

NATIONAL VOCATIONAL EDUCATION
AND TRAINING RESEARCH PROGRAM

RESEARCH REPORT

Hurdling the barriers: enabling student pathways from VET to higher education in building and construction management

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Australian Government

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Climate Change, Science, Research
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About the research

Hurdling the barriers: enabling student pathways from VET to higher education in building and construction management

Anthony Mills, Deakin University, Patricia McLaughlin, RMIT University, and Jane Carnegie, Jane Carnegie Consulting

This project investigates student transfer from vocational education and training (VET) to higher education, that is, from diploma to degree, in the building and construction industry. Thirty-six VET diploma students currently studying a degree in construction management and related qualifications were interviewed across eight universities to identify what helped them to make the transition. While previous research on pathways has considered the question of enablers, limited research has been undertaken from the perspective of students.

Key messages

Students who have used a pathway from a building diploma to a construction degree identified various enablers. The most common were:

- people who provided guidance, support and knowledge of pathways (particularly VET teachers)
- positive VET learning experiences, which built confidence and motivation for ongoing learning and the development of self-directed learning skills
- the recognition given for prior VET studies through admission and credit by the receiving universities.

While the research identified various enablers, the pathway from a building diploma to a construction degree is seriously constrained by the low numbers of students in diploma-level building studies. Improving recognition of prior learning for industry employees would help to expand the potential pool of students who could take this path.

Tom Karmel
Managing Director, NCVET

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Executive summary

The purpose and focus of this study is to investigate the ‘enablers’ that assist and support students in moving from building diplomas in vocational education and training (VET) into construction management and related bachelor degrees in higher education. These enablers are identified from the perspective of students who have moved in a linear pathway from vocational education and training to higher education.

A number of previous studies have inquired into pathway enablers but, as noted by Wheelahan (2009c), only limited research has been conducted from a student perspective. This project aims to contribute to our knowledge from this perspective within this subfield of education. Improving our understanding of the enablers may also assist in the development of enhanced pathway initiatives.

The study is broadened by an examination of the current industry and education context. This context provides a rationale for strengthening pathways and clarifies some of the key issues. The project was conducted through a qualitative case study approach, supported by the identification and review of relevant published materials.

The qualitative research component encompassed the selection of higher education providers with known cohorts of pathways students in building and construction management and seeking their assistance to gain student access. The researchers were mindful of the need for geographic diversity and the inclusion of higher education providers with relatively high levels of students in this field.

A total of 36 students were interviewed from eight higher education providers across five states. The information gathered from the interviews was recorded and then interpreted using the Design and Evaluation Matrix for Outreach (DEMO) developed by Gale et al. (2010). Although this tool was developed for another purpose – outreach – its structure provided a relevant and appropriate platform for this study. As the study is primarily interpretative and the number of interviewees relatively small, the findings should not be generalised. However, it can be said that the identified ‘enablers’ represent markers for further and broader research, while the issues and options raised in the report for improving tertiary education pathways deserve further exploration.

To set the scene for investigating pathway enablers, a picture of the industry and education context is provided using published datasets and industry reports. The value of the industry both in economic and employment terms is highlighted, along with the occupational and qualifications profile of the industry. These data provide more than background information; they influence the research findings and provide a key rationale for improving pathways and identifying constraints.

A number of recent reports highlight the current skills needs and skills shortages in the industry (Department of Education, Employment and Workplace Relations 2011a; Australian Workforce Productivity Agency 2012a; Construction and Property Services Industry Skills Council 2011). In all of these reports construction management stands out as a critical occupation. Recent growth has led to a designated skills shortage for this occupation, which is projected to continue. Construction management has become the fourth most important occupation by employment numbers in recent years, growing by 55% in the five years 2005–10 (Australian Workforce Productivity Agency 2012a), with further growth in the order of 3% per annum projected until 2025 (Australian Workforce Productivity Agency 2012a).

This occupation is also designated as ‘specialised’ by the Australian Workforce Productivity Agency (2012b), meaning it is of ‘high value and contributes significantly to medium and long term skills developed through formal and extended education and training over a long lead time’. In other words it is a degree-qualified occupation. The Australian Workforce Productivity Agency (2012a) projects that the number of bachelor degree holders will need to increase by at least 25% to meet industry needs to 2025.

Meeting this projected increase in bachelor holders is problematic, given the low levels of higher education provision in this subfield of education. Based on higher education data for 2011, students in architecture and building comprised only 2.1% of all higher education students, measured by student load. Numbers in higher education remained static in the three years 2009–11 (Department of Industry, Innovation, Science, Research and Tertiary Education 2009, 2010, 2011). Stakeholders indicated specific constraints to extending provision within universities, including suitable staff and facilities.

One mechanism for meeting industry skills needs is improved pathways into higher education for VET qualification holders. This mechanism is important because it provides opportunities for upskilling by recent VET graduates and for experienced employees, and builds on skills and knowledge already attained. It also provides higher education providers with a pipeline into second and third years. However, this mechanism is constrained by the low levels of higher education provision and the high demand for student places.

Across all fields of education, diploma graduates are more likely to continue into higher education than graduates of lower-level qualifications. This is also true for this industry, with 16.5% of 2010 graduates moving to a bachelor degree in 2011, compared with 15.2 % of graduates in all fields (NCVER 2011a). However 16.5% of graduates represent just 464 persons out of an estimated graduate pool in this field of 2810. By comparison, the total graduate diploma pool in vocational education and training in 2010 was estimated at 81 800 (NCVER 2011a). On a numerical basis, pathway students from diploma to degree in this field are miniscule.

Boosting these graduate numbers requires:

- identifying ways to increase higher education enrolments and to address higher education constraints in provision
- improving pathways from certificate III/IV qualifications into diplomas and potentially into degrees. At these qualification levels both the percentage and numbers of students continuing with studies is significantly less than the average of all fields
- increasing the number of enrolments in diplomas (also low as a proportion of diploma enrolments)
- increasing the number of graduates in diplomas.

In this context, the higher education students in building and construction management who had been successful in navigating a pathway from vocational education and training were interviewed. In essence, the interviewees formed two groups: those students for whom the VET diploma was always a pathway to the degree and those for whom the diploma became a pathway to the degree. In identifying the enablers, slightly discernible differences in emphasis were evident between these two groups.

The student responses were mapped and categorised to each of the ten characteristics and four strategies making up the Design and Evaluation Matrix for Outreach (Gale et al. 2010) and the findings

detailed in the report. In summary, the key enablers identified (and expressed in the terminology of the matrix) are:

- ‘people-rich resources’, the most significant being the teachers and other staff in vocational education and training who gave guidance and advice to these students in areas such as future study, upskilling options and career opportunities for higher-level qualifications, and information on universities, credit and other relevant issues. This enabler was evident across all student responses
- ‘recognition of difference’, expressed through recognition for prior VET studies given by the destination universities in the form of credit and guaranteed entry (where provided) or ease of admission, and the support given to transition students as individual learners. This enabler was more important to those students who had intended vocational education and training as a pathway
- the ‘engagement of learners’, represented primarily through ‘positive learning experiences in vocational education and training’, which gave these students the skills and confidence to go on to higher education. This enabler was more relevant to students who decided to continue studying as a consequence of their VET studies but was evident in both groups
- ‘collaboration and communication’ between the VET and higher education providers, expressed through familiarity activities such as orientations, strong communication between staff and ‘link’ personnel in both institutions
- the ‘building of confidence’ in learners through VET studies and experiences, which engendered a high motivation to study and succeed at university and a clear focus on the value of the degree and the career of construction management. This enabler was evidenced in the responses of students from both groups.

