0	67.3	72.5	79.3	85.2	76.3
Human welfare & services	na	57.8	77.3	81.3	87.5	80.0
Health	34.7	73.7	78.2	87.2	86.8	83.2
Nursing	na	np	81.2	92.1	85.8	86.5
All fields	50.5	61.8	79.2	84.0	83.2	77.8

Source: NCVET (2013).

Notes: na Not applicable

np Not published. NCVET does not report on estimates based on five or fewer respondents because the estimates are unreliable.

While the overall employment rate for graduates in health and human welfare and services are similar to each other and to all VET graduates, Table 2 shows that nursing graduates are more likely to be employed in nursing, compared to other graduates who are less likely to be employed in the occupation associated with their qualification. This is particularly the case for graduates of diplomas and above in the nursing narrow field of education where just over 72% of diploma and above graduates enter nursing, compared to the human welfare and services narrow field of education where just under 18% of diploma and above graduates are employed in occupations associated with their qualification. This is even lower than the 25% of diploma and above VET graduates overall who work in occupations associated with their qualifications. The tight link between employment destination and qualification in nursing at diploma and above level reflects the requirement that enrolled nurses must have a diploma to become an enrolled nurse.

In the human welfare and services narrow field of education in contrast, a very high proportion of certificate III graduates work in occupations associated with their qualification which reflects the use of certificates III as entry level qualifications in occupations in childcare, aged care and disability support work. This is so, even though their use as entry level qualifications isn't as tightly mandated as diplomas are in nursing. However, certificates III are increasingly required in these industries, and in childcare, a certificate III will become the mandated minimum entry level qualification from 2014. While individual workers in aged care don't yet face the same mandatory requirements to be suitably qualified, the accreditation standards for aged care providers requires them to employ staff 'who are appropriately skilled and qualified'¹ and this puts pressure on aged care providers to employ staff with a minimum of a certificate III.

Table 2 Percentage of those employed six months after training working in the same occupation as their training, by level of qualification and broad and selected narrow field of education, 2012

Field of education	Cert I	Cert II	Cert III	Cert IV	Dips and above	All levels
Society and culture	na	22.3*	67.6	32.8	21.0	45.9
Human welfare & services	na	31.7*	72.7	33.2	17.7	49.0
Health	0.0	19.0*	57.2	32.4	64.0	50.1
Nursing	na	na	np	56.8	72.4	68.3
All fields	24.0*	22.3	60.0	26.2	25.1	41.1

Source: NCVET (2013).

Notes: na Not applicable

np Not published. NCVET does not report on estimates based on five or fewer respondents because the estimates are unreliable.

There are also differences in further study outcomes between diploma and above VET graduates who are working in the same occupation as their qualification in the nursing narrow field of education and in the human welfare and services narrow field of education, but these are not as stark. The percentage of VET graduates with diplomas and above in human welfare and services who go on to further study is similar to those for VET graduates of diplomas and above overall, while the further study outcomes for nursing diploma and above students are about five percentage points lower. However, certificate IV graduates in nursing have a very high rate of further study, again reflecting the diploma as the new entry level qualification required to work as an enrolled nurse.

¹ See the aged care accreditation standards: <http://www.myagedcare.gov.au/accreditation-standards> viewed 26 December 2013.

Table 3 Percentage of graduates in further study six months after training by level of qualification and broad and selected narrow field of education, 2012

Field of education	Cert I	Cert II	Cert III	Cert IV	Dips and above	All levels
Society and culture	45.8	38.3	37.8	39.6	35.7	37.9
Human welfare & services	na	71.5	37.4	37.8	35.6	37.9
Health	np	53.6	39.2	38.8	30.8	37.4
Nursing	na	np	np	41.9	31.2	32.4
All fields	51.3	42.4	33.4	36.1	35.2	36.1

Source: NCVET (2013).

Notes: na Not applicable

np Not published. NCVET does not report on estimates based on five or fewer respondents because the estimates are unreliable.

Equity and social mobility

This section considers the extent to which mid-level qualifications in health and nursing, and in society and culture and human welfare and services, support social mobility and equity for students from low socio economic backgrounds to gain access to higher-level VET qualifications. While students from low socio economic backgrounds are over represented in VET overall, they are particularly over represented in lower level VET qualifications and underrepresented in higher level VET qualifications (Wheelahan 2009). However, this varies by field of education (Moodie 2012b). The occupations supported by health and nursing, and society and culture and human welfare and services, are highly feminised with lower paid and lower status occupations that comprise disproportionate numbers of people from low socio economic backgrounds (Leahy 2013). Table 4 shows the percentage of students in the two lowest socio economic quintiles, or students in the bottom 40% of socio economic backgrounds in these fields of education and for VET students overall. If students from the two lowest socio economic quintiles (the bottom 40%) were represented in VET qualifications in proportion to their numbers in the population, then they should be 40% of students in these qualifications.

Table 4 shows that mid-level qualifications in the broad fields of society and culture and health, and in the narrow fields of human welfare and services and nursing, support social mobility because they have relatively high proportions of students from low socio economic backgrounds in mid-level qualifications. While only 34% of all VET students at diploma and above are from the bottom two socio economic quintiles, about 40% of students in health in diplomas and above are from the same background. The broad field of society and culture has 42% of students from the bottom two socio economic quintiles, while the percentages for the narrow fields of education of nursing and human welfare and services are even higher. Students from the bottom socio economic quintiles are well over represented in lower level VET qualifications in these fields, with the exception of certificates I in the broad fields of society and culture and health but this is because the numbers of students in certificates I in these qualifications in these fields is so low, while there are no students at this level in the narrow fields of human welfare and services and nursing.

Table 4 Percentage of students from the two lowest socio-economic quintiles by level of qualification and broad and selected narrow field of education, 2012*

Field of education	Cert I	Cert II	Cert III	Cert IV	Dips and above	All levels
Society and culture	23.9	46.7	48.4	44.0	42.0	45.5
Human welfare & services	na	55.9	50.4	48.5	44.3	48.6
Health	29.0	46.6	41.6	41.1	39.6	41.1
Nursing	na	na	39.5	42.0	43.0	42.7
All fields	47.5	50.9	45.3	37.9	33.8	43.1

Source VOCSTATS (www.ncver.edu.au/resources/vocstats/intro.html) extracted on 26/12/2013

Notes: na Not applicable

*as measured by the Index of Education and Occupations in SEIFA (Socio-Economic Indexes for Areas), Australian Bureau of Statistics. It uses postcodes as the basic unit of measurement.

The number of students is counted and not enrolments or equivalent fulltime student load as the table focuses on attributes of students and not qualifications

Moodie shows similar results in examining the socio economic profile of students by field of education within higher education. The narrow field of nursing has both the highest percentage of students who are admitted to higher education on the basis of a prior VET qualification and the highest percentage from a low socio economic background. Some 22% of commencing students in nursing are admitted on the basis of a prior VET qualification compared to 9% of all commencing domestic undergraduate students, and 24% of commencing domestic undergraduate students are from a low socio economic background (defined in this instance as the lowest 25% of students from socio economic backgrounds) compared to 17% of all commencing domestic undergraduate students (Moodie 2012b, Table 4). Unfortunately, the same data are not available for the narrow field of human welfare and services, but in the broad field of society and culture, seven per cent of students were admitted on the basis of a prior VET qualification, while 17% come from a low socio economic background. In higher education, this field of education includes high profile and high status occupations such as law and economics among others, and the outcomes are likely to be quite different between the narrow fields of education within the broad field of society and culture.

Overall...

Overall, the data in mid-level qualifications in nursing and in human welfare and services show that:

- They provide students with qualifications they can use in the labour market, but they do so in different ways. Nursing is an occupational labour market with entry and progression tied to specific, mandated qualifications. There is an occupational ladder and students can use educational qualifications to help climb the occupational ladder. In contrast, while graduates from lower level qualifications in human welfare and services often work in the occupation associated with their qualification, this is not the case for graduates of diplomas and above. Even though graduates of diplomas and above are just as likely to be in employment six months following graduation as are graduates from nursing, they are not employed in occupations associated with their qualification. Consequently, qualifications are used as a screening device that broadly indicates knowledge, skills and capabilities required for work more broadly, in contrast to mid-level qualifications in nursing in which diplomas are tied to and specify the outcomes required for nursing.
- Mid-level qualifications in nursing and human welfare and services provide a ladder to higher level studies, broadly speaking at the same level as for other VET graduates of diplomas and above. While the percentage of nursing graduates of diplomas who continue to study is about five

percentage points lower than that for all VET diploma graduates, as Moodie (2012b) shows, they nonetheless are a very high proportion of commencing undergraduate domestic students in higher education.

- Mid-level qualifications in both nursing and human welfare and services are a mechanism for social mobility and equity for two reasons: first, they provide students with access to higher level VET qualifications, which in turn lead to good labour market outcomes compared to graduates of lower level VET qualifications (Karmel and Fieger 2012). Second, as diplomas are the key ‘transition’ qualification for VET students to higher education, they provide students from low socio economic backgrounds with access to higher education qualifications (Wheelahan 2009).

The potential for the capabilities approach and vocational streams

This final section of the case study considers interviewees’ views on the potential for the capabilities approach and vocational streams in health and nursing, and in human welfare and services. Overall, there was broad support among those interviewed for the health and community services case study for capabilities as the conceptual basis of qualifications and for vocational streams. The main debate was about how to constitute vocational streams, in particular, over whether nursing and community services should be considered as one vocational stream or two separate vocational streams.

The notion of capabilities and how the capabilities approach differs from competency based training models of curriculum was explored with all interviewees. They varied in the extent to which they were familiar with either or both approaches and had considered the issues. While some interviewees were able to make clear distinctions between the two approaches, others were either unclear about what each would involve because they weren’t necessarily engaged in providing education or developing curriculum. Alternatively, a few interviewees didn’t distinguish between capabilities and competencies, considering them to be different versions of the same thing. However, overall all interviewees were in favour of a broad approach to curriculum that was holistic, and ensured students had access to the theoretical basis of practice as well as opportunities to develop the skills needed to work in the field. They saw knowledge and skills as intrinsically related, and in part this is related to the philosophy underpinning occupations in health and community services, which emphasises human rights and empowerment.

The two representatives of community services providers interviewed for this project favoured a broad approach to curriculum because this reflected the changing nature of occupations on the one hand, and reflected the ‘humanist’ orientation of the occupations in this field on the other. In both cases, they were able to conceptually differentiate between capabilities and competencies because both were involved with education and either were still teaching or had been teachers in VET. The manager of the regional youth support service argued that instead of workers with specific skills in specific areas, the positions they had increasingly required case managers who could work in a range of areas and help support those with whom they were working more holistically, and that a broad approach to curriculum was needed to support this. This meant that they were increasingly seeking those with higher education qualifications, rather than certificates IV or diplomas, even though she valued the applied nature of these qualifications. This was in contrast to many degree graduates who didn’t have practical experience of the workplace because their social science oriented degrees didn’t include work placements. But nonetheless, they increasingly needed higher education graduates because:

...just the level of expectation, professionalism, ability to present and provide reports, we're getting subpoenaed up to court more often, there's a whole range of professional skills... and I think there's a gap with what people were doing in their certificate IV and diplomas and we're actually needing to produce more skills at a university level.

The degree could be improved with much more work experience with students placed with real agencies in the community and doing 'proper field placements'. Pathways from diplomas to degrees were particularly important for this employer because graduates would benefit from the opportunity to make sense of both the practical and theoretical aspects of their programs. It was the *combination* of the two that was important, and ideally qualifications in both sectors would embody this combination.

The representative of the aged care provider also supported a broader and more holistic approach to curriculum offered through a capabilities orientation. The employer is an enterprise registered training organisation and the main qualifications they offer to their own staff were certificates III and IV in aged care and home and community care, as well as the Certificate IV in Training and Education. The agency supported staff to undertake career pathways in nursing, both as enrolled nurses in VET and registered nurses in higher education. The representative was working to make their VET qualifications more holistic and move away from what she felt was a 'checklist curriculum mentality where we forgot about the person [the student]'. She felt that they had to reflect their agency's holistic approach to aged care in the way they treated and educated their staff. Language, literacy and numeracy was a big issue for this employer because many of their students (who were also staff members) were from non-English speaking backgrounds, and a more holistic approach to curriculum would encompass a greater emphasis on this as well as ensuring students had access to underpinning principles they needed to work holistically with aged people and to progress in their careers.

The higher education interviewees generally supported the capabilities approach and felt that it reflected the needs of the field for which students were being prepared as well as students themselves. In contrast, the two TAFE teachers, both of whom are senior teachers in health and community services respectively, didn't really differentiate between competencies and capabilities. They viewed the issues more as how competencies should (or should not) be grouped to provide students with a more generalist grounding within vocational streams.

Dilemmas – vocational streams

The main focus and debate within the interviews was about vocational streams. Almost all interviewees supported the notion of vocational streams because they could identify commonalities in knowledge, skills and practices between occupations, particularly those involved in care work. However, the main issue for interviewees was where the boundaries between vocational streams should be drawn. In the interviews we drew on a previous project we had undertaken for the New South Wales Board of Vocational Education and Training which explored the potential for new mid-level qualifications in community services and it canvassed whether new qualifications at this level could be for new generalist 'care-work' roles (Wheelahan and Buchanan 2013). Participants included leading employers in aged care and disability support in New South Wales, unions and industry advisory bodies. The general consensus was that a gap existed in the occupational structure at about diploma level, and required an 'advanced care practitioner' who would have the knowledge and skills needed to provide direct services and work with people with multiple and complex needs, such as those who were aged, frail, with Alzheimer's and a physical disability. Participants felt that such a role was needed in the longer term to help aging Australians stay in their homes for longer and was

the only way to ensure the future sustainability of health, aged care and disability support services. The new kind of worker who was needed would have the knowledge and skills at the same level as an enrolled nurse, but the qualification would be differentiated by the industries it served and the approach it took.

All participants in that project agreed that there was great potential in the notion of vocational streams as long as it excluded health (nursing) and children's services because the 'client' groups were too different, requiring different kinds of knowledge and skills. It was argued that children's services workers ran the risk of infantilising the elderly and those with disabilities with whom they worked (a view also expressed by the interviewee from the aged care provider in this project), and the career trajectory for workers in this field was into early childhood education and not care work.

Participants were adamant that aged care and disability support (and possibly mental health work and associated occupations) needed to be a separate vocational stream from nursing. This was because nursing was regarded as having an overly medicalised approach in contrast to aged care and disability support, which was about empowering people and providing them with support rather than 'fixing' them. It was felt that having a single vocational stream that included nursing would result in nursing colonising the disability support and aged care industries and imposing a medical model of care. The second reason was that currently the only occupational pathway for those in aged care and disability support, apart from those wishing to go into management, was into nursing. However, graduates of nursing diplomas (enrolled nurses) tended to be poached by the health industry rather than remain in aged care and disability support because pay and conditions were better and there were more structured occupational career paths.

Overall, interviewees in this project did not support this view. The interviewees from the regional youth service and aged care provider both felt that there was scope for enrolled nurses to work in more generalist care and case management roles, while acknowledging that there were dangers with the medical model. However, they both felt that this could be addressed through a broader approach in the diploma of nursing. This view was supported by the senior higher education academics in nursing. They felt that rather than blame nursing for poaching staff who undertake a diploma of nursing, that the aged care and disability support industries needed to address problems in funding and staffing models. According to one senior academic, 'nursing isn't seeking to colonise, I think nursing's trying to draw a line in the sand to protect patients'. The problems with these industries are, it was argued, that they are not sufficiently regulated and qualifications of staff are not sufficiently regulated and too low. Instead, the tendency was for greater fragmentation of the qualifications and skills required, rather than more holistic approaches:

Locally we have an aged care facility designed purely for people with dementia. And there are people who are employed and care for people with dementia and aged care called dementia specialists who have done a component of a Certificate IV and their supervision is to a registered nurse on the phone and there are a hundred residents. (Senior higher education nursing educator)

The other senior nursing academic argued that broadening the scope of practice of enrolled nurses so they were involved in more community and home-based care would broaden their career options and help retain them in the broader industry. Both senior educators felt that there was an overly medical approach in the diploma of nursing and that a greater emphasis on social models of care was possible and probably desirable.

The two senior TAFE teachers, one in nursing and the other in community services, took a somewhat different view. The TAFE leading nursing teacher felt nursing needed to be further differentiated

because of the differing knowledge and skills required between nursing and those working in aged and disability care. It seems that the key issue here was about the *level* of study rather than the potential for vocational streams. Nursing is a diploma, whereas most practice based qualifications in aged care and disability support are at certificate III and IV. As a consequence, this interviewee couldn't see much relevance in the concept because the knowledge and skills required of enrolled nurse graduates was a lot higher than that of graduates from certificates III and IV in aged services and disability care.²

The community services TAFE teacher argued that we needed to have three broad vocational streams rather than two: nursing; aged care and home community care; and, community work which would incorporate disability support. This is because disability support and aged care had different paradigms, and disability support was more closely aligned to community work and was more focused on empowerment, whereas aged care was more focused on direct care work.