Stakeholder forums conducted as part of this study provided the opportunity to share and discuss the research findings and to consider ideas and options to strengthen pathways in this field. The value and relevance of contextualising the research to industry needs was confirmed by stakeholders, with industry representatives strongly supporting greater involvement in the development of pathways.

Options and ideas to emerge from the forums included:

- the need to build better pathways within vocational education and training from certificate III/IV into diplomas
- greater flexibility in qualifications and combinations of qualifications between vocational education and training and higher education
- improved recognition of prior learning in higher education for existing workers with skills and experience
- greater use of work-based and integrated learning to support industry involvement and, perhaps, to assist in enabling further growth in higher education provision.

This research has contributed to a wider understanding of the importance of VET to higher education pathways to workforce needs in the building and construction industry. It has highlighted the factors/enablers which assist students to use these pathways and identified further ways by which to build and improve pathways.

Introduction

Building effective pathways for students to transfer from and between education sectors and qualifications has been the subject of extensive research, policy development and practice over the last 20 years, both in Australia and internationally. Different researchers and policy-makers have examined this topic from various angles, but all from the perspective that improved pathways constitute an essential feature in a more flexible and integrated tertiary education system.

The breadth of past research has included (*inter alia*) consideration of:

- system and institutional drivers and enablers (Phillips KPA 2006; Australian Qualifications Framework Council 2009)
- system barriers, including cultural and pedagogical differences between the sectors (Phillips KPA 2006; Wheelahan 2009a; Walls & Pardy 2010; King, Dowling & Godfrey 2011)
- different types of pathways and emerging pathway models, including integrated VET and higher education qualifications (Carnegie 2009; Phillips KPA 2010)
- patterns of student movement and transfer (Harris, Rainey & Sumner 2006; Curtis 2009; Wheelahan 2009b; Moodie 2010; Guthrie, Stanwick & Karmel 2011)
- the changing landscape of institutional provision and the blurring of sector boundaries (Wheelahan et al. 2009; Wheelahan, Moodie & Buchanan 2012)
- guidance on building better pathways (Integrated Articulation and Credit Transfer Project 2011)
- more specific research into pathways by particular fields of education, issues such as transition for students, and institutional case studies.

The role of industry in pathways development and the relationship between pathways and workforce needs have also been recent research themes. Phillips KPA (2006) reflected that employers want work-ready graduates with a mix of vocational and higher education outcomes, a point echoed by Bradley et al. (2008). More recently, the Australian Workforce Productivity Agency (2012c) called for a new partnership approach to workforce development that involves education institutions and industry, while Paez et al. (2010, p.7) suggest the way forward is to build pathways around industry skills shortages, skills gaps and workforce development needs within 'an industry determined articulation model'. One of the products of the Integrated Articulation and Credit Transfer Project (2011) is the development of such a model, called '3D articulation', in which industry is seen as an equal 'pathways' player with VET and higher education institutions.

The work by King, Dowling and Godfrey (2011) in the field of engineering pathways has also proposed closer and more effective collaboration with industry and professional bodies to build better pathways from vocational education and training into bachelor degrees. Another recent study (also in engineering) by Watson and McIntyre (2011) focused on skills shortages and the need to build industry capacity, arguing that 'meeting the requirements of employers through the industry-led model of course delivery is a strong potential driver of improved pathways' (Watson & McIntyre 2012, p.64). Eddington and Toner's overview and evaluation of skills formation strategies in Queensland (2012) also links the building of educational pathways to broader industry models to meet skills shortages and needs. Current work on vocations by Wheelahan, Moodie and Buchanan (2012) for the National Centre

for Vocational Education Research (NCVER) is also investigating the links between vocations, occupations and improved educational and occupational pathways.

Identifying the relationship between skills shortages and pathways is also relevant to this study.

Previous research on 'enablers'

Previous research on the 'enablers'; that is, the factors that facilitate pathways for students, has been undertaken by a number of authors. In their final report, Phillips KPA (2006, pp.8–10) elicited five main enablers from their research findings:

- people
- systems
- mutual respect and trust
- effective information provision
- organised transition arrangements.

The 'people enablers' were categorised by Phillips KPA into four types: leaders, doers, evaluators and promoters. The 'leaders' included the senior management staff of VET and higher education institutions, as well as leaders and champions at other levels in organisations. The 'doers' referred to the staff who develop and implement the pathways. The 'evaluators' encompass staff providing reports and analyses on the effectiveness of pathways, including progress and retention statistics. The 'promoters' are those who develop and maintain websites and other information for students detailing the pathways available. In some institutions the leader, doer, evaluator and promoter may be a single staff member.

As Wheelahan (2009c, p.39) noted, the role of teachers as 'people enablers' has been relatively ignored in cross-sectoral research. This enabler is considered further as part of this study.

The 'systems' enablers include the development of national and institution-wide policies, structures and resources. Establishing and maintaining mutual trust and respect between sectors and institutions is identified as the key to successful pathways development (Wheelahan 2009c, p.31) and is built through:

- confidence in each sector's education systems and institutions and the educational outcomes (qualifications) they supply
- collaboration between staff in both sectors in developing pathways.

Collaboration at the second level removes some of the barriers to pathways, including cultural attitudes and misunderstandings, and pedagogical differences (Phillips KPA 2006; Wheelahan 2009c; King, Dowling & Godfrey 2011). Collaboration in joint curriculum development through integrated or blended qualifications has also been seen as a strong enabler of effective pathways. As noted by Cram and Watson (2008), cross-sectoral collaboration in curriculum 'pays off' for both institutions and students.

Effective information provision ensures that students are aware of and have access to relevant, transparent and accessible information to make informed decisions about pathways and credit arrangements. This enabler has been embedded in government policies since 2006.

Transition has also figured as both an enabler and barrier in the research following Phillips KPA (2006). Some researchers have identified the need to recognise the special challenges faced by 'pathways' students and to put in place specific arrangements both before and after transfer into higher education (Brown et al. 2011; Abbot-Chapman 2011). Others have considered the implications of credit provision and the need for bridging skills (King, Dowling & Godfrey 2011).

Significantly, little research has focused on the enablers from the students' perspective. Wheelahan (2009c, p.34) notes this as 'an extraordinary gap in the literature'. Wheelahan (2009c, p.35) notes the following as student-focused enablers:

- student preparation by TAFE (technical and further education) teachers before entering higher education
- student preparation in the TAFE course through the acquisition of knowledge and skills within the field
- a 'good fit' between the TAFE and higher education programs.