The representative of the professional body argued that social work was a broad field that led to many different occupations and in this way, reflected many of the tensions that exist between different occupations such as social work, community work, welfare work, mental health work and so on. This tension was addressed by the leading academics (nursing and social sciences more broadly) interviewed for this project who explained that a major obstacle to getting broader qualifications that led to a range of different occupational outcomes was the professional demarcation between different areas within the academy, which in turn reflected occupational segmentation. Generally speaking, the professions and the academy maintain close connections, and occupational segmentation is often reflected in tensions within the academy. For example, one senior academic explained that:

I think professional rivalries and demarcation will be an issue particularly with social work. Social work isn't as dignified as you think in that regard... I would expect a backlash from them, because they have trouble with welfare officers as well, and getting social work type appointments with a welfare training background.

Conclusion

While objectively there are commonalities in the knowledge, skills and attributes required of workers, particularly in 'mid-level' occupations in health and community services, the potential for implementing vocational streams depends on the extent to which occupational segmentation can be overcome. In the second stage of the project, Strand 2 came to the conclusion that while educational institutions could support the development of new occupations requiring mid-level qualifications, that the driving force for changed or new occupational roles needed to come from within the industry and social partners: employers, unions and government. Educational institutions could support but not drive this change (Moodie et al. 2013). The potential for the emergence of vocational streams therefore depends on the extent to which key social partners are prepared to invest in the process.

In their final stage of the project, Strand 3 found that while health and community services was characterised by occupational segmentation, there was potential for vocational streams to emerge, and indeed, vocational streams had begun to emerge in localised arrangements. They argue that:

² There are diploma and advanced diploma qualifications in aged and disability care, and while graduates are expected to be involved in direct service delivery, the diplomas emphasise management and supervisory roles. Moreover, the numbers enrolled in these qualifications are much smaller than those enrolled in certificates III and IV.

The key prerequisite for moving beyond current fragmented arrangements and towards more effective delivery of services and skills development, is establishing forums that facilitate dialogue and build trust. (Yu et al. forthcoming, p.19)

The innovations in health and community services explored by Strand 3 were the result of: inclusive and consultative processes; formal but flexible models for shared decision making and conflict resolution; strong emphasis on clear protocols and structures of support in change management processes; and, evidence based evaluation of changes to models of care (Yu et al. forthcoming).

However, they argue that the emergence of vocational streams are not a given, and that trajectories towards greater fragmentation are also possible. Similarly, Strand 2's conclusion is that there are conflicting drivers within health and community services: on the one there are objective commonalities in knowledge, skills and practices within health and community services and widespread recognition of the need to develop more person centred models of care that engage the person holistically; and, on the other, the driver towards lower cost funding with resulting pressures towards skills fragmentation resulting in occupational fragmentation (as in the above example of dementia care workers who complete a component of a certificate IV).

If *coherent* vocational streams are to emerge they need to be based on occupations and the type of worker needed for those occupations. This is the connection to the capabilities approach. Broadly speaking, the model envisaged in the capabilities approach as we have used it is of a career so that individuals have the knowledge, skills and attributes they need to work in a range of related occupations within a broad field of practice, and to exercise judgement, autonomy and creativity in work. There are curricular implications in moving from training for tasks and roles for specific jobs to preparing individuals for a career within a broad field of practice; instead of a focus on tasks and roles for specific jobs, the focus needs to be on developing the person in the context of the field of practice for which they are being prepared, and the knowledge, skills and attributes they need for occupational and educational progression.

So while there was agreement about the need for vocational streams, and there was broad support for the capabilities approach, the latter was less well understood. However, the notion of capabilities has implications for the nature of vocational streams. Coherent vocational streams are premised on workers who are able to make judgements and exercise autonomy, while implicit but fragmented vocational streams can rest on greater fragmentation of occupational roles. If the latter is the model then qualifications that focus on the specific competencies needed for specific work place tasks and roles will dominate. Not only is this a cheaper model of education, but it also facilitates fragmentation of occupational roles through their further specification.

However, while occupational fragmentation may be achievable in institutions where workers are collocated and tasks and roles can be achieved through tight specifications of roles, such an approach is less suited to home based and community based care. In this instance, generalist and highly skilled autonomous workers are needed who can respond to the diverse and complicated needs of those with whom they are working, and exercise judgement and discretion.

Finally, to return to the vexed question of how to define the vocational stream in health and community services - is there one or two (or three)? While objectively there are commonalities between workers in mid-level occupations requiring mid-level qualifications, the structure of the labour market and industry is different in each, and this presents a real obstacle to developing one vocational stream. Nursing is a regulated occupational labour market, whereas community services is more unregulated and occupations and qualifications are more fluid, although there is pressure for

greater regulation in various occupations to support standards and public safety. Yu et al. (2013, p.19) found in this field ‘that links between occupations can be forged in incremental, innovative ways’. Overcoming occupational segmentation *within* community services between different care professions may well be the basis for building a vocational stream, one that is able to engage in more meaningful dialogue with the health industry over time.

Given the differences between the two vocational streams (nursing within health, and community services), qualifications need to reflect the different challenges workers face in engaging in educational and occupational progression. While mid-level qualifications in both vocational streams need to fulfil all three roles of qualifications (as a labour market qualification, to support higher level studies, and to support equity) the *curricular* implications are that mid-level qualifications in community services need to prepare students for a broader range of occupational outcomes than those in nursing, given the very weak link between diplomas and above in community services and jobs. Conceiving of these mid-level qualifications as preparation for the community services industry and care work more broadly may improve the connection between diplomas and occupations while at the same time giving graduates more options, including within the community services industry more broadly.

Agriculture

This chapter considers the knowledge, skills and attributes those working in agriculture will need as the industry changes, how we can support career progression, and the type of qualifications that will be needed as a result. It proposes a new approach to mid-level qualifications in agriculture that was developed out of the findings and insights from the first two years of the vocations project and that was tested in consultations with the qualifications' social partners: educators, employers, unions and government and professional and occupational bodies. It discusses the extent to which there is support for basing qualifications on capabilities and on vocational streams. As discussed in the introduction to this document and throughout the project, capabilities refer to the broad ranging knowledge, skills and attributes needed for a career, and the social arrangements that can support these, whereas vocational streams refer to families of linked occupations which share common knowledge, skills, practices and attributes.

This chapter firstly outlines the methods used, which are discussed more fully in the introduction to the case studies, and the participants consulted for this final stage of the agricultural case study of strand two of the project. The chapter then discusses the key themes emerging from our analysis of the data used throughout the project. The chapter then concludes by assessing our proposals for qualifications in agriculture.

Method, proposals and participants

As outlined in the introduction, the discussion papers outlined our general proposals: (1) to base qualifications on the capabilities approach, (2) to link qualifications into vocational streams, and (3) to vary as appropriate for each qualification the emphasis on each of the three purposes of qualifications: labour market entry or progression, transitions to higher level qualifications and widening access to higher level qualifications.

The discussion papers for each industry case study also made proposals specific to that area. In agriculture, we proposed to participants, first, that qualifications in agriculture be developed regionally. This responds to the marked differences in agriculture between regions. But it also responds to the social and political facts that people in regional communities organise regionally far more than people in big metropolitan centres who organise more by their economic and social sector. Thus, the team found that the dominant theme in the agricultural industries was regional capabilities which emerged strongly where commonalities in local skills and knowledge extend across agricultural, local government and mining operations as in Emerald, Queensland, (Yu et al. 2012a, p. 4).

The team proposed, secondly, that qualifications be developed to promote graduates' horizontal flexibility, that is, their capacity to work in different industries as the demand for skills changes seasonally. This is being done within one qualification for entry level qualifications, such as the certificate III in rural operations which prepares graduates for entry to and progression in both the agriculture and mining industries (Yu et al. 2012a, p. 30). Horizontal flexibility at higher levels is often achieved with joint qualifications, such as the University of New England's bachelor of agriculture/bachelor of business.

Thirdly, the team proposed that vertical flexibility and hopefully occupational progression be fostered by offering qualifications which either include higher level studies or prepare graduates for progression to higher level studies. An example might be a mid-level qualification in agriculture which

combined studies in office management and accounting which provides a pathway to professional recognition as an accountant. Another possibility might be joint vocational and higher education programs such as a diploma of agriculture/associate degree in business management.

The seven participants chosen as representing a range of interests and contrasting views in agricultural education and work consisted of:

- Three educators:
 - A former higher education dean of agriculture;
 - A higher education agriculture bachelor program course coordinator;
 - A TAFE agriculture head teacher;
- Four representatives of groups involved in agricultural work with a particular focus on education and training:
 - One union organiser who is also involved in the relevant industry skills council;
 - A consultant for agricultural employers;
 - A consultant for the relevant industry skills council;
 - An education and training consultant.

The next sections of the chapter discuss the key themes that emerged from our participant interviews and our synthesis of this data with our findings from the first two years of the project.

The changing nature of agriculture and the need for change

A number of recent reports have examined the agricultural industry, the nature of its workforce, and its education, training and skills development needs. The importance of agriculture at a time of global population growth and climate change is widely recognised, not just for the national economy but also as increasingly central to international relations, with a vital role in both trade and aid. The development of agriculture in the most efficient and sustainable way however faces a number of challenges. Agriculture consists of a looser and more externally structured labour market than most other industries, with the prevalence of small firms, barriers to advancement and insecure work, making overall planning difficult. Similar to other areas of work however (discussed in the next chapter on engineering), there has been a decline in former modes of training. In agriculture there has been a marked decline in state government provision of advice and informal training known as 'extension services'. Also similarly with other industries, a decline of these former modes of training and education has happened concurrently with technological change and industry restructuring which necessitates new and often more complex forms of skill and knowledge. Broad development of knowledge and skills however appears to be quite a challenge in an industry that faces an ageing of its workforce and declining enrolments in mid-level qualifications in recent years (ACIL Allen Consulting Group 2012; AWPA 2013a; Pratley 2012).

In the first stage of the vocation project, Strand 3 analysed data from the survey of Household, Income and Labour Dynamics in Australia to examine occupational trajectories in different industries over the period 2001-2009 covered by the longitudinal survey. It found that those involved in agriculture at some time over 2001-2009 had the same broad occupational role for all or most of this period, rather than move between roles. This included 36% of respondents who were farm managers, 9% who were professionals, 9.1% who were trade workers, 26.3% who were in high-turnover manual

roles, 11.4% who were in in other low or semi skill roles and 8.1% who were not in the labour force, for all or nearly all of this period (Yu, Bretherton, Schutz & Buchanan 2012, p.31). Medium to high skill occupations are quite segmented, with little progression from other occupations. The team found that because agricultural work is strongly seasonal many workers had marginal attachment to the workforce and were likely to spend long spells outside the labour force. It found significant movements between low skilled agricultural work and clerical, community service and sales roles (Yu et al. 2012b, p. 34). The team reported that agriculture employers report longstanding difficulty recruiting workers (Yu et al. 2012a, p. 20).

In considering the relation between qualifications and work, agriculture has some significant differences from the other case study industry and occupation groups in this project. Our TAFE teacher participant in this third stage of the project made a point that we have perhaps not highlighted in the project previously: that it is ‘probably a unique industry particularly if you look at the four areas this study is looking at. This is the only one that you don’t need a qualification to be employed’. He and other participants clearly saw this as a negative, related to the insecure nature of work, and the need to develop new knowledge and skills. How the qualification profile differs in agriculture from other case study areas considered in this project, and from the work force as a whole can be seen in Table 5, which shows the proportions holding different levels of qualification as their highest qualification. The proportion in the ‘not applicable’ category, which is mostly those with no qualification, is at 62.2% for agriculture, which is considerably higher than that for other industries relevant to this project, and higher than the proportion of 38.7% of the work force as a whole. Proportions in agriculture with higher education qualifications are similarly low.

Table 5 Percentage of those in selected industries with each broad qualification level, 2011 Census

	Not applicable	Certificate level	Advanced Diploma and Diploma level	Bachelor Degree level	Postgraduate level	Total
Agriculture	62.2	20.1	8.0	7.8	1.8	100.0
Mining	34.4	37.0	7.1	15.6	5.9	100.0
Manufacturing	45.4	32.5	7.8	10.8	3.5	100.0
Electricity, Gas, Water and Waste Services	31.0	33.6	10.9	16.7	7.8	100.0
Construction	36.9	49.0	6.0	6.5	1.5	100.0
Health Care and Social Assistance	23.4	19.8	15.1	30.3	11.4	100.0
Financial and Insurance Services	31.9	12.3	14.5	29.5	11.7	100.0
Workforce	38.7	23.6	10.5	19.3	7.9	100.0

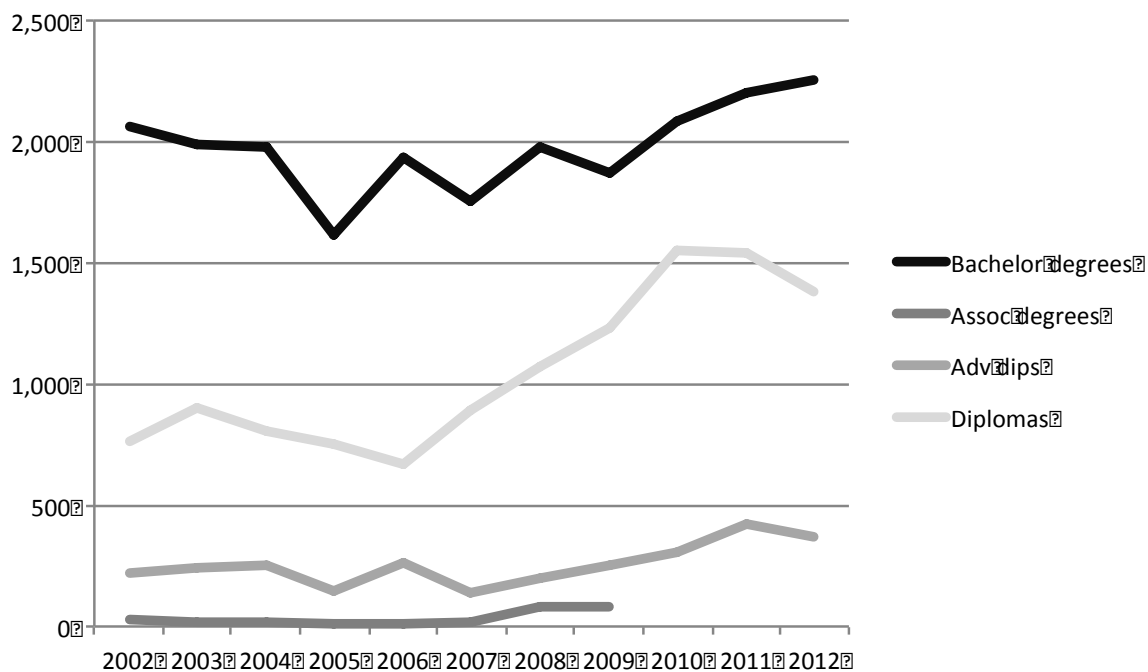
Note: ‘Not applicable’ is defined as ‘Persons who have a qualification that is out of scope of this classification, Persons with no qualification and Persons still studying for a first qualification’.

Source: (ABS 2011)

Current trends in enrolments in qualifications relevant to mid-level work in agriculture are illustrated in Figure 3. It summarises this data for the narrow field of education of agriculture. We can see that while enrolment load in AQF levels 5-7 programs in agriculture generally increased from 2005 to 2010, since then enrolments in diplomas, advanced diplomas and bachelor degrees appear to have fallen or

plateaued, while it is not clear whether the 2006-2012 increase in associate degree enrolments has continued, as data for these programs in the higher education sector are no longer readily available. These data suggest that as an increasing need for mid and higher level skills in agriculture have been identified as discussed above, conscious efforts to encourage continued enrolments in programs at these levels will need to be made.

Figure 3 Full-time equivalent load in AQF 5–7 programs in agriculture, 2002–2012



Note: Data on higher education associate degree load only available until 2009.

Source: VOCSTATS (www.ncver.edu.au/resources/vocstats/intro.html) extracted on 1/10/2013; and DIISRTE (2013) Table 4.1: actual student Load (EFTSL) for all students by State, higher education provider and broad level of course, full year 2011 and corresponding tables from previous years.

The project’s third stage employer consultant participant forcefully put the view that developing agriculture as a technically advanced and ecologically sustainable industry was not merely economically rational, but a moral imperative in the healthy nourishment of a growing world: ‘it’s an obligation we have... Food is different, it’s not just a product or commodity, there is a morality that surrounds food’. As an example he stressed that it was important to develop breeds of cattle that are grass feed and not grain feed in northern Australian because with grain fed cattle:

You produce an awful lot of not good fats and secondly you deprive an awful lot of people of grain that they need to eat as well. You’re making it harder for the bottom end of humanity to get a feed while you’re developing food for the top end of humanity, which is no good for them.

The current low level of qualifications existing alongside the need for new knowledge and skills supports our contention of the need for a new approach to linking qualifications and work in agriculture.

Purposes of qualifications

This section explores how previous findings in the project and the views of the participants in the third stage of the project can inform the appropriate balance of purposes for mid-level qualifications in agriculture between labour market entry and progression, educational progression and widening

access to qualifications. In the first stage of the project we interviewed 72 educators (teachers and managers), students and graduates across engineering, agriculture, financial services and nursing, in higher education and VET. Our interviewees involved in agriculture emphasised a range of purposes for study in the field. They projected a strong vocational identity, a sense of participation in the field linked to relationships with land, family enterprises and backgrounds, concern with developing the industry generally in more sustainable ways, concern with how education and work can address some of the social issues of rural life such as relative lack of opportunities for women. They also emphasised some of the weak links between education and work, particularly in the mid-level qualifications: while certificate level study had some clear links, with skilled farm labouring, and higher education with professional and research work, the labour market did not seem to be creating opportunities for skilled and technical work that mid-level qualifications should be well suited for. The VET students and graduates in the case study appreciated the programs individually tailored to their current employment or business, but this seemed very labour intensive for teaching staff if larger numbers of graduates are actually needed (Fredman, forthcoming; Wheelahan et al. 2012).

Labour market entry and progression

In previous work in the project we identified relatively strong work outcomes from study in agriculture, but there is some evidence that this may be weakening. In the report of the second year of the project the team (Moodie, Fredman, Bexley & Wheelahan, 2013) noted from NCVET's 2011 Student Outcomes Survey that agriculture graduates of vocational diplomas or higher in 2011 had very strong employment outcomes, at 94.2%, which was over nine percentage points above the employment rate for all graduates of vocational diplomas and above. In 2012 employment of diploma and higher graduates fell to 78.7%, with the difference between this and the rate for all fields falling to five points (Table 6).

Table 6 Percentage of graduates in employment six months after training, by level of qualification in the broad field of education of agriculture, environmental and related studies and the narrow field of education of agriculture, 2012

Field of education	Cert I	Cert II	Cert III	Cert IV	Dips and above	All levels
Agriculture, environmental and related studies	44.4*	67.7	89.1	89.9	85.4	81.0
Agriculture	67.2	76.6	87.7	91.6	78.7	83.7
All fields	50.5	61.8	79.2	84.0	83.2	77.8

Source: NCVET (2013).

Notes: na Not applicable

* The estimate has a relative standard error greater than, or equal to, 25% and therefore should be used with caution.

np Not published. NCVET does not report on estimates based on five or fewer respondents because the estimates are unreliable.

Unfortunately employment rates are not published for the small number of graduates of higher education diplomas and associate degrees. However, Graduate Careers Australia's (2012) Australian Graduate Survey reports that 72.6% of agriculture bachelor graduates in 2011 who were available for full time employment were employed full time, rather lower than the bachelor graduates' employment rate for all fields of 76.1%. This was a slight increase over the rate of 70.9% in the 2011 Australian Graduate Survey.

While there was a fall in the employment rate of agriculture diploma or higher graduates in the 2012 Students Outcomes Survey compared to the 2011 survey, the proportion employed in agriculture was very similar. As we previously reported 51.7% were employed in agriculture in 2011, which was just

over double the rate for all fields of 25.5% for vocational diploma graduates (Moodie et al. 2013). The respective 2012 survey figure for graduates of diploma or higher graduates is 50.4%, again around double that for diploma or higher graduates from all fields (Table 7).

Table 7 Percentage of those employed six months after training working in the same occupation as their training, by level of qualification in the broad field of education of agriculture, environmental and related studies and the narrow field of education of agriculture, 2012

Field of education	Cert I	Cert II	Cert III	Cert IV	Dips and above	All levels
Agriculture, environmental and related studies	0.0	27.4*	44.8	28.6*	30.1*	36.9
Agriculture	0.0	44.8*	36.6	20.1*	50.4	37.8
All fields	24.0*	22.3	60.0	26.2	25.1	41.1

Source: NCVET (2013).

Notes: na Not applicable

* The estimate has a relative standard error greater than, or equal to, 25% and therefore should be used with caution.
 np Not published. NCVET does not report on estimates based on five or fewer respondents because the estimates are unreliable.

Two of the third stage participants with substantial and long standing involvement in the VET sector emphasised that mid-level qualifications (in this case certificate IVs and diplomas) had significant problems in being considered a suitable preparation for labour market entry because they did not cover the broad range of skills needed for such work.

If someone comes in expecting I'll do a Certificate IV and that will get me an overseer or trainee manager's jobs, and [unless] this bloke's got experience or they've done a lower-level qualification, it doesn't really work that way. And I think that goes to the third point that all level qualifications are a market entry qualification, and I don't think the agriculture qualifications are... to be an overseer you also got to be a farm hand, and to be a manager you've also got to be a farm hand and an overseer, so you need to have both lower - level skills. I think the way qualifications are written currently they're very restrictive; if you come in and do a Certificate IV you can only really attach two practical Certificate III level units to that qualification... there's no entry requirements [as there was in previous packages]. The qualifications are very restrictive because they don't match job the description of what an overseer, a farm manager or a farmer would be. (TAFE head teacher)

Often a diploma is not the real entry; it's been made the entry because we want to make it look good. Let's have Diploma as the entry level but we haven't got the underpinning knowledge and skills to do that role. (Training consultant)

However, these and other participants saw mid-level qualifications when combined with other skills, knowledge and experience as successful in occupational progression, in particular in preparing workers for managerial roles. Comments along these lines included:

It's probably about re-acquainting people or finishing them off ready for the management roles... turning those people that perhaps have got a higher-level qualification or no qualification and lots of experience can finish them off in a job where they can be hands on, quite productive and have a fair range of knowledge about what they're doing. (Training consultant)

The role I've seen best described was by the NCDEA, the National Centre for Dairy Education Australia and it's certainly up to managing level roles. (University lecturer)

The latter appears to be an example of an authoritative body representing a sub sector of agriculture working closely with education providers to develop qualifications closely matching mid-level skills

needs. The NCDEA has developed a range of qualifications delivered through different TAFE systems from certificate I to advanced diploma. The diplomas are designed for 'Production Manager', 'Senior Production Manager' or 'Business Manager' in the farming stream, and there is a Diploma of Laboratory Technology and a Diploma of Food Science & Technology (Dairy) in the processing stream of qualifications (NCDEA2010).

There were differing views among our third stage participants about the changing nature of technical work in agriculture and the appropriate entry requirements for this. The TAFE teacher and employer consultant argued that diplomas should be well suited for high skilled, mid-level roles:

A really good mate who's actually managing a breeding program for one of the private companies, and he's looking for someone now and focussing on university students. And I said why aren't you looking at Certificate IV or Diploma? He said they haven't got enough science. But then I said to him if you get someone with an agricultural science degree graduate, that person hasn't got enough practical stuff; what do you want them to do? Go out and sow your seeds properly, make sure they're fertilised and go and do the harvest or do you want them to do science of it? And he said well yeah, that was sort of the quandary he faced. Someone with a Certificate IV and a Diploma would be ideal for those sorts of research assistants and technical officers because they're going to have a much more practical lean – understanding the practicalities of doing that work. And you would expect that the scientists are the ones that have got to make all the scientific decisions and really the technical officer is just a bit of a problem solver. (TAFE teacher)

I think ... agronomy is moving towards a Diploma, I know Elders Land Mark are finding it increasingly beneficial to run them through a Diploma of agriculture than your business rather than a degree person, because they've got that hands on aspect to it. (Training consultant)

In some contrast the skills council consultant argued that 'technical work' in agriculture encompassed a range of roles and thus a range of approaches in training was required:

There's two kinds of jobs and I think people might be getting confused around the terminology. There's some technical officer type jobs which have that title which can often be seen in research and development related activities. That'd probably be more attuned to a person with a university degree, because they need that underpinning biology and science background. Whereas a technical person is another role, the farming system that's supporting that with operations and planting/seeding equipment might be a person that would come up through the ranks and take that on. So I think there's probably two different types of jobs that appear to have the same name.

We have argued that qualifications have more a screening role or a human capital role, depending on the industry to which they are related, and that this affects the role that they can serve in gaining their graduates entry to or progression in the labour market. Qualifications related to industries with loose, external labour markets, such as finance, emphasise a screening role. They are used by employers not to ensure that recruits have specific knowledge or skills, but to screen out applicants who are assumed not to have the general level of aptitude signalled by the qualification. Qualifications related to industries with structured or occupational labour markets, such as health and engineering, emphasise a human capital role. They are used by employers to certify that graduates have developed specific attributes needed to undertake skilled roles in that industry. Perhaps because the agricultural labour market is loosely structured, but also requires specific skills, our participants emphasised that qualifications in agriculture should both certify existing knowledge and skills, a type of screening role, and develop new skills, a human capital role.

For example the university lecturer emphasised that occupational progression beyond a certain point needed the development of skills by qualifications.

We have many labourers that up-skill, that's a vertical education, but up-skill not because they want to stick themselves into a particular profession or job but up-skill because there is a threshold between the perception of the skills of a labourer and moving altogether whether it's vertically or horizontally. I'm talking about individuals with maybe a certificate III or IV. Once you've gone above that I think there's more opportunities.

The training consultant made this point while emphasising the dual role of certifying existing skills and developing new skills.

We get a significant number of people who have worked in agriculture as a farm hand or rural service industry basically learnt on the job and they're doing it well, but they're never going to progress because they haven't got the opportunity to learn or develop some of the higher level skills, and they more often than not in corporate agriculture particularly they need a piece of paper. So they'll come to us and get a qualification reasonably quickly because they've got a whole lot of prior knowledge and competence and they leave and get a job, but I don't see that as an entry level qualification, I see that as just being a pathways qualification... a work pathway... Recognising existing skills and refining those skills.

Similarly the skills council consultant argued that while the 'skills for the job' were a more central requirement than a qualification, a qualification could be a 'foot in the door' in gaining work.

Educational progression

In the first stage of the project strand 2 examined how pathways varied in tertiary education. We first examined the extent to which students were admitted to bachelor level programs on the basis of previous VET study. It was noted that 9% cent of all students commencing bachelor programs in 2008 were admitted on the basis of a VET qualification. This proportion was somewhat lower in the broad field of agriculture and environment, at 5%, and in the narrow field of agriculture at 6%. Of the detailed fields within agriculture the proportion varied from 2% in fishery studies to 11% in horticulture and viticulture (Moodie et al. 2013, pp.11-12).

We also examined pathways in tertiary education more broadly by examining the detailed educational history available in the Australian Bureau of Statistics' Survey of Education and Training. We noted that successive issues of this survey through the 2000s show a trend towards multiple qualifications and also shows a trend towards a greater proportion of qualifications in higher education (Wheelahan et al. 2012, p. 16). We looked at the extent to which different pathways had been followed, examining the first and second qualification for those who had undertaken at least two qualifications. We analysed this by broad field of education and type of pathway followed, that is, the possible combinations of VET to VET, VET to higher education, higher education to VET and higher education to higher education. This analysis did not distinguish between agriculture and environmental programs.

To show the overall extent of patterns of student articulation and how this has changed over time, we estimated from the 2009 Survey of Education and Training the numbers of working age people in 2009 who had gained a qualification in each broad field, in either VET or higher education. We divided these estimates by qualifications completed before 1990 and by qualifications completed from 1990 to 2009. We analysed this by field, sector and completion period for people who had no further qualification, a second qualification in VET or a second qualification in higher education. In the broad

field of agriculture and environment, the results between the pre-1990 and post-1990 groups follow the general trend of increasing proportions of multiple qualifications and a greater proportion of qualifications in higher education. Compared to other fields examined, a relatively high proportion of those commencing in VET undertook a second qualification in VET, and a relatively high proportion of those commencing in higher education undertook a second qualification in higher education. However, low proportions of those commencing in VET undertook a second qualification in higher education: 4% of those completing a first qualification before 1990, the equal lowest with engineering of the fields examined, and 8% of those completing a first qualification from 1990, second lowest to engineering (Fredman 2013, p. 10). Hence by both institutional data and Survey of Education and Training data, there appears to be little articulation between the tertiary education sectors in agriculture, although this has increased somewhat over time, and although there are relatively high rates of multiple tertiary study within each sector.

We also used the 2009 Survey of Education and Training to examine the extent to which those with at least two qualifications changed fields between their first and second qualifications, as an indicator of the coherence of educational pathways in these fields. We found that for those with a first qualification in agriculture and environment, a relatively high 61% studied in a different broad field for their second qualification (for all fields this was 52%). Management and commerce was the most common second field for all pathways.

In the second stage of the project, as well as the patterns in enrolment and in work outcomes discussed above, we also further examined educational outcomes from qualifications. Table 8 shows the proportions of graduates of different levels of study undertaking further study, with the proportion of graduates of diploma or higher programs in agriculture similar to that for all fields.

Table 8 Percentage of those in further study six months after training in the broad field of education of agriculture, environmental and related studies and the narrow field of education of agriculture, 2012

Field of education	Cert I	Cert II	Cert III	Cert IV	Dips and above	All levels
Agriculture, environmental and related studies	29.1*	47.7	26.4	51.9	36.3*	35.5
Agriculture	np	39.9	26.1	58.3	41.4*	35.0
All fields	51.3	42.4	33.4	36.1	35.2	36.1

Source: NCVET (2013).

Notes: na Not applicable

* The estimate has a relative standard error greater than, or equal to, 25% and therefore should be used with caution.

np Not published. NCVET does not report on estimates based on five or fewer respondents because the estimates are unreliable.

Several of our third stage participants remarked that in agriculture while progression through levels of the VET system was effective there were significant barriers to educational progression from VET to higher education. The TAFE teacher stated,

Students complete Certificate III and are invariably asked to go to Certificate IV or ask about Certificate IV and the same from Certificate IV to Diploma. So I think that part works well.

In contrast the former dean of agriculture argued that:

Well they should be a qualification on a career pathway so that those people that come in via the vocational education and training sector should have the opportunity to move up through the certificates and diplomas, but in reality that really doesn't happen too well in agriculture.

While there appears to be reasonable transitions within each of the tertiary education sectors, it could be argued these are not meeting needs, and that transitions between the sectors are lacking. The training consultant argued that varied educational pathways were vital, but that those in higher education have been slow to engage with the reality of this, and nor do current funding models support the life-long approach to education which is needed:

It's got to be a two way street, it's not just the deans telling us what should happen, it's a matter of then engaging with the vocational sector... Step out of their ivory towers and say we do recognise that a Diploma of Agriculture from XXX Agriculture College in Victoria has some value to a degree in agriculture rather than saying you've got to start from scratch... perhaps the funders have got to say we will fund somebody who's got a Degree to come back and do a Diploma to get the hands on experience and knowledge they need. Whereas at the moment they won't – you've got a higher qualification so you can't come back and do a lower qualification, so that barrier has got to be broken down as well.³

A concept raised independently by two participants, and which also mirrors a proposal by our dean of engineering participant discussed in the engineering case study chapter, is that a way to implement educational progression suitable to the realities of agriculture might be 'post graduate' programs that are short and specific, but also rich in knowledge, that could accumulate towards awarded qualifications. The skills council consultant argued that:

We should have the degree programs, the diploma programs to set people up but there seems to be some kind of formality that you've got your degree/diploma and off you go, it doesn't sit in the context of lifelong learning... Whereas if you saw that as part of a continuum, say with young adults or people up to their forties the system in a sense should be like an RPL process, where they have to take a job at other things as well or apply, government fields days, do workshops... At least you'd get that practical application to do your discipline until you can get a portfolio with evident skills behind you to demonstrate you've got the skills.

Widening participation in qualifications

This section examines the extent to which mid-level qualifications in VET widen participation in higher level qualifications for students from disadvantaged backgrounds, thus supporting equity and social mobility. Table 9 shows the percentage of students in the two lowest socio economic quintiles, or students in the bottom 40% of socio-economic backgrounds, in the broad field of education of agriculture and environmental and related studies, and in the narrow field of education of agriculture and for VET students overall. If students from the two lowest socio economic quintiles (the bottom 40%) were represented in VET qualifications in proportion to their numbers in the population, then they should be 40% of students in these qualifications.

The table shows that both the broad and narrow fields of education examined here support students from low socio economic backgrounds to access mid-level qualifications, in contrast to the situation in VET overall, where students from the most disadvantaged backgrounds are under represented in higher level qualifications. This is particularly true for the narrow field of education of agriculture, in which more than half of all students undertaking diplomas and above come from the most disadvantaged backgrounds. Both the broad and narrow fields of education in agriculture are over

³ In Victoria, and increasingly in other states, government policies stipulate that public funding for VET qualifications is available only to those undertaking higher-level qualifications. There are some exceptions to this rule, but for the most part, policy restricts funding in this way.

represented by students from low socio economic backgrounds, particularly in lower level qualifications. This reflects the fact that students from rural and regional Australia are over represented in these fields of education, and that rural and regional areas also have a high percentage of the most socio economically disadvantaged postcodes.

Table 9 Percentage of students from the two lowest socio-economic quintiles by level of qualification and broad and selected narrow field of education, 2012*

Field of education	Cert I	Cert II	Cert III	Cert IV	Dips and above	All levels
Agriculture, environmental and related studies	56.1	56.0	50.8	52.6	39.5	51.8
Agriculture	58.9	59.5	57.7	52.0	53.2	57.3
All fields	47.5	50.9	45.3	37.9	33.8	43.1

Source: VOCSTATS (www.ncver.edu.au/resources/vocstats/intro.html) extracted on 26/12/2013

Notes: na Not applicable

*as measured by the Index of Education and Occupations in SEIFA (Socio-Economic Indexes for Areas), Australian Bureau of Statistics. It uses postcodes as the basic unit of measurement.