A survey investigating student awareness and knowledge of pathways by Byrnes et al. (2010) for the Integrated Articulation and Credit Transfer Project found that students were 'on the whole more aware than expected'. The researchers also found that this awareness came principally from teachers rather than the web or other information sources.

Our research focuses on these and other enablers. It also focuses on vertical pathways from vocational education and training to higher education, particularly from diploma qualifications into bachelor degrees.

It could be argued that improving 'diploma to degree' pathways has become more significant following Bradley et al.'s 2008 review of higher education in Australia and the setting of national education targets by Australian governments. The current targets include increasing the number of bachelor degree graduates (to 40% of 25 to 34-year-olds by 2025) and a doubling of diploma graduates by 2020, along with new equity targets for students from lower socioeconomic backgrounds. As noted by Wheelahan (2010, p.3), if these participation and equity targets are to be met, pathways must become centre stage in a coherent tertiary education policy 'because there needs to be a bigger pool of qualified applicants at every level to fulfil the higher level targets'. Wheelahan also identifies diplomas as the key qualifications in pathways because they are the most significant in providing vertical pathways from vocational education and training to higher education.

Purpose of the research

Against this research background, the principal purpose of this study was to investigate and evaluate the student-identified enablers that support tertiary student pathways from VET diplomas into bachelor degrees in construction management and related degrees (within the field of architecture and building¹).

¹ Field of education is part of the Australia Standard Classification of Education (ASCED). ASCED is used by the Australian Bureau of Statistics, the Department of Education, Employment and Workplace Relations, NCVET and other organisations involved in educational statistical collections. ASCED classifies educational activity into 12 broad fields of education that are narrowed into more specific areas. The relevant broad field for this project is 04 – Architecture and building, further classified into the narrow field of 0403 – Building. The published data included in this paper may relate to the broad field of education and would thus include material relating to architecture as well as building students. Disaggregated data are used where available.

The specific project objectives were to:

- research the enablers that support pathways from VET diplomas into higher education bachelor degrees in this field of education from a student perspective
- map and evaluate these enablers using the Design and Evaluation Matrix for Outreach, developed by Gale et al. (2010)
- based on the student voices, identify the critical enablers.

Research questions and themes

In accord with this project purpose and objectives, the following research questions were identified. These informed both the research process and the project findings:

- What are the main areas of skill need in this industry and where do these skills sit in the qualifications spectrum?
- What are the main 'pathway' qualifications in this industry and how do these compare with all industries?
- What is the size of VET and higher education provision in this industry and what are the implications for pathways?
- What or who assisted the students interviewed for this study in continuing on to a degree and in selecting destination universities?
- Which enablers were the most evident and how did these relate to the selected evaluation tool?
- How did the students find the transition from VET into higher education studies in this field?
- What role can industry play in supporting pathways?

Methodology

This project was undertaken in two overlapping stages using different research methods. The first stage involved a review of the relevant published quantitative data on students and a brief review of past research on pathways and background information on the building and construction industry. The second stage entailed qualitative research, involving interviews with 'pathways' students and the interpretation and evaluation of the collated student interview data. Stakeholder forums on the research findings supported each stage.

In the first stage, published data were examined to provide an industry and education snapshot relevant to the project scope. Data sources included, inter alia: NCVET; the Australian Bureau of Statistics (ABS); the Department of Employment, Education and Workplace Relations (DEEWR); the Department of Industry, Innovation, Climate Change, Research, Science and Tertiary Education (DIICCSRTE); the Construction and Property Services Industry Skills Council (CPSISC) and the Australian Workforce Productivity Agency (AWPA).

The qualitative research stage was conducted through a case study approach involving in-depth, semi-structured interviews with students who had transitioned from vocational education and training to higher education in this field, supported by two consultative forums with industry and other stakeholders.

A total of 36 bachelor degree students were interviewed for the project (including one graduate, 13 final year students and 22 second/third year students). All were male, with one exception. These students were nominated by participating universities and were selected on the basis of student records as a prior VET student. All interviews were conducted in accord with RMIT University ethics requirements. The students came from eight higher education institutions offering degrees in construction management or related qualifications. These were:

- RMIT University, Vic.
- Curtin University of Technology, WA
- University of Western Sydney, NSW
- University of South Australia, SA
- Holmesglen Institute, Vic.
- University of Technology Sydney, NSW
- University of Newcastle, NSW
- Deakin University, Vic.

These higher education providers were selected as the interview sites for a number of reasons including:

- a history of providing sustained VET to higher education pathways over a significant period of time
- a mix of institutional type: stand-alone higher education, mixed provision and dual-sector
- a known cohort of construction students moving from vocational education and training into degrees in these institutions
- the capacity to identify pathways students within the project timeframe through university contacts
- broad national coverage.

The student interview responses were mapped against the Design and Evaluation Matrix for Outreach, developed by Gale et al. (2010) for the National Centre for Student Equity in Higher Education. The researchers selected this tool because its structure and features form a useful and meaningful scaffold for organising the diverse students' responses and for mapping these into distinct 'enablers'. Further information on the matrix and its application is set out on page 23 of this report.

Two roundtable consultative forums were held (April 2012 and September 2012) to consider the issues and questions arising from both the reviewed industry and statistical data and the student interviews. The invited participants were drawn from a wide cross-section of industry and other stakeholders, including the Master Builders Association of Australia, individual construction companies, the national Industry Skills Council and the relevant Victorian state training body, industry unions, universities, VET providers and government agencies.

Scope and limitations of the study

The findings of this project are drawn principally from the student interview data, which involved a relatively small number of participants. While their perspectives have shed light on the key enablers, it is not possible to generalise from this study. A more substantial interview cohort would be needed

and other studies undertaken to verify the findings. The perspectives of other key groups, including staff in the original VET providers for these pathways students and staff in their destination higher education provider, were also beyond scope. The perspectives from industry and other stakeholders are limited to the participants in the roundtable forums.

Industry and education context

The building and construction industry

The building and construction industry is vital to the Australian economy. It is a significant contributor to economic activity and growth, as well as being a major source of employment. According to the ABS (2012), the construction industry's total share of the production of goods and services in Australia was 7.7% or \$102 billion dollars in 2010–11. This makes construction the fourth largest industry in Australia, as measured by economic value. This industry is now the third largest source of employment after health care/social assistance and retail trade and employs more people than manufacturing (ABS 2012). In 2011 the industry reached a high in employment of 1 043 000, following ten consecutive years of growth, or 9.1% of the total Australian workforce. During this period construction became the third largest growth industry in employment terms. In 2012 employment fell by 4.5% to 996 800, reflecting a downturn in the industry due to global economic uncertainty and lower consumer demand (Department of Education, Employment and Workplace Relations 2012a, p.2).

The workforce profile, not surprisingly, is trade-centric. The most significant occupations in the industry (by numbers employed) are, in order:

- carpenters and joiners
- electricians
- plumbers.