The number of students is counted and not enrolments or equivalent fulltime student load as the table focuses on attributes of students and not qualifications

However, this does not necessarily translate into social mobility into higher education. Moodie (2012b Table 4) shows that the broad field of education of agriculture, environmental and related studies admits approximately 8% of students on the basis of prior VET studies, compared to 9% for higher education overall. On the other hand, it admits approximately 21% of students from low socio economic backgrounds, compared to 17% for higher education overall (in this instance, calculated as the bottom 25% of disadvantaged students and not 40% as we are using it here). It is clear that while at least some of those students from disadvantaged backgrounds who are admitted into the broad field of education may have had prior studies in VET, the majority of disadvantaged students entering agriculture did not come via VET.

Capabilities approach

There was general support among the third stage participants for a capabilities approach of developing broad-ranging knowledge and skills throughout careers, and building the social arrangements to achieve this. The skills council consultant emphasised the need for education through working life:

I think it's fairly short-term view to knock somebody's education over in two or three years to think that's going to set them up for life. I like the capabilities approach because it's incremental over a long period of time, it takes all their means of learning rather than just institutional based because there's a whole lot of other ways people learn.

The training consultant participant put forward as a best-practice example an employer with a long-term and comprehensive view of a structured approach to education and work:

Then a guy in western Victoria a few years ago, a large grain farmer, operates about 60,000 hectares of grain across western Victoria and southern New South Wales and he had a terrific concept for his staff. He had about sixteen or eighteen staff on board, he said what he'd like to be able to do is grab them out of school, do a school based apprenticeship with them while they finish year 12, work one day a week, do their Certificate II in Agriculture, let them work for twelve months or so, then send them away, go and do something somewhere; a Certificate III or apprenticeship somewhere, then come back and I'll take you on and run you through a Certificate

IV or five. Then you go and do your graduate program at Marcus Oldham and you'll be my next farm manager, my 2IC sort of person. So the coming in and coming out – almost like a cadet program where you can do some work, training, work, training. And I thought that was a good idea but very hard to put in place.

This participant saw the nature of current funding mechanisms as one barrier to a capabilities approach.

You try and do lifelong learning with the current funding mechanisms we've got currently and it doesn't happen. You get one shot at it and that's it. Everything else you've got to pay for, and if you've got a Degree in something forget actually trying to get a Diploma in something because it's coming down the ladder and you're not allowed to get access to it. You've got to be able to move across and up and down and come back in, that sort of thing, and we should be recognising that ability and provide some funding there or the capacity for it to be funded at a reasonable rate anyway.

Another barrier raised by several participants is the aversion of employers to supporting training at all. As the former dean of agriculture put it:

Industry has a poor record of paying for qualifications for skilled labour... unless industry recognises qualifications, it's going to struggle to find people to work in it and we're seeing that in horticulture and agriculture. Because if you compare agriculture with the other sectors, its level of education qualifications are very low, so the industry only sees it from the employer point of view.

The training consultant similarly stated:

There are good employers out there that will say to get good people we've got to pay them good money and they're probably only about 40-60% of the market and they're producing 90% of the product. The other ones that get all the oxygen are the ones that whinge and scream; we've got to pay them another \$10 a week when the national wage thing comes out every year. Well hang on, you go and buy a bloody \$40,000 quad bike or spend \$100,000 on a new heater or \$25,000 on a new dog, but you won't pay your apprenticeship another \$2 a week.

But he stressed really that the lack of investment for training and labour generally was not the fault of the individual employers, but their existence within a very tight market. For example co-operative efforts have become more difficult with marketising policies:

As soon as the dairy industry started getting together and saying perhaps we might have a self-demanding product price for our milk then the ACCC kicked them down and said you're becoming a cartel, you can't do that.

The training consultant also suggested that there may be a disincentive for training for employees, because in a relatively unstructured and unregulated labour market the returns are not clear:

If you've got a diploma of agriculture or a degree in agricultural science there's no definitive pay structure that says because you've got that, you've got to be paid this amount of dollars as you'd have in the manufacturing or education fields etc. So we haven't got that pay structure and I don't think we ever will because industry is just too diverse.

Some third stage participants argued that where employers support training it can be at a superficial level that does not build capabilities. The union organiser participant argued that employers in food processing were most interested in exploiting the previously available subsidies for certificate II programs:

There has been some evidence that employers were exploiting the Certificate II model just to achieve the subsidy and once achieving the subsidy, they could have all sorts of other offsets when it comes to payroll tax, workers compensation and those sorts of things. That's been reined in personally, and I think my organisation as I represent, think that's a good thing because it's actually stopped the ability for some people to rot the system.

The union organiser also saw employers as being adverse to well-rounded qualifications because they preferred more employer-specific 'skill sets':

I don't like the idea of using specific skill sets; I want people to be able to move from job to job if they want to. The last thing we want is for someone working in a large retail chain supermarket and they're performing a particular food service model there and then they have a qualification that says they're trade equivalent and go to another small business for instance to perform that trade qualification, and they've only got half the skills. The certificate they've got isn't worth the paper it's written on, you need to make sure those skills are trade specific if talking about certificate III or certificate IV equivalence... the key is to make sure that people get a real qualification... Offering a certificate II in food processing in my view is not a real qualification because you move to the next company and they don't recognise it... what people want is certificate III qualifications and that's what workers are telling us that they want, that they want a trade equivalent.

The former dean of agriculture saw this as a general problem in developing skills and knowledge in agriculture:

In agriculture it tends to be very focussed skills sets rather than more generic qualifications at vocational education and training level and so you go in and do wool classing or sheep production. Some of those generic things are probably disguised, perhaps not even done, because particularly for people who are in employment, the employers only want them to get the skills that the employers want and that's the only time they'll get release to do that. I actually think that's a problem, I think we ought to be looking at the rounding of the person with broader skills as well.

The term 'skill sets' can however be used in varied ways, with the former dean using it also in a broader sense:

Whilst there are good reasons for developing skill sets, those skill sets ought to be in a broader context because what we're doing is we're training people for future careers, not just the current one. Those skill sets in the context should be the building blocks on which they can develop better qualifications to allow them to progress to greater opportunities.

The university lecturer saw as another barrier a lack of underpinning conceptual knowledge in VET programs.

The up-skilling needs to have the next step in mind. There is a very serious gap in skills, I'm not talking about skills I'm talking about capabilities. There is a big gap in capabilities in intermediate educated individuals and their capacity to enter tertiary education. It's a very significant problem. The reason I do think it is important is we do actually have quite a lot of data that shows vocationally educated students struggle tremendously to start their course. But once they start to pass their subjects, they actually do better than their counterparts. It's not that they're stupid it's just they haven't got the capabilities in the first place... the intermediate education has to give the capacity for a student to prepare for the next step. So for a student that wants to do a cascade of courses, so a student that enters vocational education with the idea that he or she can go as far as he or she can. It may be they continue straight away into university they

must get those skills to study at university... There will be no pressure on AQF level 5 and 6 to design courses that prepares students to go into AQF level 7. There is absolutely no pressure for them to do so. As long as they meet the AQF level requirement they do not have to specifically prepare students for the next level. I really can't see changes at that level.

He argued that more rigorous teacher training is needed to address the need for a higher level of knowledge in VET.

Ensuring that teachers have the qualifications superior to that at which they're teaching. That's a first step towards more rigour into the teaching. I'm not saying for a second saying that every TAFE teacher has to be a scientist, but they need to be able to see the next step.

Vocational streams

Third stage participants generally gave the concept of vocational streams cautious support as relevant to limited areas in agriculture. The TAFE teacher connected the idea of streams in agriculture to one area in which higher certificates and diplomas as currently constituted have a purpose as entry-level qualifications, in the enterprises servicing and supporting farming:

There are some qualifications that do work as entry-level qualifications. So if you look at Certificate III and someone going into rural service industry or rural merchandising, stock and station agents; yep that works really well. If you look at someone going from say Certificate IV in Agricultural Business and going into rural finance; that works reasonably well.

This participant continued his discussion of the services and business areas of agriculture as most relevant to the concept of vocational streams, while conceding that there were limited areas of possible streaming in technical and production areas:

I think once you get to certificate IV there are certainly areas where you can stream; once you get to Certificate IV you start to get into the business/production side of agriculture. And that applies in the diploma and then when you get to the advanced diploma it's almost all gone to the business side of it rather than there's not much production at all... So there are some areas like that but it's pretty much mainly on business or some rural merchandising or customer service, those areas where there is some cross over, so people can come in and do a certificate IV or certificate III in agriculture or certificate IV in agriculture business, and they can put some retail units in there. So there is potential for people to be employable across streams there, but if you look at agriculture production particularly the streams are really enterprise based; sheep, cattle, crops, pastures. And keeping cattle obviously there's a fair bit of similarity. A lot of the concepts between livestock and cropping apply at certificate IV and diploma level but the technical detail is different. It's limited.

He also pointed out that 'generic' skills developed in agriculture could lead to other work, but the possibilities here were limited by the limited transferability of technical skills.

I think one thing that does happen with young people particularly but also some middle aged people who leave farms, they are super employable but only at a basic operator level, just because they haven't got the technical training in those other streams. But invariably I hear employers say they like the work ethic, adaptability, flexibility, problem solving ability and ability to handle a whole lot of pressures that people who worked in agriculture have, because you've got to develop those skills otherwise you won't survive. But they're not necessarily technical skills or going to get people jobs in the higher employment areas other than a basic operator.

Comments from the union organiser participant support the contention that food processing as a whole could make up a vocational stream:

Whether you're working in dairy, meat processing, white meat processing, fish manufacturing as well; those qualifications you can use and are clearly portable, but what we need to do is make sure the qualifications are generic and also usable so employers want to take on people that are going to be productive.

In some contrast, the skills council consultant argued that skills were sequential, that there was a related layer of underpinning common skills in agriculture:

There's functional skills as core, then there's the higher level ones that you need for a particular job... Then when you're in an animal system or plant system, what you need to know is the particular skills to go to the next level, growing cotton or growing wheat.... I think there's an underpinning layer of skills then you move into the second layer of skills heading into the area you're in.

The university lecturer argued that management was the area with most commonalities between broad streams and specialisations, and also saw a trade-off between horizontal and vertical movement in work.

The generalist course for agriculture relates usually to agricultural management. The segmented courses in agriculture will usually relate to animal science, or animal specific courses and agronomy courses. Other than these specific disciplines, I disagree that there is a high segmentation in the agricultural industry... the more flexibility in a program the more difficulty in fact to identify the profile of an individual. Although it's positive when you want to move sideways, it's negative when you want to get a promotion.

Regionality

Participants in the third stage of the project, to differing degrees, supported the idea of regionality in the design of qualifications, but pointed to a range of issues that needed to be considered to ensure that high quality and nationally recognised qualifications were available to all who needed them in agriculture. The former dean of agriculture argued that the concept regional qualifications should be able to be incorporated into educational and occupational progression, including across regions:

I don't have a problem with it in the sense that if someone has a certificate IV winter crop production for example, then move to Queensland, that certificate IV is a qualification, it says that this person has a certain level of competence, knowledge, understanding, but it may be that when they get there they need to top it up, maybe go to a diploma and do the extra year and get the nuances of a different region. But the fact that they've actually got a qualification is something that is portable, it signifies they do have certain level of capability and then they just have to adapt it when they're there.

The training consultant was more cautious, seeing some merit if standards, recognition and portability could be maintained:

There is the argument of portability and also as a national consistent standard as well. The risk of going regional is – does it become the lowest common denominator in that region or is it everyone else is trying to catch up to that standard? The feedback I get around the states is there is that hunger in the registered training organisation networks for some consistency in content and delivery and outcomes... You still want some sort of consistency across product. I think the

regional stuff is more the commodity or the conditions of the area that need to be focussed on rather than - still maintain standards for what the industry is looking for... The last thing you want is for a qualification to not be recognised.

The union organiser saw some limited merit, but was concerned with not just portability of skills but also equality of educational opportunity between city and country:

I think the qualifications that people might achieve whether talking about metropolitan areas of Sydney, regional areas of New South Wales or regional sectors all across the country, those qualifications should be generic and identical. Yes certain skills are required in certain areas of AgriFoods sectors when talking about key farming areas, however when we're talking about food processing which is a fundamental part of the AgriFoods sector in Australia, and we want to make sure that someone's qualified in one particular area in the city, ten years those same skills in another particular area of the country... But portability of skills yes, to be able to move from place to place of course we want that to happen, but we want those people in regional Australia to be offered the same skills that are being offered in the city.

The university lecturer argued that teaching, curriculum and the practice of teachers has to be tied to regional labour markets, which can relate both to preparation for specific industries and broader knowledge in curriculum, and gave an example of regional cooperation between a university and TAFE with the close involvement of the dairy industry training body:

[As well as those institutions that practice student-centred teaching] the other institutions that I think are very good are those that know where their students are going. Your paper touches on this, the concept of regionality and regional relevance that the first proposition you're doing in the paper. If your students are staying regional and mostly going into the mid-section market then you must map to this. If your catchment includes a university as students go to university then you need to prepare those students for university. It's a different set of units... We have an articulated pathway [with a particular TAFE]. It's actually more than an articulated pathway; we now have a campus on that site where the students/TAFE graduates continue into either a Bachelor of Agricultural Business Management or Bachelor of Agriculture. So we've mapped what they've done and it is facilitated or simplified by the fact that their diploma was set by NCDEA so we knew what units they had to do and instead of six electives they only had two electives. We've changed early subjects to include some of the skills that we thought were missing which means as a result all our students, doesn't matter if they come from a vocational pathway, but all our students are now getting more writing/maths skills as part of their early subjects.

Social partnerships

The need for renewed social partnerships in the governance of education and training and their links to work was implicit in many of the comments discussed above from our third stage participants. Participants said that employers need more support (and sometimes need sanctions, as the union organiser pointed out to stop employers rorting subsidies); that the dairy industry involvement in developing qualifications and pathways was a good model; and that more flexibility in the design of VET qualifications was needed, particularly to enable regional partnerships. The TAFE teacher was most explicit about the need for change when he argued that industry skills councils were dominated by those too far removed from the grass roots, and in agriculture governance needed:

Some key people from registered training organisations, some key producers, some managers in corporate agriculture who are very hands on, you don't sort of want the general manager who sits

in his office who doesn't really talk to his or her people very much. You need the local farm managers, probably some overseers.

The need for new arrangements in agriculture has been supported by work in this project. A strong model is the Make it Work project based in Narrabri. This project is supported by the Agrifoods Industry Skills Council and brings together the local council, employers and educational providers to create both more secure work and continuing educational opportunities within a region (Yu et al. 2013, pp. 36-37, 43). The need for new arrangements at a national level is also supported by other recent reports. The Australian Workforce Productivity Agency (2013a p.13) states: 'The central finding of this food and beverage workforce study is that responsibility for developing industry workforce development agenda, much of which is outlined in this report, should be invested in a fully representative and authoritative body with the necessary mandate' (AWPA 2013a, p.13). ACIL Allen Consulting (2012, p.58) urges the creation of a 'Agriculture Education Council' which would 'comprise representatives of higher education, vocational education, school science education, industry and government' (ACIL Allen Consulting Group, 2012, p. 58).

Conclusions

This chapter has synthesised findings from the three years of the vocations project including a round of consultations in the third stage of the project to examine the need for a new approach to qualifications in agriculture, focusing on mid-level qualifications and updating data reported in previous reports. It has examined new and increasing demands for skills and knowledge in the industry, and the barriers to and challenges in meeting these demands. These challenges include the current low level of qualifications in the industry, the loose and unstructured nature of the labour market, the lack of support from many employers, particularly the small and struggling, the inflexibility of VET qualifications and their general lack of conceptual underpinnings. In canvassing these issues and our proposals to address these issues with a range of participants, we found: general support for the capabilities approach and learning that is rich in knowledge and extends over careers; some support for the concept of vocational streams in particular areas such as management and services; and some support for regionally designed qualifications, with the caveats of the need for assured quality, recognition, portability and regional equality of opportunity in qualifications. These findings suggest that there is support for change in agricultural education and work, and that debate needs to continue over forms this change should take.

Engineering

This chapter considers the knowledge, skills and attributes that those working in engineering will need as work in engineering trades and professions changes, how we can support career progression, and the type of qualifications that will be needed as a result. It proposes a new approach to mid-level qualifications in engineering that was developed out of the findings and insights from the first two years of the vocations project. The new approach was tested in consultations with the qualifications' social partners: educators, employers, unions and government and professional and occupational bodies. The chapter discusses the extent to which there is support for basing qualifications on capabilities and on vocational streams. As discussed in the introduction to this document and throughout the project, capabilities refer to the broad ranging knowledge, skills and attributes needed for a career, and the social arrangements that can support these. Vocational streams refer to families of linked occupations which share common knowledge, skills, practices and attributes.

This chapter firstly outlines the methods used, which are discussed more fully in the introduction to the case studies, and the participants consulted for this final stage of the engineering case study of strand two of the project. The chapter then discusses the key themes emerging from our analysis of the data used throughout the project. The chapter concludes by assessing our proposals for mid-level qualifications in engineering.