Together, these occupations comprised 27.8% of people employed in the industry in 2011 and, when bricklayers and painting trades are added, the trades-related occupations form 35% of the workforce (Department of Education, Employment and Workplace Relations 2012a, p.7). The industry also employs large numbers of unskilled and semiskilled workers in such roles as labourers, concreters, plant operators and truck drivers.

At the professional and paraprofessional levels the main occupations are:

- construction managers (6.8% of the workforce in 2011, compared with 6.6% in 2010)
- architectural, building and survey technicians (2.8 % of the workforce in 2011, compared with 3.1% in 2010)
- civil engineering professionals (1.25% of the workforce in 2010).

(Department of Education, Employment and Workplace Relations 2011a, p.3, 2012a, p.7)

Construction management is the fourth largest occupation in the industry (after the three key trades) with 66 600 persons employed (Department of Education, Employment and Workplace Relations 2012a) and showed the largest growth of all occupations in the industry in recent years. In the two years to 2010, construction management grew by 19.1% (Department of Education, Employment and Workplace Relations 2011a, p.3). In the five years 2005–10 employment growth in this occupation was 55% compared with total employment growth in the industry of 17.8% in the same time period (Australian Workforce Productivity Agency 2012a, p.4). Over this time industry technician jobs (diploma-level jobs) fell by 11.3%, signalling much lower demand for these occupations.

As demonstrated by the slight downturn in employment over 2011–12, this industry is cyclical and subject to significant shifts in employment in response to broad economic circumstances, particularly

for semi-skilled and skilled/trade-level work. Thus, while the trades grew in the five years to 2009–10 in the order of 30%, more recent data show trade-level employment fell by approximately 10% over 2011–12 (Department of Education, Employment and Workplace Relations 2012b).

Skills shortages in construction management

Despite the softening of the labour market, the demand for skilled professionals, in particular construction managers, remains high and is at the forefront of skills shortages in the industry.

The Department of Education, Employment and Workplace Relations (2011a, pp.6, 7) identified this occupation as a skills shortage in both 2010 and 2011 and has only recently, in 2012, downgraded its status to one of recruitment difficulty, due to the current downturn in the industry (2012a, p.14). Department of Education, Employment and Workplace Relations workforce forecasts suggest the downturn will be short, with employment generally continuing to expand in the industry over the five years to 2016–17, in the order of 2.4%. Employment growth of 4.7% per annum is projected for construction managers. Workforce projections by the Australian Workforce Productivity Agency suggest employment growth for construction management of between 2.7 and 3% per annum over the 15 years, 2010–25, depending on different economic scenarios (Australian Workforce Productivity Agency 2012a, p.6). This represents growth of between 60 000 and 85 000 jobs over his period.

The basis for this projected future growth in employment demand and skills shortfall in construction management includes a number of factors:

- changing qualification requirements for construction management: the industry is increasingly seeking degree-qualified personnel in construction management jobs, whereas in the past many jobs at this level were ‘experience based’
- an ageing workforce, particularly in experience-based construction managers, with projected replacement needs in the order of 70 000–75 000 persons over the period 2010–25
- increasing internationalisation and globalisation within parts of the industry and the need for suitably qualified staff
- the increasing need for project managers for large infrastructure projects, particularly in the resources sector
- increasing regulation and complexity of the industry, requiring staff with such skills
- the gap between current higher education provision in construction management and industry requirements for suitably qualified staff.

Addressing these workforce projections and skills shortages in construction management will rely upon a number of factors and strategies. It is likely that this would include increasing the number of bachelor degree holders.

Skills and qualifications profile

The Australian Workforce Productivity Agency defines construction management as a ‘specialised’ occupation requiring specialised skills learned in formal, extended education and training over a long lead time (identified as four years for a higher education qualification). Specialised occupations represent both high use (a good occupational fit) and high risk, whereby the impact of skills shortages imposes significant economic or community costs (Australian Workforce Productivity Agency 2012b, p.12).

At present, the percentage of persons holding a bachelor degree in this industry is low, relative to all industries, at only 7% (compared with an all-industry average of 19.6%). In part, this rate reflects the broad employment profile of the industry, with its strong emphasis on trades and lower-skilled work. This translates into:

- 40.8% of employees with a certificate III/IV (compared with 19.6% all industries)
- 38.0% with no post-school qualifications
- 7.0% with a bachelor degree and 1.5% with postgraduate qualifications
- 5.2% with a diploma/advanced diploma
- 7.5% with a certificate I/II or certificate undefined (Department of Education, Employment and Workplace Relations 2012a, p.8).

While this qualifications structure may have reflected the industry's skills and education needs of the past, the question is now how well does it meet current and future skills needs and employment demand, especially in relation to the current and projected skills shortages of professionals.

The Australian Workforce and Productivity Agency has estimated that the number of bachelor holders in the industry will need to increase by 25% to meet its workforce projections (in the period 2010–25). Such professionals will come from a range of higher education backgrounds, including engineering and management qualifications, as well as those in construction management and related degrees.² If such an increase is to be realised, a significant expansion of current higher education provision will be necessary, particularly in building and construction-related studies.

However, recent higher education data (Department of Industry, Innovation, Science, Research and Tertiary Education 2009–11) indicate this field of education to be relatively static, with extremely small student numbers relative to other fields of education. Construction management and related building studies sits within the field of architecture and building, which comprises two subfields (architecture/urban development and building). The whole field represented just 2.1% of total student load in higher education or an equivalent full-time student load (EFTSL)³ of 19 300 in 2011.⁴

Within the field, architecture dominates, comprising just over 81% of the total student load. This percentage was the same in both the 2011 and in 2010 student data (table 4.4, Department of Industry, Innovation, Science, Research and Tertiary Education 2009–11). Although architecture has far more students, it is not designated a skills shortage occupation.

When the statistics are disaggregated to the focus of this study (domestic students studying at bachelor-degree level in the subfield of building), the equivalent full-time student load in 2011 was just 2688 with a commencing student load of 967 (Department of Industry, Innovation, Science, Research and Tertiary Education 2009–11). This compares with a total EFTSL of 2445 for domestic/bachelor degree students in 2010 (commencing student load of 692) and 2695 in 2009 (commencing student load 769). These figures suggest a shortfall in graduates against projected industry demand and the need to expand the provision of building-related degrees. Constraints to

² The appendix contains a list of the qualifications relevant to the scope of this study, which only covers qualifications relevant to the sub-field of building education.

³ EFTSL is a measure of total student load of both part-time and full-time students used for statistical purposes. Actual numbers of individual students will be higher.

⁴ The appendix contains a list of all higher education providers in this field and EFTSL for each provider in 2011.

increased provision, as identified by education personnel participating in this project, include infrastructure capacity and human capital issues (lack of qualified lecturers).

Mechanisms to increase the number of degree holders in the industry could include:

- increased migration of suitably qualified people
- improved recognition of prior learning to credit existing employees with relevant experiential skills and knowledge
- increased and improved VET to higher education pathways in construction management and related degrees.

Skilled migration may be part of the solution but it is a solution that does little to assist existing workers in the industry to upskill and to take advantage of professional job opportunities. As noted by the Australian Workforce Productivity Agency (2012c), it is important to ensure ‘home grown’ solutions.

Recognition of prior learning provides genuine opportunities to support existing workers to gain recognition for industry experience and to undertake further studies, but it is time-consuming and not well understood by workers and employers. Improving recognition processes was strongly supported by industry representatives in the roundtable discussions, but further examination of that solution falls outside the scope of this study.

Pathways

Pathways from vocational education and training to higher education can be one important mechanism to help industry meet skills needs and address skill shortages in construction management, providing opportunities to both younger students and existing workers for higher-paid jobs. Pathways can help to retain skilled workers who might otherwise leave the industry through age or other factors; pathways provide recognition for existing skills and enable access to further formal higher learning. Pathways also provide opportunities for VET students to move into degree-level studies either as a planned outcome or one that emerges in the course of VET studies. While not taking advantage of such pathways, the industry is not capitalising on the potential of its existing and future workforce.

At present, pathway outcomes involving direct transfer of graduates from VET building studies to higher education are very limited, especially by comparison with many other industry fields of education. Data from NCVET’s Student Outcomes Survey (SOS) provide a picture of the destinations of VET graduates into work and further study six months after they graduate. For the purposes of this study, data on VET graduates, rather than enrolments, are used because graduates are more likely to be successful in transferring to higher education and because reliable data on graduate destinations are available. However, it is also recognised that non-graduates from vocational education and training may also go on to higher education but not on the basis of a completed award. Graduates and non-graduates may also go on to further study in higher education many years after graduation.

The average percentage of all VET graduates (all Australian Qualifications Framework [AQF] levels) from 2010 going on to study at university in 2011 was 7.4%, rising slightly to 7.8% for the graduates from 2011 going on to university study in 2012 (NCVER 2012a, p.7). Despite the significant focus on pathways in policy and practice, this VET to higher education transfer figure has remained relatively stable, at between 7% and 8% of the VET graduate pool, for the last eight years.

In the field of architecture and building the rates of transfer to higher education are much lower than this average, at just 2.7% of all graduates (all qualifications) going on to university in 2010–11, falling to just 2.2% in 2011–12 (NCVER 2011b, 2012b).

There are a number of reasons for the lower rates of VET to higher education transfer in this field. One is the much lower percentage of diploma and above graduates,⁵ in the field of architecture and building, as a proportion of VET graduates. Diploma and above graduates comprise only 6.9% of all the graduates in this field. This compares with 13.9% of all graduates at diploma and above, across all fields (NCVER 2011a, table 2). In effect, the percentage of graduates in diplomas and above across all fields is nearly double that of architecture/building.

The low percentage of diploma graduates in this industry is a key issue, given that diploma-level qualifications constitute the main gateway into university for all VET graduates (Wheelahan 2009b, 2009c). NCVER data confirm their importance for students across all fields moving from VET to higher education, with 15.3% of all graduates at these levels going on to university and 15.2% undertaking a bachelor degree (NCVER 2011a, table 40).

Diploma graduates in architecture and building show comparable, even slightly higher, rates of transfer with graduates in all fields, with 17.2% going on to university and 16.5% enrolled in a bachelor degree (NCVER 2011a, table 13). These figures suggest that a student completing a diploma in this field has similar transfer rates to university as students across all fields.

The key problem is the much lower percentage of diploma graduates (as a proportion of the graduates in this field) and how this translates to actual student numbers. In 2010, the total diploma and above graduate pool in vocational education and training was estimated at 81 800, of which only 2810 or 3.4% were in architecture and building. At a VET graduate transfer rate of 15.2% across all fields, this translates to approximately 12 434 of all diploma graduates going on to a bachelor degree. The comparable number of graduates transferring into a degree in architecture and building from a diploma and above was just 464 students (16.5% of 2810) (NCVER 2011a).

The low number of diploma and above graduates in this field is a reflection of the low number of enrolments at these AQF levels. Enrolments in diplomas and advanced diplomas in this field have averaged just below 11 000 students per annum in the five years 2007–11 and have remained static over this period (NCVER 2012d, table 1). By comparison, enrolments in diplomas and advanced diplomas across all fields have continued to grow each year, over the same period, with a total enrolment of 257 300 in 2011, representing an increase of 56.8% over 2007 (NCVER 2012c, table 4). It should be noted that these figures are for publically funded vocational education and training and do not include private fee-for-service provision. (See appendix for more details.) The static enrolments in diplomas in this field significantly impact on the capacity to increase the graduate pool.

Another issue is the much lower rates of transfer to higher-level AQF qualifications in vocational education and training by graduates with trade-related qualifications at certificate III and IV in this field compared with all fields. Given the size of the graduate pool at these AQF levels and the potential of this pool for increasing both the diploma pool of students or in adding to VET to higher education transfer, the impact is significant.

⁵ NCVER uses the term 'diploma and above' in various statistics. The term combines diploma and advanced diplomas, as well as other AQF qualifications, including bachelor degrees and graduate certificates and diplomas. The most significant by number of students are diplomas, followed by advanced diplomas. The other qualifications have very small numbers of students.

Graduates at certificate III/IV constitute 59.3% of all VET graduates in this field, with an estimated population of 24 580 (NCVER 2011a, table 2). Of this cohort, only 3.1% continued with studies into a diploma or advanced diploma and only 1.1% went on to study a bachelor degree (NCVER 2011a, table 14). In numerical terms this represented approximately 762 certificate III/IV graduates going on to a diploma and just 270 undertaking a degree in this field.

By comparison, 8.7% of all certificate III/IV graduates went on to study at AQF 5 or 6 and 5.1% of graduates went on to AQF 7 (bachelor degree) (NCVER 2011a, table 41). Of course, it can be argued that the intention and motivation of the vast majority of these certificate III/IV graduates is an employment outcome, but this would also be true in other fields, yet the data show significantly more graduates continuing with studies at higher AQF levels.

The reasons for this difference are unclear but may be related to the very high employment outcomes generated by AQF 3 and 4 level qualifications in this field, with 82.1% of graduates not previously employed before training gaining employment after training. This is the highest percentage of any field, followed only by engineering at 74.1%, with other fields demonstrating substantially lower employment outcomes (NCVER 2011a, table 2).

Supporting pathways from lower AQF qualifications in vocational education and training to higher qualifications is important as a mechanism for building bridges to higher education. An issue for the industry and education providers is how to encourage more trade graduates to return to further study into diplomas and, potentially, into higher education, after a period of work, as a means of upskilling to meet the higher skills needs of the industry. Unless such pathways are created and/or more school students are encouraged to undertake VET diplomas, the issue of low enrolment and graduate numbers in diplomas will remain, flowing through to low numbers of VET to higher education pathways students.