Method, proposals and participants

As outlined in the introduction, the discussion papers for the case studies outlined our general proposals to base qualifications on capabilities and on vocational streams. They described the three purposes of labour market entry or progression, transitions to higher level qualifications and widening access to higher level qualifications and noted that the balance between these purposes may vary as appropriate between fields of education and work.

The discussion papers for each case study also made proposals specific to its industry. The team proposed as a model for mid-level qualifications in engineering the Minerals Industry National Associate Degree (MINAD) project initiated by the Minerals Council of Australia (MCA). The MCA designed this program to prepare graduates for highly skilled, para professional roles. While the associate degree prepares graduates for further development into professional roles, its chief aim is to develop skills within the engineering team. It summarises the program thus:

Through its innovative Minerals Industry National Associate Degree (MINAD) Program, the MCA is working to develop para-professional roles in mining engineering and minerals geoscience to alleviate reliance on four-year trained professionals. Holders of these collaborative, nationally consistent associate degrees will perform discipline- specific roles under the supervision and mentorship of a four-year trained professional. In time, this will create a new pipeline of skilled labour, though it will not negate the chronic need for four-year trained mining engineers and minerals geoscientists. (Minerals Council of Australia, 2012, p. 8)

In discussing this program with a range of participants in stage two of the vocations project the team found that:

The pilot is progressing well and has good potential to solve the problems identified by the Minerals Council of Australia and by the research more generally. The project has attracted interest from a broad range of employers, universities and TAFE institutes and could be a general

model for other fields. This case is the most successful of those studied. Importantly, it involves collaboration by the three social partners. An industry association initiated the qualification, described the work role for which the qualification should prepare graduates and sets the aims for the project. Educators consulted employers and their colleagues, developed the qualification and offer it in close association with employers. Governments establish the regulatory environment, funded the development of the qualification, subsidise its teaching and offer income contingent loans for student fees. (Moodie, Fredman, Bexley and Wheelahan 2013, p.25)

Associate degrees in engineering are also offered by CQUniversity, Swinburne University, University of South Australia, University of Tasmania, Southbank Institute of Technology, TAFE South Australia and RMIT University. One focus of our interviews was to investigate the potential for expanding these associate degrees and applying the model to other engineering fields and at other institutions.

The eight participants chosen as representing a range of interest groups and contrasting views in engineering education and work consisted of:

- Four educators:
 - A higher education dean of engineering;
 - Two engineering teachers in the TAFE division of a dual-sector university;
 - An engineering lecturer in the higher education division of this dual-sector university;
- Four representatives of groups involved in engineering with a particular focus on education and training:
 - One union official who is also involved in the relevant industry skills council;
 - A consultant for engineering employers;
 - A mining industry representative;
 - A representative from a relevant professional body.

The next sections of the chapter discuss the key themes that emerged from our participant interviews and our synthesis of this data with our findings from the first two years of the project.

The changing nature of engineering and the imperatives for change

In previous work in the project we observed that engineering has strong occupational labour markets with strong structures and connections between employers, unions and professional associations. However, engineering has highly differentiated trades and professional segments and a lack of progression in education and work (Moodie and Fredman 2013; Moodie et al. 2013; Wheelahan et al. 2012). In particular, in the first stage of the vocations project, Strand 3 analysed data from the survey of Household, Income and Labour Dynamics in Australia (HILDA) on workers in engineering trades and professions. A number of judgements had to be made to construct the area because workers in engineering and the trades work in a range of industries and because quite a broad catchment of skills might feed into trades and engineering roles. Involvement in engineering and the trades was defined as those who had worked at some point in the nine years of the longitudinal HILDA survey from 2001 to 2010 in the occupations defined by the Australian Bureau of Statistics as engineering professional, engineering technician, or automotive, construction, engineering, electrotechnology or telecommunication trades worker. Table 10 shows clusters of occupational trajectories for such workers. In most clusters participants remained in the same broad occupational group for all or nearly

all of the whole nine-year period. The clusters with movement between broad occupational categories are the 8.1% who had switched between low skill, manual roles and the trades and the 8.4% who had moved from higher education study into an engineering professional role. Some 5.4% were not in the labour force (NILF) (Table 10).

Table 10 Clusters of broad occupational groups among those with some work as engineering professionals, technicians or tradespeople, 2001–2009

Description	%
HE → engineers	8.4
Managers	6.7
Other professionals	4.8
Low-skill non-manual	8.1
NILF	5.4
Low-skill manual → trades	8.1
Movement out of trades	28.3
Trades	30.1
Total	100.0

Source: Yu, Bretherton, Schutz & Buchanan 2012, p. 42, Table 17 Results of cluster analysis, trades and engineering

The team found that engineering and the trades are stable occupations tied explicitly to standards of entry and practice governed by occupational bodies. While trades workers are the biggest cluster of stable occupations, there also appeared to be those on the fringe of this segment, transitioning into low skill manual and even non manual work. Pathways into professional work were available, but seemingly limited to those with experience as engineering technicians or electronics trades, or had come via extensive higher education studies (Yu, Bretherton, Schutz & Buchanan 2012, p.42).

The team also found strongly segmented occupational markets in engineering and the trades maintained by occupational associations, regulation in some cases, and specialised education and training. This restricts horizontal mobility between occupations in different fields and vertical mobility even within the same field. However, there is considerable movement of occupations between industries. Trades workers, technicians and professional engineers work across the mining, construction, manufacturing, transport and utilities industries (Yu et al. 2013, pp. 18-19).

A number of changes are occurring in the industries most related to the work of engineering. These changes effect the nature of qualifications and work, not least by recasting and creating new needs for mid-level work. Manufacturing, in both absolute employment and as a proportion of total national economic activity, is experiencing a long term decline in most of its sub branches except, with some connection to agriculture, food and beverage manufacture. In particular, routine process work is increasingly being displaced by automation, which however creates new needs for skilled workers to monitor and maintain systems (AWPA 2013b).

In a previous paper in the project we discussed how there has been increasing demand for a range of skills. This is exacerbating the limited supply of skilled workers due to the collapse of previous modes of education and training – cadetships, apprenticeships and graduate programs – that were formerly much more common in public utilities and some private employers (Fredman et al. 2013). Several of our stage three participants highlighted this issue. The civil and construction sector participant saw this as a problem exacerbated by the short-term nature of projects within those branches of engineering.

We used to talk about an engineering skills shortage, we don't anymore because they've all getting fired within the past year. I do believe there is still a systemic problem with the supply of the

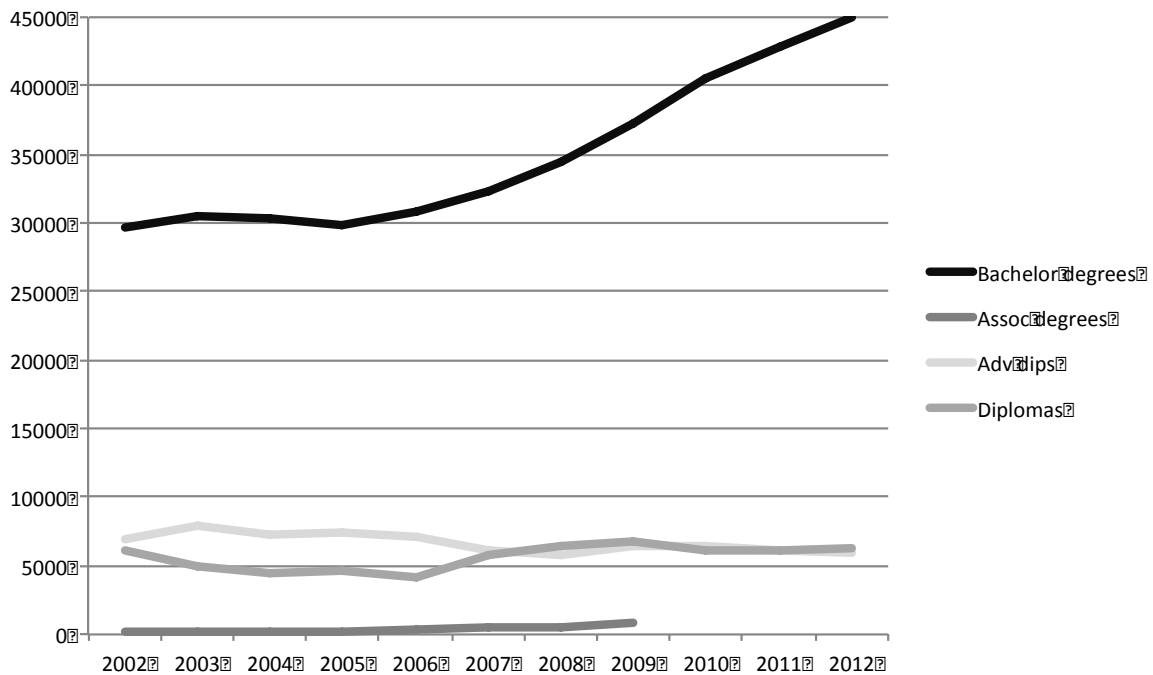
engineering workforce. We think a lot of that stems from the privatisation of public utility organisations and other government departments and agencies that really acted as the breeding grounds for engineers but then go to the private sector. That doesn't exist anymore, it's now the private sector that's responsible for that training. The private sector in our view understands this and takes it on – is fine with that idea, but we don't think that clients understand or respect the cost of doing that. So the jobs that they win don't really have enough margin to invest an awful lot of it back into training. (Consult Australia)

The engineering dean thought qualifications were being used as a substitute for the decline in these previous modes, and that this allowed employers to abrogate their responsibilities.

The unfortunate thing is that industry has moved away from offering training on the job. They'd get somebody as an apprentice with almost no skills knowing that this person needs a bit of monitoring and hand-holding. They were also offering a lot of engineering graduate opportunities and again giving these graduates the chance to see a whole spectrum within that engineering workforce ... So it's a very selfish attitude of the industry that wants everything for very little and want everything now, they don't want to invest. And now they're looking at -- we don't want to train anybody who has Diplomas or Certificate IV - we're not going to invest much in them, we want the universities to bring the next level up. That's the role of the industry.

Current trends in enrolments in qualifications in engineering can be seen in Figure 4 which summarises this data for the broad field of education of engineering and related studies. We see strong growth in bachelor degree enrolments from 2005. This appears at least partly driven by increased enrolments of international students, who increased from 22% of total load in 2002 to 29% of total load in 2012. Advanced diploma load has fallen somewhat overall, while an increase in diploma load from 2002 to 2009 has reversed somewhat more recently. Associate degrees increased almost fivefold from a small base of 197 in 2002 to 799 in 2009. It is not clear whether this strong growth in associate degrees has continued as the data are no longer readily available. Associate degrees both have the clearest articulation pathway and the better recognition by Engineers Australia as a preparation for mid-level work, as noted below.

Figure 4 Full-time equivalent load in AQF 5–7 programs in engineering, 2002–2012



Note: Data on higher education associate degree load only available until 2009.

Source: VOCSTATS (www.ncver.edu.au/resources/vocstats/intro.html) extracted on 1/10/2013; and DIISRTE (2013) Table 4.1: actual student Load (EFTSL) for all students by State, higher education provider and broad level of course, full year 2011 and corresponding tables from previous years.

The decline in previous modes of education and training was compounded by an expansion of mining, leading to specific skills shortages noted in a number of reports, most recently (AWPA 2012). However, more recent data on the engineering workforce (Engineers Australia 2013) suggests that the ‘skills shortage’ in engineering is less of an issue than when the project previously discussed the drivers for a change in approach to engineering qualifications (Fredman et al. 2013). Engineers Australia’s (2013) data show a lower proportion of qualified engineers are working in engineering occupations and that a lower proportion of employers report difficulties in filling positions. The discussion here however suggests that there are still new needs for knowledge and skills and that previous modes of education and training still need to be replaced.

Purposes of qualifications

This section draws on data on employment and further study outcomes from qualifications and interviewees’ perspectives to explore an appropriate balance of purposes for mid-level qualifications in engineering between labour market entry and progression, educational progression and widening access to qualifications.

Contradictions in work and educational purposes in mid-level engineering qualifications

Throughout the project we found contradictory indications of and views on the purposes of mid-level qualifications in engineering which, as noted above, is an area with highly structured segmentation between trades and professional roles. Employment outcomes of qualifications at all levels are good but varied, while there are indications of generally poor and worsening pathways from engineering

study to engineering work at the mid-level. Table 11 shows that engineering graduates of vocational diplomas or higher in 2012 had strong employment outcomes, with 86.6% of graduates employed after training. However, employment rates of engineering graduates of diplomas and above differed somewhat by narrow field of education, with vocational diploma or higher graduates in process and resource engineering having an employment rate (88.9%) higher than the rate for graduates in electrical and electronic engineering and technology (85.7%).

Table 11 Percentage of graduates in employment six months after training, by level of qualification in the broad field of education of engineering and related technologies and selected narrow fields of education, 2012

Field of education	Cert I	Cert II	Cert III	Cert IV	Dips or higher	All levels
Engineering and related technologies	68.3	69.8	87.8	89.8	86.6	83.9
Process and resources engineering	np	65.9	82.3	97.9	88.9	80.8
Electrical and electronic engineering and technology	0.0	80.6	96.2	94.3	85.7	92.0
All fields	50.5	61.8	79.2	84.0	83.2	77.8

Source: NCVET (2013).

Notes: na Not applicable

* The estimate has a relative standard error greater than, or equal to, 25% and therefore should be used with caution.

np Not published. NCVET does not report on estimates based on five or fewer respondents because the estimates are unreliable.

Unfortunately employment rates are not published for the small number of graduates of higher education diplomas and associate degrees. However, Graduate Careers Australia's (2012) Australian graduate survey reports the proportion of bachelor graduates in 2012 in engineering available for full time employment who were employed full time. The rates differ between narrow engineering fields, but the employment rate for most engineering fields are very high, much higher than for all fields (Table 12).

Table 12 Bachelor degree graduates in full time employment as % of available for full-time employment, by aggregated field of education and employment status

Field of education	% employed
Aeronautical engineering	81.4
Chemical engineering	77.5
Civil engineering	90.5
Electrical engineering	88.0
Electronic/computer engineering	79.5
Mechanical engineering	88.4
Mining engineering	93.9
Other engineering	85.4
Surveying	93.0
All fields	76.1

Source Graduate Careers Australia (2012) Table 2: breakdown of bachelor degree graduates available for full-time employment, by field of education, 2012 (%)

While a high proportion of engineering graduates of vocational diplomas or higher programs in 2012 were employed, only 19.2% were employed in engineering, even lower than the relevant rate for all fields of 25.1% (Table 13). This is a marked drop from the 2011 figure of 35.1% of engineering diploma or higher graduates employed in engineering, perhaps reflecting the decline in the 'skills shortage' discussed above.

Table 13 Percentage of those employed six months after training working in the same occupation as their training, by level of qualification in the broad field of education of engineering and related technologies and selected narrow fields of education, 2012

Field of education	Cert I	Cert II	Cert III	Cert IV	Dips and above	All levels
Engineering and related technologies	38.7*	12.2	75.7	35.8	19.2	58.2
Process and resources engineering	np	np	67.7	np	0.0	49.9
Electrical and electronic engineering and technology	na	16.2*	89.9	53.9*	np	76.3
All fields	24.0*	22.3	60.0	26.2	25.1	41.1

Source: NCVER (2013).

Notes: na Not applicable

* The estimate has a relative standard error greater than, or equal to, 25% and therefore should be used with caution.

np Not published. NCVER does not report on estimates based on five or fewer respondents because the estimates are unreliable.

This suggests that notwithstanding the aim of vocational diplomas and above in engineering to prepare graduates for specific jobs, they actually prepare graduates for employment more generally. It also highlights the importance of vocational qualifications' other roles, to support transitions to higher level qualifications and to widen participation in higher level qualifications by expanding access for students from disadvantaged backgrounds.

Our previous findings in the project also suggested a lack of coherence in educational progression in engineering. In the first stage of the project Strand 2 examined how pathways varied in tertiary education. We firstly examined the extent to which students were admitted to bachelor level programs on the basis of previous VET study. It was noted that 9% of students commencing all programs in 2008 were admitted on the basis of previous VET study. This proportion was somewhat lower in the broad field of engineering and related technologies, at 5%, and in the 12 narrow engineering fields the proportion ranged from zero to 12%, with the marked exception of manufacturing engineering and technology in which it was 43% (Moodie 2012a, p. 11).

We also examined pathways in tertiary education more broadly by examining the detailed educational history available in the Australian Bureau of Statistics' Survey of Education and Training. We noted that successive issues of this survey through the 2000s show a trend towards multiple qualifications and also shows a trend towards a greater proportion of qualifications in higher education (Moodie 2012a, p.16). We looked at the extent to which different pathways had been followed by examining the first and second qualification for those who had undertaken at least two qualifications. We analysed this by broad field of education and type of pathway followed, that is, by the possible combinations of VET to VET, VET to higher education, higher education to VET and higher education to higher education. We looked at the broad field of education of engineering, rather than narrow fields of branches of engineering.

To show the overall extent of patterns of student articulation and how this has changed over time, we estimated from the 2009 Survey of Education and Training the numbers of working age people in 2009 who had gained a qualification in each broad field in either VET or higher education. We divided these by those who completed their qualification before 1990 and those who completed it from 1990 to 2009. We calculated the proportions of graduates who had no further qualification, a second qualification in VET or a second qualification in higher education and analysed these by field, sector

and completion period. Patterns for those with a first qualification in engineering show, compared to other fields, a low level of articulation either within or between the sectors, and little increase in these rates between those completing before 1990 and those after 1990 (Fredman 2013). Hence by both institutional data and Survey of Education and Training data, there appears to be little articulation within or between engineering in the tertiary education sectors and little change in this.

We examined the extent to which those with at least two qualifications changed fields between their first and second qualifications, as an indicator of the coherence of educational pathways in these fields. We found that for those with a first qualification in engineering, the proportion studying in a different broad field for their second qualification, 51%, was statistically the same as that for all fields, 52%. Management and commerce was the most common second field for all pathways.

In the first stage of the project we also interviewed 72 educators (teachers and managers), students and graduates across engineering, agriculture, financial services and nursing, in higher education and VET. Interviewees involved in engineering explained that highly structured pathways worked well, such as associate degrees that guaranteed entry to a bachelor degree. However, less formal pathways such as attempting to move from the trades to technical or professional work could be very difficult (Wheelahen et al. 2012, p. 23-24).

One issue raised in the literature review and in participants' comments in the second stage of the project was that Engineers Australia, as the profession's qualification accrediting body, generally finds advanced diplomas too diverse and opaque to accredit. Engineers Australia has a general preference for associate degrees for an AQF 6 qualification, as long as it is a real preparation for work and not only for progression to higher level study. We examined examples of engineering associate degrees at two universities and a TAFE institute and in particular the Minerals Industry National Associate Degree (MINAD) initiated by the Minerals Council of Australia, all of which appear to be successful (Fredman forthcoming; Moodie et al. 2013).

Views of the purposes of mid-level qualifications varied markedly among our stage three participants, by the social institutions they represented and by the branches of engineering they were most directly involved in. The participant who represented civil and construction engineering employers saw a clear primary role in preparing graduates for entry to the labour market and clear secondary role in preparing graduates for educational and occupational progression:

The thing our employers would be most interested in is having people who come to the workforce with actual skills for jobs they have, so preparing for labour market entry is the primary thing that employers want. I think secondary to that is the supply of people who have the potential to move up to a higher-level qualification or role.

According to this participant, an occupational pathway from a technical role such as a drafter to a later professional role in civil and construction engineering can be advantageous with a good starting salary and practical skills. With a later degree a professional then has a good combination of skills, knowledge and experience, although this entails more study overall than someone initially undertaking a bachelor degree:

A graduate professional engineer is probably not really as useful in the workplace as a graduate drafter and I think in fact [graduate] drafters earn roughly the same amount as professional engineers at the junior ranks... a good associate engineer becomes a quasi-professional engineer, although not officially and they don't have qualifications, they can certainly start to take on many of the roles of a professional engineer. A good associate engineer who then retrain as professional engineer is probably a stand out professional engineer, that's what we hear.

The mining industry participant expressed a very strong focus on occupational progression as a key purpose for mid-level qualifications, in particular for the above mentioned MINAD project, which we put forward as a model in our discussion paper for engineering participants. For this participant the current and future skills of the industry point to a need for a substantial mid-level qualification that the MCA views as being possible with associate degrees:

We are coming off a price lead growth phase to a volume lead growth phase, so you're kind of having to do more to stand still, and that means fundamentally how do we answer that productivity equation? The example we can think of here is the new types of skills that professionals may need: twenty years ago we couldn't have imagined that there would be a remote operations centre in Perth that drives trains in the Pilbara area to begin with and then drives trucks, etc. An automated production environment with less people but people who are highly skilled already, and you're giving them some complementary additional up-skilling. Is that a mid-level qualification perhaps or it is just a natural part of that job growth that's not formalised somehow?... I guess the Associate Degree [process] has gone a long way to identifying what those fields of knowledge are... [We've come to see that] the associate degree is a new way in which we can supplement those skills and ... promote a sustainable workforce with transferrable skills.

But he also pointed out that industry, not necessarily through this associate degree project, needs to have a concern with the broader roles of education, such as literacy and numeracy and 'basic life and non-directly vocational skills'.

[We are] an industry with remote and regional operations that exist within communities or are nearby communities which are Indigenous communities and which haven't had possibly the same educational experience as urban Australians. So how do we assist in either facilitating or getting life skills components right to develop a kind of pre-employment pool of individuals?

The union participants argued very strongly for a direct vocational purpose for mid-level qualifications, and that current diplomas and advanced diplomas were a suitable preparation for high skilled and some managerial roles in manufacturing if they were delivered well by good quality and well regulated providers. He saw, however, an overly marketised system undermining the quality of training, and along with an overly 'educational' focus, the system promoting a negative 'purpose' of profiteering by less scrupulous private providers.

Our view of that is mid-level qualifications should qualify people for mid-level occupations, that's our intent in dealing with the training package. We have diplomas that are geared towards trade vocations, diplomas that are geared towards technical occupations, advanced diplomas and some graduate qualifications as well... we're unashamedly vocational in our thinking, we want to prepare people for the work that exists... If we can maximize the amount of articulation of credit into our education qualifications that's a fine thing, but that's not our principle goal... the whole notion of having a purpose for vocational education and training that is vocational is being lost... you introduce market models and so called demand driven models into that and it's a recipe for the sort of bad behaviour Victoria's renowned for... We're constantly being asked to fill up our training packages with [Mayer] key competencies, core skills, foundation skills, employability skills but they were always in there but we've been asked to make this stuff more explicit and we're losing vocational relevance and opening things up for rent seekers to grasp. So [institutions developing new qualifications are] trying to sell something that has no natural constituency.

By contrast, three of the educator participants involved in a range of VET and higher education programs in a dual sector university saw different if overlapping educational progression and work

preparation purposes for mid-level qualifications. In this they argued that there was space for both advanced diplomas and associate degrees. One VET sector educator pointed to a problematic lack of industry recognition of mid-level qualifications while arguing advanced diplomas still fulfil some work roles:

Changing work processes has meant a lot more 'mid-level' work – drafting, word-processing – falls on professional engineers, particularly for younger professionals, with less clear mid-level roles. But there is still a potential strong work role, even if not recognised. That the associate degree is for nearly all students an educational pathway doesn't fit in with this need, which industry representatives on the institution's committees always say.

The other VET sector educator, while arguing that the associate degree had a real labour market entry role, pointed out that its closer connection to higher education made it a better preparation for educational progression than the advanced diploma.

The teaching style is very different because the associate degree is curriculum based, just like what higher education do, whereas the advanced diploma is competency based.. [the former] even if it's at AQF level 6 it needs a bit more analysing and thinking skills and problem solving and a strong maths background is needed... if they don't have that level of knowledge it will be very difficult for them to survive in the associate degree ... they should be at the same level [as bachelor degree students] when they go into third year, they should not be lagging behind.

All the dual sector participants reported that advanced diploma students have a harder time transferring to higher education but that individual support is available. They also had to change automatic entry for associate degree students to a grade point average minimum for those completing from 2014. The civil and construction engineering employer representative also commented on the current difficulties of a transition from VET to higher education.

It is actually really hard for people to transition from the Diploma, Advanced Diploma up to Bachelor Degree. The recognised prior learning is hard to get and it seems that each university has different rules so I think we could benefit from having standardised, recognised prior learning criteria or guidelines so students know what to expect when they approach university. It's also hard to step up because by the time you're ready to do that, you've done your Advanced Diploma, you've worked for a few years, now you're in your mid to late twenties and that's when things start to get a bit more real; you start to maybe get married, have kids, get a mortgage and the time and cost commitment is pretty high.

The higher education educator from the dual sector institution sees a clear work role in mid-level qualifications, in recognition of the relative segmentation of engineering work within the engineering team. He also appeared to suggest the seamless nature of the AQF was a barrier to educational progression: in not recognising real discontinuities it did not highlight the need for support and bridging.

[The role of mid-level work is in] analysis, fault-finding and rectification, and assisting in design. Two years isn't enough underpinning knowledge for complex design. They need a good knowledge of how the whole industry operates. In some associate degrees there's a rush to get to higher-level things which appear to third and fourth year engineering which seems somewhat inappropriate... There's segmentation, but also an overlap and a spectrum of activity. There's a role for supporting creative and design work undertaken by graduates of [AQF] level 7-9 programs. There has to be the same language to enable discourse, but people of each level shouldn't be doing the same thing. Professionals may know how to do de-bugging of systems, or fitting and

turning on a lathe, but probably don't have highly-honed skills in these areas... AQF while it may help doesn't really match the actual discontinuities in work. There isn't scope in current programs for what might be needed in terms of bridging programs, academic scaffolding.

Perhaps the most sceptical of the potential of mid-level qualification and mid-level occupations among interviewees was the engineering dean. He argued:

My personal view is there is really no need under this current trend of the job market to have a mid-level qualification in engineering, and I do understand that the Minerals Council of Australia wants to instigate the creation of mid-level qualifications, but unless there is an [ask] for it in industry and a recognition of what is exactly in them and the uses of it then it's really going to be a waste of time both for educators as well as those candidates that undertake them.

The graduates of the Bachelor of Technology courses have difficulty finding jobs which are for engineering technologists. They either don't find a job or if they do it's as a technician or engineer. If you look at the BTECH graduates they are either working as an engineer or technician; they are doing the job of one level higher or one level lower, they're not doing their own job.

The dean saw scepticism as appropriate both in the general needs of engineering work, and also because of a current downturn in employment for engineering professionals.

What I see as the intention of these mid-level qualifications is to have a super technician; the person who knows more perhaps in terms of integration than someone who has done a Certificate IV or Diploma, but then they are not designers, they are not necessarily people who can innovate. Is there a real need for it? In my view not really, I do appreciate the studies that have shown the shortage of engineers in the workforce, but I share the view of many of my academic colleagues who actually talk to the graduates who might've finished in the last six months or year and we find that the employment rates are not all that wonderful.

Along with the union official, the dean saw a negative 'purpose' in the recent developments of new mid-level qualifications, as, in the dean's case, a substitute for employers for a lack of previous modes of work based training:

I think what industry is after is they want to slough off their responsibility of some on the job training themselves and they are after many tiers rather than investing into training they just want to pick somebody put them in the role - you are for Certificate III, you are doing the job of a Certificate IV, you are doing the job of an Advanced Diploma, an Associate Degree, a Bachelor of Technology an engineer - you cannot have all those levels... after all of these tiers of qualifications and they want to exactly define what their learning outcomes, skills and capabilities are; Certificate III, Certificate IV, Diploma, Associate Degree, Bachelor of Technology, Bachelor of Engineering, it's just way too much.

However, in a similar manner to two of the participants in our agriculture case study, the engineering dean also suggested that short courses that were specific but also could accumulate towards qualifications might be a useful alternative approach to mid-level qualifications and for educational progression.

The systems have become more and more complex, so the difficulty is being too focussed on what industry needs now... [Systems] need the opportunity to address what industry will need five years later. Rather than thinking about mid-level qualifications, we should think about training opportunities which might involve a combination with university... the tertiary sector offering those short courses so someone who has finished with their diploma or certificate IV has ability to learn more in a systematic way but doing short courses and as the need arises, rather than having

another bundle to move to next level you need to do this. Because what is that bundle going to do? That bundle is not going to cater for what that industry wants. Again it's going to have a lot more generic attributes and skills... based on the needs of the job, once completed so many modules or credit points we can give you a qualification called associate degree or advanced diploma. We should not put any further qualifications constrained on a fixed set of units, subjects... if we really focus on the needs of the industry and design independent yet relevant modules so people do them as they need them and at the end when they've done it a good number of them; a particular qualification will be awarded to them.

Widening participation in qualifications

This section examines the extent to which mid-level qualifications in VET widen participation in higher level qualifications for students from disadvantaged backgrounds, thus supporting equity and social mobility. Table 14 shows the percentage of students in the two lowest socio economic quintiles, or students in the bottom 40% of socio economic backgrounds, in the broad field of education of engineering and related technologies. It also shows these percentages in the two narrow fields of education of process and resources engineering and electrical and electronic engineering and technology. If students from the two lowest socio economic quintiles (the bottom 40%) were represented in VET qualifications in proportion to their numbers in the population, then they should be 40% of students in these qualifications.

The table shows that students from the most disadvantaged backgrounds are under represented in diplomas and above in engineering overall and in the two narrow fields of education examined here. This underrepresentation is about the extent of the underrepresentation of students from the most disadvantaged quintiles in VET overall. Disadvantaged students in the broad field of education of engineering are more under represented in diplomas and above than for the two narrow fields in engineering and for VET students overall. The narrow field of electrical and electronic engineering and technology has fewer students from the most disadvantaged backgrounds compared to VET overall, and compared to the broad field of education of engineering and the narrow field of process and resources engineering. It is only in certificates II in electrical and electronic engineering and technology that students are represented close to proportionally with their numbers in the population, but this profile is quite different to certificates II in engineering overall and in VET more broadly. The most disadvantaged students are dramatically over represented in certificate I in electrical and electronic engineering and technology, but there are very few students in this narrow field of education in certificates I: there were only 115 students enrolled in these qualifications in 2012, which represented 22 full year training equivalents.⁴

⁴ Source: Vocstats, <http://www.ncver.edu.au/resources/vocstats/intro.html> accessed 3 January 2014.

Table 14 Percentage of students from the two lowest socio-economic quintiles by level of qualification and broad and selected narrow field of education, 2012*

Field of education	Cert I	Cert II	Cert III	Cert IV	Dips and above	All levels
Engineering and related technologies	47.5	51.9	49.3	44.4	30.6	48.0
Process and resources engineering	39.8	54.7	54.3	50.8	34.2	53.2
Electrical and electronic engineering and technology	86.1	39.3	38.6	35.2	33.2	38.0
All fields	47.5	50.9	45.3	37.9	33.8	43.1

Source: VOCSTATS (www.ncver.edu.au/resources/vocstats/intro.html) extracted on 26/12/2013

Notes: na Not applicable

*as measured by the Index of Education and Occupations in SEIFA (Socio-Economic Indexes for Areas), Australian Bureau of Statistics. It uses postcodes as the basic unit of measurement.

The number of students is counted and not enrolments or equivalent fulltime student load as the table focuses on attributes of students and not qualifications

Engineering does not support widening participation or social mobility for students from disadvantaged backgrounds. Moodie (2012b Table 4) shows that only approximately 6% of students commencing undergraduate higher education in the broad field of engineering are admitted on the basis of prior VET qualifications. Some 18% of students in higher education in engineering come from disadvantaged backgrounds (defined in this instance as students from the 25% most disadvantaged backgrounds), which is close to the 17% for higher education overall (Moodie 2012b, Table 4). However, they are unlikely to have come via VET given the very small percentage who are admitted on the basis of prior VET qualifications and low proportion of students from low socio economic backgrounds in VET engineering diplomas and above.

Capabilities approach

Our engineering participants in this third stage were similar to those in other case studies in generally supporting the capabilities approach to education and work, not least in lifelong education and progression. The mining industry participant called this conception ‘the uninterrupted education and training pathway’. It is noteworthy that the process of developing a national framework for minerals and geoscience associate degrees had been refined to some extent from a purpose of creating more professional engineers to creating more skills and knowledge within the engineering team.

Part of the process of an associate degree I can link here is one of our members had indicated that the original intent for them was that it grows a future pool of mining engineers. They then revisited that to say it grows a pool of technical skills that can assist mining engineers.

Our participant representing employers in civil and construction engineering argued that employers and managers in that branch wanted drafters and associates with a depth of skills, and seemed to contrast employers’ views in this with that of the industry skills councils.

Senior engineers within our member firms ... are making a lot of comments on there needs to be a greater emphasis on maps and principles behind what students are learning... employers are talking about making sure the student has not so much specific capability but a broad understanding... I just get a sense that employers really want to make sure students come out with a deep broad understanding of the principles, and I get a sense that the skills council as a whole keeper of curriculum is keen to make sure that it is very competencies based.

By contrast the higher education educator at a dual sector institution (whose specialisation is in a different branch to that of civil or construction engineering) saw a contrast between educators' and employers' support for a capabilities approach to mid-level education and work.

From a pedagogic perspective, I agree. From an employer's perspectives, they're used to the idea of competencies they can check off. If they're not confident of these, employers might be tempted to employ higher-level educated people.

The engineering dean stressed the need for education for adaptability in a constantly changing area of work:

I think in the higher education sector, including the VET sector, a big responsibility on their shoulders is to educate people for life-long learning, and therefore embed knowledge and skills which gives them their adaptability and flexibility to change as the job market changes. The more we narrow the sorts of outcomes – in terms of learning outcomes and skills of a particular qualification to be really just what the industry wants, we are going too narrow and losing that opportunity to give them that breadth which in the long run would benefit them and industry as well... If a qualification becomes too narrow the scope for lateral movement and horizontal movement and scope for adaptability becomes very limited... Courses should not be designed to meet the needs of the industry now but need to embed enough breadth and lifelong capabilities within the courses so the graduates will be relevant and employable for many years to come.