Gale et al. (2010) note that higher education is not necessarily better for all individuals in terms of life choices or economic prosperity; however, there is considerable evidence that access to a degree provides significant benefits, while lifelong learning is vital for industry development, especially in the context of skills shortages in construction. The Australian Workforce Productivity Agency (2012c pp.37, 25) in more recent workforce modelling suggests that professional jobs will continue to be the strongest in the economy, with higher economic returns for higher levels of education.

Identifying the enablers of pathways: a student perspective

The students in this study

Against the backdrop of so few student transfers in this field we were able to find a small group of pathways students to support the study. The students were identified through academic contacts at the selected universities, with the interviews completed over several months. Fifty students were initially contacted and of these, 36 chose to participate. The remainder either chose not to participate or simply failed to attend at the agreed interview time. Most interviews were conducted in person on a one-on-one basis or via telephone and, in the case of some of the University of Technology, Sydney students, as a small focus group.

All of the students had undertaken a diploma or had been recognised by their university as having an equivalent qualification. The Diploma of Building from the Construction, Plumbing and Services Training Package was the most commonly held VET qualification. Some students had completed the Diploma of Building Design and others the Diploma of Quantity Surveying, also from this training package. Two of the interviewees had only completed a certificate IV but with work experience were given recognition and entry into a relevant bachelor degree. The most common destination degree of these students was a Bachelor of Construction Management. Some students were undertaking double degrees in construction management either with economics or architecture. A few of the students (five) were classified as mature-aged-entry students under their particular institution's guidelines, rather than as VET transfer students. Most of the pathways students had undertaken their VET studies through TAFE, with the exception of transfer students from UWS College⁶ into the University of Western Sydney.

To keep the interviews succinct only minimal data were collected on the students' background and included gender, age, postcode and family connections with building and construction. All but one of the students was male. The gender focus is unsurprising, given that this industry has the highest proportion of male employees of any industry in Australia (ABS 2012). All the students were aged in their early to mid-20s and had either entered university directly after finishing their VET qualification or within a year or two of completing their VET studies. This age characteristic reflects the findings of Stanwick (2006), quoted by Wheelahan (2009b, p.7), who identified the non-homogenous age background of this VET qualification cohort. Stanwick categorised diploma students into three types: under 25 in age with Year 12, seeking employment or a pathway to university; over 25 undertaking a diploma for employment purposes; and over 25 without any post-school qualifications. Wheelahan identified the first group as much more likely to continue further study at university.

The interviewees in this study are representative of this first group in age and also in motivation. Many of the students indicated that they had enrolled in the diploma primarily as a means for gaining entry into higher education, either because they had not been initially accepted into the degree of first choice on the basis of their tertiary entrance ranking or because they were aware that vocational education and training provided an alternative entry point into university.

⁶ UWS College prepares international and domestic students making the journey from secondary school to bachelor degree programs at the University of Western Sydney.

I wanted to get into a construction degree, so going to Granville TAFE was the way to get there. I didn't get the entry to UWS. (University of Western Sydney)

I didn't have the right score to get into UWS even, so went to UWS College first ... then came here. (University of Western Sydney)

I chose this program because it offered me a chance to go to uni that is something I didn't see myself doing. (University of Technology Sydney)

Well I got an ok score in year 12 but it wasn't enough for the degree so I chose TAFE because I knew it could get me into construction management if I did well. (Deakin University)

These responses are not surprising, given the high tertiary entrance requirements for the destination of construction and related degrees of choice and the limited number of places on offer. They also indicate, in the case study participants, a cohort who deliberately chose vocational education and training as a stepping stone to university and who had prior awareness of pathway possibilities.

Other students indicated additional reasons for undertaking vocational education and training as the basis for their initial qualification including:

- work in the industry
- practical experience first
- extent of ability unknown; the diploma was an easier option
- personal time commitment and flexible offering making the diploma attractive
- relevance of the diploma to current work/workplace
- cheaper fees in the diploma (excluding Victoria)
- perceived shorter course/study period.

For these students the option and the decision to go on to university studies appears to be more directly related to their experience as a VET student and the guidance given to them in the course of their studies.

In terms of choosing this field of study, many of the students interviewed had a family member working in the building and construction industry and/or had obtained work in the industry through family. For some there was no direct industry connection but interest was created laterally:

Well my family was having 'renos' on the house and I watched that and thought I could do that. (University of South Australia)

I originally wanted to do advertising but then got into building design but I hated the CAD so looked at other jobs in the industry and project management looked far more interesting. (Deakin University)

Interview analysis tool: the Design and Evaluation Matrix for Outreach

The research team selected the Design and Evaluation Matrix for Outreach to categorise and draw out specific enabling factors from the interview data. Although developed originally as a tool for outreach programs, the matrix provided a scaffold that could be adapted to the purposes of this study.

The Design and Evaluation Matrix for Outreach was developed in the context of a key report by Gale et al. (2010) for the National Centre for Student Equity in Higher Education on improving access to

and equity outcomes from higher education for disadvantaged students. Prompted by the Bradley Review of Australian Higher Education (2008) and its call for ‘a more sophisticated approach’ to outreach, Gale et al. drew on work by Anderson and Vervoorn (1983) on this topic. Anderson and Vervoorn had previously identified four necessary conditions for entry to higher education:

- the availability of places
- students’ academic achievement
- the accessibility of higher education to qualified aspirants
- students’ aspirations for higher education.

Anderson and Vervoorn (1983) interpreted these conditions as having causal associations: availability influencing achievement; achievement and aspiration as mutually influential; and both influencing accessibility.

Using this earlier research in addition to their own, which included a review of international research literature, a meta-analysis of data, as well as case study exemplars, Gale et al. (2010) conceived a matrix for designing and evaluating early interventions to improve access to higher education for disadvantaged students. The matrix is set out in table 1. It comprises ten characteristics grouped into four strategies, which combine to provide both depth and breadth in interventions.

Table 1 Four strategies and ten characteristics of the DEMO model

Assembling resources	Engaging learners	Working together	Building confidence
People-rich	Recognition of difference	Collaboration	Communication/information
Financial support/incentives	Enhanced curriculum	Cohort-based	Familiarisation/site experiences
Early intervention/sustained	Research-driven		

Source: Gale et al. (2010, p.9).

A program that contains many of the ten characteristics represents depth; conversely, a small number of characteristics equates to shallowness. A high number of characteristics within a program also increases the number of strategies it contains, so that increased depth also leads to increased breadth. In the matrix the overall effectiveness of an outreach/access program depends on the combination of depth (the number of characteristics) and breadth (the number of strategies) and the importance and value of combining these determinants.

In applying the matrix as a tool of analysis for this research study, the strategies and characteristics, as well as the synergy between them, are relevant. The characteristics represent identified or potential enablers to support pathways, while the strategies strengthen pathways. It is worth noting that most of the characteristics in the matrix have been identified in previous research on pathways transitions as enablers, as summarised earlier. Another point to note is that this matrix was designed as a program evaluation tool, whereas in this context it is being used as a scaffold to categorise students’ perspectives on enablers.

In using the matrix in this study, the researchers have interpreted the meaning of some characteristics to better reflect this purpose and context. The broad meanings of each characteristic remain the same as in Gale et al.’s study but are linked to a pathways focus. Thus, in Gale et al. ‘recognition of difference’ is concerned with university recognition and valuing the knowledge and learning capacities that VET students bring to formal education; in the context of pathways this

recognition and valuing are demonstrated through the provision of entry and the granting of credit for VET studies and relevant work experience.

It should also be noted that the Design and Evaluation Matrix for Outreach was not designed as the final arbiter of transition program merit. Instead, it was intended to promote discussion and debate, to inform design and to strengthen evaluations that also draw on a range of other data (Gale et al. 2010). Gale suggests that the strength of a program depends more on the combination of characteristics, in response to the particular needs of different contexts, than on the specific characteristics that are combined. Therefore, two programs comprising quite different sets of characteristics could be equally effective. According to Gale et al. (2010) the combination of characteristics and strategies, and in accordance with the orientation of the program, provides a better abstract indicator of likely effectiveness than specifications of required program structures or checklists of required features. This could also be said of pathways interventions.

Analysing the student interviews

The analysis below sets out the student responses against each of the characteristics (enablers) within the four strategies in the matrix. In reviewing the data most of the matrix characteristics and all four strategies were evident. Some enablers were more commonly reflected in the students' responses than others and these were also the enablers identified as having the most impact on pathway decisions and outcomes.

Strategy 1: Assembling resources

This strategy comprises three characteristics:

- *People-rich*: this term refers to the development of relationships between the students and other people who are in a position to offer ongoing guidance and support that is appropriate and relevant to the situation and capacities of the students.
 - In this study, such guidance relates to pathways knowledge and advice, support for continuing studies, identification of pathways opportunities and assistance.
- *Financial support/incentives*: this addresses individuals' economic constraints and any assistance that may be available to support participation in higher education.
 - In this study, this characteristic relates to financial impacts (both positive/negative) on students who use pathways to higher education.
- *Early and sustained intervention*: this addresses working with students to provide supports from the commencement of higher education studies.
 - In this context it incorporates interventions from the commencement of VET studies through transition into higher education.

Many of the students interviewed identified a strong people-rich component in their decision to go on to higher education following their VET studies. This was particularly important where students had not initially contemplated further study beyond the diploma. For this group, it was most often VET staff who first gave them the idea to continue with their education. Teachers were the most commonly named people in providing such advice and guidance but other staff were also mentioned, including heads of department and coordinators. The students commented upon the knowledge and willingness of VET staff to answer their questions, undertake enquiries for them and provide support

as they progressed through VET studies. Gale et al. (2010) stress the importance of ‘extended conversations’ to provide resources for learners.

When I started the diploma I wasn’t really thinking about the degree you know ... it was just as I was finishing I talked to [teacher name] ... who told me about the degree.

(University of Technology Sydney)

I didn’t think I could do it actually, then Mr [teacher name] ... said it wasn’t that much more involved really.

(RMIT University)

Other VET staff... yeah head of TAFE suggested.

(University of South Australia)

The capacity of VET staff to provide a people-rich experience is also dependent upon their understandings of pathways and the opportunities a degree might provide to their students, in addition to a VET qualification. VET staff who were aware of which universities more likely to give access to pathways students and who had a collegial relationship with their university colleagues were able to make this guidance more specific.

Well this uni had a relationship with the Leederville TAFE and that meant you could find out about the degree.

(Curtin University of Technology)

The TAFE coordinator knew all the staff at Curtin.

(Curtin University of Technology)

Other significant people-rich resources include family and employers (for the students who were working). Many of the students had family working in the industry and family who were aware of the job opportunities offered by a degree. Employers could also give such advice:

My father made me go to uni he expects us to achieve and people at work told him the pay was better.

(University of South Australia)

No, none of my family have come here [to university], but they wanted me to get qualified in building.

(University of Western Sydney)

At work they told me the degree would be more helpful ... I wasn’t sure till I spoke with the programme director.

(Holmesglen Institute)

The use of mentors, tutors and peers as support resources is seen as a valuable aspect of ‘enabling resources’ in the context of outreach (Gale et al. 2010). In this study, such resources were not strongly identified, although it could be argued that VET staff also played a mentoring role in guiding students with the capacity towards higher education because they knew them individually (a consequence of much smaller classes in vocational education and training). Some students also mentioned peers:

I knew students who had gone to higher education last year and they gave me advice about the electives etc.

(RMIT University)

The second characteristic in this strategy is financial support. Examining the interview responses, this was not a higher-order enabler, with only a few students raising financial considerations. This might be because many of the students were still living at home and quite a few had part-time jobs in the industry and so the costs of continuing education were not an immediate issue.

Phillips KPA (2006) cited the savings to students in undertaking a pathway to a degree as a driver and enabler, based on the reduction in real costs and opportunity costs in gaining qualifications. At the time this report was written, TAFE costs were considerably below those of higher education and so the cost to pathways students granted credit in higher education for their VET studies meant lower overall costs in gaining the degree. Recent funding changes to vocational education and training and

the introduction of full fees and with loans schemes for some diplomas, similar to the Higher Education Contribution Scheme (HECS), have meant that similar costs between diplomas and degrees are now in place. Brown et al. (2011, p.18) suggest that it is the time savings rather than the financial savings that pathways students respond to, and that some students are relatively unresponsive to financial considerations. The limited feedback on this enabler suggests a similar perspective.

One student reflected on his diploma costs in the following way:

If your diploma isn't actually going to get you anywhere, then it's a bit of a worry paying that much ... because I knew it was my pathway to uni, I was happy to pay.

(University of Western Sydney)

The third characteristic (enabler) in the strategy of 'assembling resources' is early and sustained interventions. In the context of this study such interventions are evident in institutions' commitment to developing sustainable pathways through models that suit their contexts. These might include: partnership arrangements for credit transfer and articulation between VET and higher education institutions; mixed-sector provision in institutions, including integrated VET and higher education degrees; and transparent or guaranteed pathways, which provide students with predetermined admission and/or credit.

The development of these models requires significant commitments in human, financial and infrastructure resources by the institutions and other parties involved in long-term sustainable pathways, but these resources sit in the background for students and are largely unknown. As such, the students in this study did not respond to this enabler, except where the primary focus of the VET studies was to provide a pathway; thus the students were more aware of these interventions. This was the case for the University of Western Sydney students who had used the UWS College pathways model, which combines foundation studies and the Diploma of Construction Management and feeds directly into the second year of the construction management degree. This pathway was transparent and its structure well understood by the students.

For others their experience of such interventions is evident in the ease of transition:

Admission was fine and I just got the credit.

(University of South Australia)

It was really smooth ... the staff all knew what credit you got and what subjects you would have to do.

(University of Technology Sydney)

Such examples can only exist where universities have well-established and resourced systems where it is not up to the students to drive the credit transfer process; rather, the systems are already in place and operating well.

Strategy 2: Engaging learners

This strategy contains three characteristics (enablers). These are:

- recognition of difference
- enhanced academic curriculum
- research-driven interventions.