While generally defending the current system of competency based training and training packages, and explicitly disagreeing with various aspects of our discussion paper, the union official agreed with the need for depth of knowledge and adaptability in education and work:

I think what's in the paper about the breadth of qualifications just goes too far. I'm not far away from the concept, but the practical application of it has to be doable in the sense of the world of work, because someone's got to pay for the breadth of training that's required to produce a person who has both horizontal and vertical mobility through vocations... I don't think people can say training packages and competencies standards are too narrow because I don't believe they are, they're perfectly capable of delivering sound broad outcomes, sound underpinning knowledge and skill... We have skill levels in our awards, we no longer describe a fitter or turner or technician, and we describe levels of skill and broad vocational fields within those levels. We have one diploma advanced trade, one diploma technical and one advanced diploma. There is a significant amount of flexibility in that plus a well-defined process for aligning to the nature of work. Work in the broader sense of what are the requirements of work in terms of knowledge, skill, contingency, planning, management, autonomy, discretion... Of course industry wants people who can work, who can adapt to change and we need enough of the capability – what are we calling it now? – adaptive capacity.

Vocational streams

Our engineering third stage participants were as a group similar to our agriculture participants both in expressing general support for the capabilities approach while expressing more limited support for the vocational streams concepts. In a similar manner to the range of views expressed by participants in agriculture, participants saw some limited validity in the concept of vocational streams within specific areas in engineering. The participants representing civil and construction employers stated that 'the concept is certainly relevant in management, as many firms have engineering associates as managers

or part of a management team'. The need to teach management in context and being part of the engineering team was seen as important by the VET educator participants. One argued that,

Engineers Australia put so much emphasis on engineering management. When I talk to industry advisory people they say we don't mind people with less knowledge but we at least want someone who is a good team player. What if a person is very knowledgeable but they're not able to fit into a team?

The VET educators pointed out that a breadth of education was important in being part of the engineering team and the common language it needed, and also as preparation for possible later moves into separate but related areas of engineering work.

While there are specific professions, education should involve multi-skilling and a broad range of attributes, a lot of lateral and soft skills, communication, management, law, environmental issues, teamwork, and a knowledge of other areas. A civil engineer needs to know about surveying... some of this is education for some, there should be re-training and the ability to move to other areas through learning at work

Having a common year of study across engineering branches within associate degree programs was seen as one way of incorporating the vocation stream concept into engineering.

It will give them one full year to decide what their strengths are, which field they want to go to and then second year they will go to their major, one full year they will study into their subject, decide on their major and they will be competent enough to go either go to industry with that knowledge, or go to the Bachelor.

The engineering dean expressed scepticism that mid-level technical engineering work could be strongly linked:

I do appreciate that people might get an advanced diploma, and after a while they may not necessarily work in that particular field, but it is unlikely that they would be working somewhere where a different type of advanced diploma should be occupied there. Say someone does an advanced diploma in electrical technology, whilst it is likely that a good professional job - they may not find a job and do something different, that something different is not going to be the job that a person who has done an advanced diploma in mechanical technology would normally undertake, so the opportunity to move horizontally is fairly limited.

The dean seemed to see some possibilities at bachelor degree and above levels but not levels below:

Because of how complex the systems have become the challenges are more than what they would've been twenty, thirty years ago... looking at the broadening knowledge and skills [needed], you need higher qualifications at least equivalent to three, four or five years, nothing less than that. A one or two year qualification, based on where systems are, it will only let them touch the surface of an area of specialisation, you don't have a lot of opportunity to give them breadth.

The mining industry participants discussed vocational streams in terms of the Regional Agricultural and Mining Integrated Training (RAMIT) program, in which agricultural and mining industry bodies have worked together in pilot programs in Morawa, WA, and Emerald, Queensland to 'give complementary skills to both sectors. The whole idea there is that if one sector is in decline, then at least that person might be able to find employment in the sector that's in the up'. This program has been discussed previously in this project as a model of regional collaboration along with the Make It Work program, also mentioned in the agricultural case study chapter in this paper (Yu et al. 2013, pp. 36-37).

Social partnerships

Engineering participants in the project's third stage raised a number of examples of, and ideas relating to, new forms of social partnerships that could better develop education and work in engineering. The mining industry representative discussed the progress of the MINAD process as an example of collaboration, and stressed this is very much led by industry defining the needs in skills and work roles, with providers designing the best way to fulfil these. They politely contrasted this with our discussion paper's focus on educational providers initiating new qualifications –:

What we did [in early 2013] was we took recently trained four year graduates, their supervisors as well as technical experts, so there was about forty people across five work shops across the country, and we asked them to imagine what a person – who is a paraprofessional – who has got a two year qualification, what it is they might do. So once we were able to define what they would do, we brought it one step back to say what knowledge do they have to have to perform those functions? We were able to crystallise ultimately sixteen fields of knowledge broadly for in fact both disciplines in our target of our Associate Degree program; one mining engineering and one geoscience. So those sixteen fields of knowledge were by in large common for both, which I found quite interesting... the education providers are now able to take that and either match current curriculum that achieves those fields of knowledge or identify the gaps where we can support them... And industry takes those fields of knowledge now so they can in fact write the job description. So it's the same thread both ways.

While industry defines the fields of knowledge:

The education providers ultimately take those fields of knowledge and package them up. It's not really for us to decide - we'd be quite happy – and this is how it's going to end up being - the model that we deliver is this broad model that has flexibility for education providers to say we already have those foundation engineering mathematics or physics in a physical environment to use two examples, we already have that in our own institution or organisation... we won't in any way try and influence the pedagogical approach.

They stated that there is little space for an associate degree in geoscience, an area in which there has been particularly heavy retrenchments.

The engineering dean also saw that new forms of collaboration between industry and educators had to be interactive:

Collaboration/cooperation both ways... So the challenges can be addressed if they work together, the answer is not in another series of qualifications to be named whatever, we have to work on what the graduates' outcomes are at the end of the qualification... [Industry] can't just ask for things, the same thing applies to universities as well. The universities have to invest in linkage with industry, not focus on needs of industry... The tertiary sector, including both TAFE and universities, have to engage more with industry and not expect outcomes straight away... And industry has to invest in giving more work experience to people doing various qualification levels because if they're after something that is more tailored for them then to really participate in it, not magically at the end somehow they will be an engineering graduate or engineering technologist or somebody with a Certificate IV or Diploma who knows exactly what they're after

One of the VET educator participants in a dual sector institution also expressed this:

There's four players: industry, educational institutions and professionals associations, and government. The main, prime mover should be industry. We can't say, look guys, we're produced

these great qualifications, you take them. We have to consult heavily. We hear there's a need for mid-level work but we need to know there's employment for them.

The higher education educator from this institution saw a need for change and new bodies:

There's a lack of heart and soul industry engagement. In medicine, nursing and teaching it seems students get closer to industry, in a more coherent way than in engineering. There's a whole lot of fora and panels, but not necessarily a sense from industry and government that training the next generation of engineers is important for the country. Maybe there has to be something systemic which supports that... rather than a supply chain focus in which something is produced whether it's needed or not, it's more about integration of the system. Engineers Australia might play a brokering role, but universities and TAFEs have to work directly with industry. We have to also work out how this doesn't become a free market free for all, but has a coherent and adaptable overlay.

New forms of collaboration were discussed by the civil and construction employer representative, who was involved in the reaccreditation of the Diploma of Engineering Drafting and the Advanced Diploma of Engineering Design. These programs had broad industry support as developing broad based knowledge and skills in drafting and drawing and as providing clear pathways to higher study. The programs are registered in South Australia as accredited courses because they were due to run out and the alternative training package programs were seen as narrow and inferior. The process drew together TAFE teachers, Engineers Australia, employers and SkillsDMC, and our participant noted, 'After a while I realised that none of those four sets of stakeholders had ever spoken to each other about the problem'.

Generalising from this experience, this participant considered that there needs to be clear roles for all stakeholders, and a recognition that the education and skills development needs of engineering does not fit into the industry-based skills councils since it includes a range of related trades, technical roles and professions across several industries:

The skills council needs to lead development of training packages obviously, but for engineering in particular there needs to be a nominated skills council who is in charge of all engineering related things. Or either a new skills council or a new offshoot of the skills council to look after engineering workforce development... Teachers need to be able to connect with the skills councils they're not all coordinated across different jurisdictions but the skills council are. And the professional associations don't have any statutory authority at all or any public funding. They're a key stakeholder, but again I think it's the skills councils who need to take control and we need to figure out which skills councils or a new body within the skills council's framework could be created to take care of engineering. Employers have a role to help at least with that, but in our area employers are being squeezed pretty tight so there's not an awful lot of money sloshing around for training. They do spend a lot on training but there's not a lot of money spent on really forward thinking stuff that takes five years or more to get done.

Conclusions

This chapter has examined the need for a new approach to qualifications in engineering, focusing on mid-level qualifications. This need has arisen from the new and increasing demands for skills and knowledge in engineering, the barriers to and challenges in meeting these demands such as an apparent downturn in engineering employment and the segmented nature of work in engineering. A new approach is also needed because of weak educational progression in engineering, in particular

the difficult transitions between VET and higher education. In canvassing these issues and our proposals to address these issues with a range of participants, we found a range of views on the purposes of mid-level qualifications, with a generally strong preference for their direct vocational role. We heard scepticism about overly educational focuses by one participant, and the validity of mid range education and work generally by another. We found general support for the capabilities approach and knowledge-rich, career-long learning, with only cautious and critical support from one participant. We found mixed support for the concept of vocational streams, with some support in particular areas such as management or in education as preparation for later transitions with further training. Apart from one participant, interviewees believed that new social partnerships are needed and can be developed. The findings from the three years of the project suggest that there is a diversity of views within those involved in engineering education and work, but that there is widespread recognition of the need for change and that the debate on these issues needs to continue.

Financial services

Here we discuss the possibilities for a vocational stream in financial services, underpinned by a capabilities approach to education and training that facilitates horizontal flexibility between a range of related occupational roles, as well as vertical mobility supported by clear pathways between education and work. The focus in this section is on the role of mid-level qualifications in financial services, which we have identified as those that prepare graduates for para professional occupations: diplomas at Australian Qualifications Framework level 5 and advanced diplomas and associate degrees at AQF 6. The paper draws on a discussion paper developed for this project and presented for feedback to VET and higher education educators, scholarly experts, professional bodies and occupational bodies. During these consultations participants were asked to consider what types of changes are needed for a better approach to mid-level qualifications in financial services. Specifically, the team sought informants' views on the knowledge, skills and attributes that those working in financial services will need as the industry changes.

The paper begins with a discussion of the method used in this stage of the project, followed by an overview of education and employment trends in banking and finance uncovered by our review of relevant data collections. The main part of the paper presents our analysis of the policy, legislation, and licencing requirements of the financial services sector and the outcomes of our consultations with stakeholders about the future of education in the sector and in particular possibilities for the creation of vocational streams supported by a capabilities approach to education.

Method and participants

The third stage of the project reported here consisted of, firstly, producing a general discussion paper and a discussion paper for each of our four case study industries that synthesised our findings from the first two stages and put forward proposals for a way forward for mid-level education in each field. We then distributed these discussion papers to a range of participants representing interest groups in each field. The seven interviewees involved in financial services consisted of:

- Three education leaders / scholars:
 - A Dean of Business;
 - Two senior, prominent scholars of business and finance education;
- Two educators:
 - A higher education course coordinator of a bachelor specialising in financial planning;
 - A VET business head teacher;
- One industry body representative;
- One education-based professional involved in education and employment partnerships programs.

These consultations were supported by an analysis of the regulatory environment of the financial services sector and analysis of education and occupation data.

Education and employment trends in banking and finance

NCVER's 2012 student outcomes survey shows that graduates of vocational diplomas and above in banking and finance in 2012 had reasonable employment outcomes, with 73.2% employed after graduating. However, this is much lower than the employment rate for other graduates in the broad field of management and commerce (85.3%) and the rate for graduates of all fields (83.2%) (Table 15).

Table 15 Percentage of VET graduates in employment six months after training, by level of qualification and broad and selected narrow field of education, 2012

Field of education	Cert I	Cert II	Cert III	Cert IV	Dips and above	All levels
Management and commerce	52.4	60.0	77.8	84.4	85.5	77.8
Banking and finance	na	np	78.8	82.9	73.2	76.4
All fields	50.5	61.8	79.2	84.0	83.2	77.8

Source: VOCSTATS (www.ncver.edu.au/resources/vocstats/intro.html) extracted on 1/10/2013.

Notes: na Not applicable

np Not published. NCVER does not report on estimates based on five or fewer respondents because the estimates are unreliable.

While employment rates are not published for the small number of graduates of higher education diplomas and associate degrees, Graduate Careers Australia's (2012) Australian graduate survey reports that 74.5% of business studies bachelor graduates in 2012 who were available for full time employment were employed full time, slightly below the bachelor graduates' employment rate for all fields of 76.1%. Somewhat higher employment rates were enjoyed by bachelor graduates in economics (76.8%) and accounting (79.9%) (Table 16).

Table 16 Bachelor degree graduates in full time employment as % of available for full-time employment, by aggregated field of education and employment status, 2012

Field of education	% employed
Business studies	74.5
Accounting	79.9
Economics	76.8
All fields	76.1

Source: Graduate Careers Australia (2012) Table 2: breakdown of bachelor degree graduates available for full-time employment, by field of education, 2012 (%)

In 2012 only 28.4% of banking and finance graduates were employed in their field of training six months after graduation (Table 17). This is very low, much lower than the 41.1% of graduates of all fields employed in their training field after graduation. An even lower 17.5% of graduates in the broad field of management and commerce were employed in that field after graduation, while 22.7% of graduates from the narrow field of banking and finance were employed in the same occupation as their training.

Table 17 Percentage of those employed six months after training working in the same occupation as their training, by level of qualification and broad and selected narrow field of education, 2012

Field of education	Cert I	Cert II	Cert III	Cert IV	Dips and above	All levels
Management and commerce	15.9*	26.7	34.0	15.6	17.5	23.5
Banking and finance	na	np	34.4	36.9	22.7	28.4
All fields	24.0*	22.3	60.0	26.2	25.1	41.1

Source: NCVET (2013).

Notes: na Not applicable

* The estimate has a relative standard error greater than, or equal to, 25% and therefore should be used with caution.

np Not published. NCVET does not report on estimates based on five or fewer respondents because the estimates are unreliable.

This suggests that notwithstanding the aim of vocational qualifications to prepare graduates for specific jobs, they actually prepare graduates for employment more generally - and that this is particularly true of qualifications in management and commerce. It is perhaps unsurprising that banking and finance, being a less general field, has slightly higher in-field employment rates, but the links between qualifications and jobs for mid-level qualifications in this field is still very loose.

Data from the survey of Household, Income and Labour Dynamics in Australia reveal the occupational trajectories for those in financial services from 2001 to 2009. Those involved in financial services at some time over the period were mostly involved in the same broad occupational role for all or most of this period, rather than moving between broad roles. This included the 22.8% of respondents who were clerical/administrative workers, 24.1% who were professionals, 14.6% who were managers, and 30.5% who were in high turnover low skill roles for all or nearly all of this period. The only group that moved somewhat between broad occupational categories was the 8.1% who had moved from higher education to professional or clerical roles. These clusters of occupational paths were highly gendered: 84% of those static in clerical/administrative work were women, as were over two thirds of high turnover low skilled workers, and of the cluster defined by movement from higher education to professional and clerical roles. Conversely, over two thirds of those in stable professional and managerial roles were men. This suggests that women leave finance before establishing themselves in professional or managerial positions (Yu, Bretherton, Schutz & Buchanan 2012, p.30). A similar pattern is observed in law (Law Council of Australia 2013).

Financial services, then, is characterised by fluid occupational labour markets, with high general education entry requirements, typically a university degree. Critically, qualifications rarely align with job descriptions, and qualifications are typically used to screen entrants to the industry, with graduates from a wide range of disciplines being accepted and then trained on the job in specialised skills (Buchanan, Yu et al. 2010).

Educational requirements and regulation under ASIC

At present, education and training in the financial services sector, and particularly in financial advising, is tightly linked to the regulatory requirements of the Australian Securities and Investments Commission (ASIC). The financial services industry is regulated under the *Financial Services Reform Act 2001* (FSRA). Under the Act, people providing financial advice must comply with Regulatory Guide 146: Licensing: Training of financial product advisers. The areas of specialisation covered by RG 146 are: securities; derivatives; managed investments; superannuation; insurance—general, life and broking; deposit products and non-cash payment products; foreign exchange; first home saver accounts; margin lending facilities; and regulated emissions units.

RG 146 has required that those offering financial advice have undertaken training at an equivalent of at least the Australian Qualification framework 'Certificate III' level for Tier 2 (financial product sellers) or AQF 'Diploma' level for Tier 1 (those providing independent financial advice) (ASIC 2012). Training is likely to be continuing, for RG 146 requires that practitioners be trained in the particular areas in which they are providing advice, and that their knowledge be up to date. Until 2013 training has had to be completed via a course listed on the ASIC Training Register.

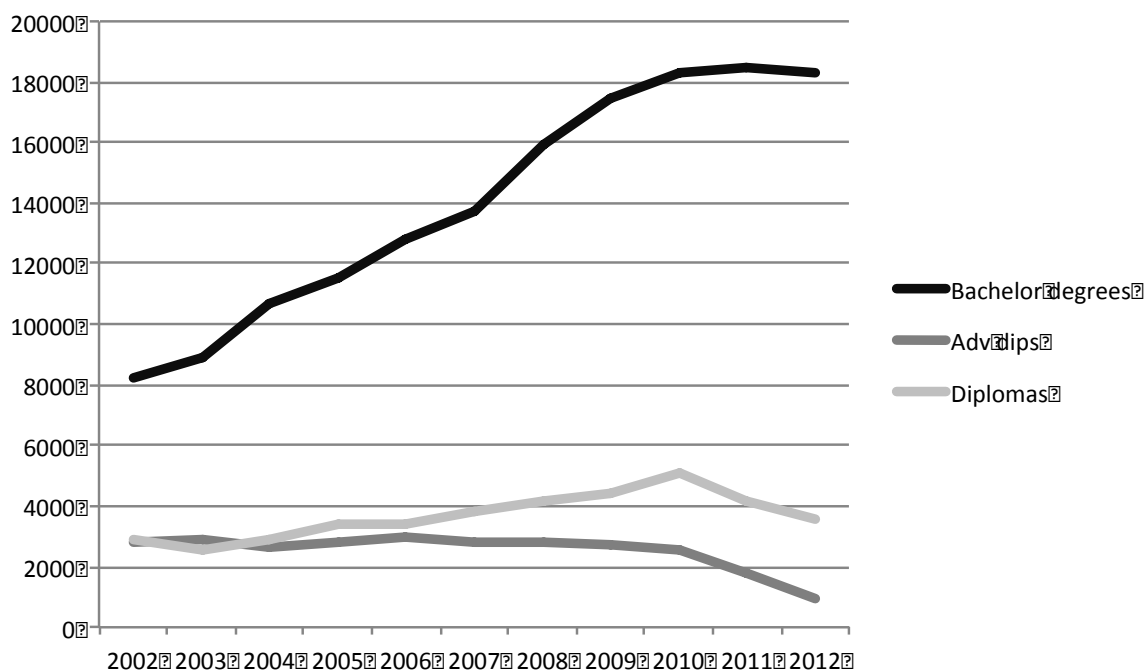
However, the level of education and training required has been updated to reflect the increasing complexity of the financial services sector. The *ASIC (Corporations Amendment (Future of Financial Advice) Act 2012* and *Corporations Amendment (Further Future of Financial Advice Measures) Act 2012* will require higher levels of education for practice. From 2019 Tier 1 advisors will require a bachelor level qualification to practice (AQF Level 7) and Tier 2 advisors a diploma. The generic and specific areas of knowledge required will also be substantially broadened. Previously, these areas of knowledge were broad and generic, but after 2019, the generic areas will include areas such as: 'Concepts in behavioural economics'; 'Risk profiling/risk tolerance'; 'Life stages and their characteristics'; 'Life events and their characteristics', and 'Ethics' (ASIC 2013). These changes are in keeping with the feedback about the education of financial advisors that we received during our interviews, as explained below.

The hollowing out of mid-level qualifications in financial services

Previously, in drawing on the work of Cully (2003) our team has noted that there has been a 'hollowing out' of the middle of the skill distribution, while those at the high and low end have increased (Wheelahan, Moodie & Buchanan 2012, p.30). The team further noted that Curtain (2003, p.1) argues that there has not been sufficient policy attention on intermediate skills and the adequacy of skills formation for intermediate skills.

The financial services sector has followed this broad trend. At the employment level the financial services are shifting from an industry to a profession, creating a widening gap between low skilled and semi administrative work such as product selling and high skilled professional work in advising, funds management, etc., as we note above in the discussion about regulation. This is illustrated in Figure 5 which shows the trend in enrolments in mid-level qualifications in banking, finance and related fields from 2002 to 2012. There has been a big increase in the number of equivalent full time students in bachelor degrees in banking and finance, although this seems to have levelled off in 2012. In contrast, while there was an increase in equivalent full time students in VET diplomas until about 2010, their numbers have declined since then, while the number of equivalent full time students in advanced diplomas declined quite a lot. The move to degrees and away from diplomas signals the requirement for degrees for entry to the field. Participants in our consultations agreed that mid-level qualifications in financial services have few direct employment outcomes (client management and sales management were mentioned as exceptions), and that the hollowing out of occupational roles at the mid-level has led to mid-level qualifications becoming mainly a means for transitioning to higher qualifications.

Figure 5 Full-time equivalent load in AQF 5–7 programs in mid-level banking, finances and related fields programs, 2002–2012



Source VOCSTATS (www.ncver.edu.au/resources/vocstats/intro.html) extracted on 1/10/2013, and DIISRTE (2013) Table 4.4: Actual student Load (EFTSL) for all domestic students by State, higher education provider and broad level of course, full year 2012 and corresponding tables from previous years.

This is further exacerbated by employment practices. Our interviewees stated that job applicants often need a degree and membership of a professional association simply to get an interview, even if the job is at the lower level and does not obviously require higher learning. In this sense, degrees are ‘a filter of capability’. Once employed, people are often trained on site for lower level roles (for example preparation of business activity statements, or data entry). Our interviewees also stated that many such mid-level jobs are being replaced by technology. Other low and mid-level jobs are going overseas, particularly to India where they can be completed overnight and returned electronically. All these features of the sector contribute to a hollowing out of the middle.

The purpose of mid-level qualifications in the financial services sector

As outlined in the introduction to the case studies, mid-level qualifications serve three purposes: entry to or progression in the labour market, transition to higher level studies, and access to higher level studies for students from disadvantaged backgrounds. However, the way these purposes are balanced will be different for particular qualifications. Our interviews with interest groups in the financial services sector indicated that both lower level and higher level qualifications in the sector are primarily used to facilitate entry to the job market: at the certificate level, to meet the regulatory requirements for product sellers and product advisors; at the higher level (bachelor and above) for entry to professional practice. As we note above, mid-level qualifications are rarely used for direct entry into the labour market.

Our interviewees stated that mid-level qualifications in financial services are primarily used by those wishing to change career direction within the broader commercial sector and by workers who need to upgrade lower level qualifications they were awarded when the industry was less credentialled. In this sense, the qualifications logic at the mid-level is somewhat disjointed. Mid-level qualifications provide a transition either between specialisations or between levels of accountability.

Widening participation in qualifications

This section examines the extent to which mid-level qualifications in VET widen participation in higher level qualifications for students from disadvantaged backgrounds, thus supporting equity and social mobility. Table 18 shows the percentage of students in the two lowest socio economic quintiles, or students in the bottom 40% of socio economic backgrounds, in the broad field of management and commerce and in the narrow field of education of banking and finance. If students from the two lowest socio economic quintiles (the bottom 40%) were represented in VET qualifications in proportion to their numbers in the population then they should be 40% of students in these qualifications.

The table shows that students from the most disadvantaged backgrounds are under represented in diplomas and above in management and commerce and particularly in banking and finance. They are also under represented in certificates IV in banking and finance, and in the banking and finance field of education as a whole. About 40% of students in certificates III in banking and finance come from the two bottom socio economic quintiles which is proportional to their numbers in the population, but their profile is unlike VET students in all fields of education in certificates III, where 45% come from the two bottom socio economic quintiles. It is only in certificates I and II that students from disadvantaged backgrounds have a disproportionate share, but there are very few students at all in these qualifications in banking and finance. In 2012, there were only 42 students in Certificate I and 189 students in Certificate II in banking and finance, which translated to seven full year training equivalents in certificate I and 31 full year training equivalents in certificate II respectively.⁵

Table 18 Percentage of students from the two lowest socio-economic quintiles by level of qualification and broad and selected narrow field of education, 2012*

Field of education	Cert I	Cert II	Cert III	Cert IV	Dips and above	All levels
Management and commerce	45.3	52.4	43.0	35.5	31.1	39.3
Banking and finance	90.5	56.1	40.5	30.0	29.4	32.2
All fields	47.5	50.9	45.3	37.9	33.8	43.1

Source: VOCSTATS (www.ncver.edu.au/resources/vocstats/intro.html) extracted on 26/12/2013

Notes: na Not applicable

*as measured by the Index of Education and Occupations in SEIFA (Socio-Economic Indexes for Areas), Australian Bureau of Statistics. It uses postcodes as the basic unit of measurement.

The number of students is counted and not enrolments or equivalent fulltime student load as the table focuses on attributes of students and not qualifications

Moodie (2012b, Table 4) shows that 11.6% of domestic students commencing undergraduate programs in the broad field of management and commerce are admitted on the basis of prior VET qualifications, which is higher than the 9% for the sector overall. Approximately 16% are admitted from low socio economic status backgrounds, which is similar to the 17% for the sector overall. Unfortunately, we don't have data within the narrow fields of education to show percentages admitted on the basis of prior VET qualifications or from low socio economic backgrounds. It seems reasonable to conclude, then, that in the financial services sector mid-level qualifications are primarily used to move horizontally within an occupational stream, or for transition to higher level studies to enter professional practice. Mid-level qualifications in banking and finance are not particularly effective in widening access for students from disadvantaged backgrounds or in supporting social mobility.

⁵ Source: Vocstats, <http://www.ncver.edu.au/resources/vocstats/intro.html> accessed 3 January 2014.

Vertical mobility: tensions in the VET / HE transition

Many of our participants stated that the competency based training offered by VET is not useful for progressing a person through education leading to employment in a professional field. As one participant put it, ‘There is a friction between the notion of competence, and professional standards and professional ability.’ Interviews undertaken in the previous years of this study also support this view, as do the findings of our earlier *Missing Links* study undertaken for NCVET (Wheelahan, Leahy, Fredman, Moodie, Arkoudis, & Bexley 2012). Here, and particularly in our interviews with VET students, we found that people often struggle in the transition from vocational to higher education. Another interviewee for this project commented that ‘they think operationally and task wise rather than conceptually’, and therefore a person coming out of competency based training will have trouble with the kind of work a graduate can do. In short, the VET/HE divide reinforces existing industry boundaries and occupational segmentation.

We note, however, that our colleagues in Strand 3 of this study found that within large organisations such as banks and insurance companies mid-level qualifications are often the basis of an explicit and well organised progression within a structured labour market [Yu et al. forthcoming]. Our interviews with employers and registered training organisations (RTOs) confirmed these observations. In these instances, mid-level qualifications (generally delivered in house by a private RTO) are focused on the skills formation and specialisation of employees with higher education qualifications, where higher education has been used to screen employees for entry to that employment. Conversely, where an individual’s highest qualification is at the mid-level they are unlikely to get a job in a big corporation, and therefore will be unable to access the structured internal labour market of the corporation.

Vertical mobility is a key issue in financial services, and most workers need a bachelor degree to proceed to professional or management jobs. Consequently, the team is proposing that vocational diplomas emphasise broad job outcomes, but also the knowledge and skills students will need to progress to a bachelor degree. Guaranteed pathways from vocational diplomas to relevant degrees will help give students certainty and will support more coherent pathways within the field.

Horizontal flexibility and vocational streams

Qualifications need to better promote graduates’ horizontal flexibility, that is, their capacity to work in different roles and in different parts of the finance industry. We asked participants to think about how we could better design mid-level curricula in finance so that graduates are equipped in a suite of skills suitable for a broad vocational stream rather than a single occupation. Responses were in keeping with the main theme, reiterated across our interviews: even for low level work in financial services, employees need a reasonably sophisticated understanding of professional ethics and the kinds of people skills to ensure all interactions are undertaken with responsibility and integrity. Indeed, one interviewee pointed out that it is at the lower levels of employment, where someone is advising an older person about superannuation for example, that the effects of misadvising can be felt most harshly. Another participant put it in these terms: ‘It’s great if you’ve got the skills ASIC requires but you need to be able to deal with people ethically, you need people management skills and a bunch of other skills that don’t come from [RG146]’. Professional ethics, therefore, needs to pervade all levels of qualification. However, ‘You can’t build that into a competency framework’. Other ‘soft’ skills proposed by participants were professional identity, professional awareness, and self efficacy: ‘Constructs that should be relevant for all levels of qualifications, not picked up when you leave university, [and] not just from a final capstone unit’. These soft skills should be included in

a curriculum that includes a basic but thorough understanding of economics, statistics, financial planning, and client relationships.

Engagement between employers and educators

In its interviews the team proposed that qualifications in financial services be developed mainly in consultation with major employers since these are most important for constructing employees' transition, and that sectoral bodies should also be consulted to encourage coordination between employers and strengthen sectoral approaches which are currently much weaker in financial services than in other industries such as agriculture, engineering and health.

Participants indicated that the field of education in finance, including at universities, suffers from not having had a strong external influence on curriculum (compared with accounting or economics, for example, where programs are generally accredited by professional bodies such as the Certified Public Accountants - CPA - Australia). Because of this, some felt that the focus on teaching and learning was weaker in finance than in other business-related fields. This has led to a great deal of variation in the quality and structure of finance education across the country.

Another aspect of training for horizontal flexibility within vocational streams was the need to improve work placements and workplace based learning. While employers are keen for graduates to have work experience, it is notoriously difficult to find sufficient employers willing to offer placements. One suggestion was for education providers to form close partnerships with a small group of employers, working together to provide cohesive work integrated learning. It is useful here to note recent developments in the UK, where the Minister for Skills has called for the introduction of apprenticeships (on the job education) in insurance, accounting and law, as well as 'higher apprenticeships' at the equivalent level of a bachelor or masters degree (Hancock 2012). These apprenticeships are based on collaboration between employers, professional bodies, and further and higher education. Certainly, such a collaborative model of vocational/professional education and training has great potential, however we would warn against the possibility of such innovation coming at the expense of horizontal flexibility.

Key messages and conclusion

The team in Strand 3 of the project found in the industry support for broad education and training programs which develop employability skills and vocationally specific knowledge such as knowledge of financial assets, risk and governance, and accounting, which support a range of career directions. The team proposed a vocational stream in funds management, general insurance and banking which included a range of occupations, both within and between firms, which included compliance clerk, business analyst, risk analyst and financial dealer. Another possibility would be a stream which facilitated movement between equities analyst, derivatives analyst, financial broker and financial dealer. Respondents regarded such transitions as common and typically supported by some core disciplinary studies, and/or strong on the job learning (Yu & Bretherton forthcoming, p.24).

Our strand also found a very widespread support for a vocational stream in financial services that could prepare individuals to work in a career rather than specific jobs. It was felt that the traditional bachelor path from a management and commerce degree was too broad, particularly in a post GFC environment where consumer facing retail roles are replacing traditional investment house roles:

There is a tension at the moment between traditional finance/banking programs and financial planning programs... Pathways to corporate and investment banking have disappeared post GFC.

[There are] more banking retail and personal finance roles [and] these are more geared to someone with a Financial Planning degree than the Accounting degree. [Graduates] need to be RG146 compliant and that comes from financial planning not corporate finance. Those emerging tensions make it hard to break up qualifications and occupational roles.

Workers need to be able to work within the range of roles regulated under RG 146 - securities; derivatives; managed investments; superannuation; general, life and broking of insurance; deposit and non-cash payment products; foreign exchange; first home saver accounts; margin lending facilities; and regulated emissions units. Yet to be able to navigate a career in financial services in the future, workers will also require the new skills to be incorporated into regulation from 2019, such as 'Concepts in behavioural economics'; 'Risk profiling/risk tolerance'; 'Life stages and their characteristics'; 'Life events and their characteristics', and 'Ethics' (ASIC 2013). What is interesting here is that regulatory arrangements appear to be keeping step with the needs of a swiftly evolving occupation, rather than being put in place to force change.

Strand 3 (Yu forthcoming) also found that, 'the current settings within the financial services *already* foster a strong occupational mobility and workers who are adaptable across the vocational stream'. We agree, although with the caveat that, for mid-level qualifications, mobility is limited to specialisation via diplomas and other shorter qualifications *post bachelor*, and that these qualifications are mostly not used to facilitate entry to the occupation by people from disadvantaged backgrounds.

Therefore, we need not recommend the *creation* of a vocational stream in the financial services, but rather the purposeful refinement of one that is already nascent. There are a number of key challenges for ensuring that the vocational stream in financial services grows in a healthy direction. These challenges can all be met by adopting a capabilities approach.

- 'Soft' analytical skills need to pervade all levels of education in the financial services sector. These include: professional ethics, professional identity, professional awareness, and self-efficacy. These skills are incompatible with a competencies approach. Therefore, VET level education in financial services needs to be broadened and deepened in a way that does not seem possible under the present system.
- Curricula also need to include the broader skills particular to the sector: economics, statistics, financial planning, and client relationships. While these skills are broader, they need to be contextualised by the field of practice for which students are being prepared and need to be embedded into all levels of education.
- While it is true that *within* the employment of large organisations such as banks and insurance companies mid-level qualifications often form the basis of an explicit and well organised progression within a structured labour market, this is not so outside of such organisations. Therefore, other providers need to build stronger relations with employers to improve work placements and workplace based learning. If not, there is the potential for creating two streams of education which have unequal graduate employability.
- Similarly, there needs to be a greater focus on teaching and learning in finance education. Participants reported a great deal of variation in the quality and structure of finance education across the country. It is unsurprising that mobility takes place within corporate structures if education providers have uneven quality of provision.

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