In a pathways context, recognition of difference involves recognising and valuing the existing knowledge and skills of VET pathways students by a destination university. This is expressed through admission into a degree and credit for VET qualifications or specific units. It can also include recognition of skills and knowledge gained through work, for those students who have industry experience.

On another level, recognition of difference can also refer to recognising that these students may have specific needs in making the transition from vocational education and training to higher education.

Many of the students in this study commented positively on the recognition they received from their university for their prior VET studies. For some, the granting of credit was one of the most important enablers, especially for those who undertook the diploma expressly as a pathway to higher education.

I did the diploma because I knew I could get credit into the degree and I didn't have any work experience so I probably wouldn't have got in without the diploma. (Deakin University)

But the university as a whole ... they do, they give you exemptions so they obviously value the education that you've learned if you choose to take that. (Curtin University of Technology)

Admission was fine and I got 18 months credit but was block so ended up doing subjects I'd done at TAFE. (University of South Australia)

It was a simple decision. I just went where the best credit was given and where it was available. (Curtin University of Technology)

These responses mirror the findings of an extensive survey by Byrnes et al. (2010, p.8) on student awareness of pathways in Queensland. In that survey, 27% of 12 815 respondents in vocational education and training and higher education indicated their choice of study was influenced by the availability of credit.

While credit is clearly important, it can also be problematic or unclear. Some of the students in our study expressed concerns about the amount and forms of credit granted or a lack of understanding about why it was granted.

I only got 2 units credit ... I thought I should have got more ... no point doing the pathway without credit [note interviewee had incomplete VET qualification]. (Curtin University of Technology)

I don't know if there is a relationship between Petersham TAFE and UTS, but I got the same credit as the others. (University of Technology Sydney)

If you're exempt from those subjects based on your TAFE subject, so you jump in with the third or the fourth part of that, you missed out the technology bit, so you struggle to use technology. (University of Technology Sydney)

Most of the students indicated receiving block credit outcomes of 12 months (and up to 18 months) for the diploma/advanced diploma. This form and amount of credit is consistent with AQF policy on pathways (Australian Qualifications Framework Council 2011). It is also made possible by the qualification structure of the VET diplomas in this training package, which have a strong focus on core units of competency. For example, the current Diploma of Building and Construction requires students to achieve 18 units of competency, 13 core units and five electives (Construction and Property Services Industry Council 2011).

The possible negative impacts of block credit have been raised by some researchers, in particular, the concern that these students may be disadvantaged because they miss out on various orientations and skills formed as part of their first year at university, including access to scholarship, theoretical concepts, academic literacy and critical thinking skills, which are formed as part of first year university experience (Byrnes et al. 2011, p.25, quoting Milne 2006 and Watson 2006; Wheelahan 2009c, p.35).

The students in our study did not raise these issues, perhaps because of the solid grounding provided by the diploma qualifications in this field and the VET public providers that deliver them:

I thought the credit was pretty generous but I've done the continuation studies for the initial subjects I got credit for and I haven't had any difficulty with them.

(University of Technology Sydney)

Gale et al. (2010) emphasise the valuing and recognition of individual knowledge brought by students from diverse backgrounds. Applied to pathways this would involve a recognition of prior learning assessment and individualised credit. Some students indicated that recognition was used in determining the credit they received, but for most the credit was predetermined on the basis of standardised credit transfer agreements between institutions for the VET diploma qualifications. Standardised agreements provide greater transparency than individualised credit arrangements, but there is a place for both.

Admission is also part of recognising difference. Obviously all the students in this study gained entry to university, but there was confusion and anxiety about the whole process and in understanding the basis for admission into some of the intake universities.

Well I did the entry test thing – the STATS, and then I don't know how they decided, but I was accepted, which is good!

(University of Technology Sydney)

Some of my friends from TAFE were not accepted, but they were just as good as me [University of Technology Sydney]. Definitely, it was still a worry after I got my diploma ... to try and think whether I got in or would I still get in. You apply and wait and wait and worry and then start thinking that everyone else gets in but you.

(University of Technology Sydney)

It was hard to get in as the RMIT had quotas on numbers ... so some kids missed out.

(RMIT University)

These quotes suggest that improved policy interventions are needed to ensure greater transparency, clarity and commonality of admission processes for diploma students aiming to transfer to higher education in this field of education.

In recent years, tertiary entrance rank scores for construction degrees have steadily risen with construction degrees, which has been compounded by the limited available places referred to earlier. This has sapped confidence for students in some institutions where expectations of transfer are high but are not always met. Such uncertainties need to be addressed, where possible, through improved pathway arrangements that include guaranteed admission for graduates of relevant building diplomas.

The third aspect of recognising difference is reflected in understanding that not all VET students have the same prior learning experiences and that, for some, extra time and effort are needed to address the transition into higher education.

Some students suggested that they would have liked extra curricula in the diploma to support the transition to higher education, but as their VET teachers had explained this was not possible because training package qualifications are agreed nationally. In the University of Western Sydney case study this was not an issue because the college diploma had been accredited through higher education and could encompass foundation subjects.

Well at UWS College, they would recognise that the students are different and treat them like that ... you know different teaching ways and different resources.

Everyone says you get more help at the UWS College ... I knew from my school and my friends.

Where a VET provider has the opportunity/capacity to modify and enhance learning experiences to meet pathways students' needs and better align the outcomes with the university curriculum, the advantages are obvious. Such approaches to pathways reflect continuity and complementarities that support and enhance educational progression (Wheelahan 2009c, p.36). However, if changes are too broad or alter the actual outcomes of a recognised VET-endorsed diploma, this may have negative implications for credit because the qualification loses its national integrity. A further question is the degree to which industry vocational outcomes in a VET qualification should be modified to meet the potential for some students to go on to higher education. The latest descriptors for qualifications in the AQF provide the balance, identifying the purpose of each qualification in a vocational or employment context and as a pathway to further learning (Australian Qualifications Framework Council 2013).

The second characteristic in this strategy is referred to as enhanced academic curriculum, which in Gale et al. (2010, p.9) refers to high-quality and rigorous student learning, driven by quality teaching.

The value of the learning experiences and the quality of teaching in vocational education and training were commented on by many of the interviewees and this characteristic stood out as an enabler. The students identified a number of different aspects in their learning experiences that had helped them in their VET studies and subsequent transfer to university. These included the:

- level of interest, encouragement and assistance given by the VET teachers in class (also another aspect of 'people-rich')
- small size of VET classes compared with university, which enabled VET teachers to know their students individually
- way learning is done in class as a group activity and the amount of time available for learning activities
- similarity of the learning in TAFE and the educational base it provided for university studies.

Of all the enablers, this was the one that generated the most common and broad-ranging response, irrespective of whether the student had intended to go on to university from the outset or whether their going was a consequence of their experience in vocational education and training. The observations of the students were detailed and provide a clear picture of the value of their VET teaching/learning experiences:

The TAFE experience was incredible. The things I learnt here at uni, at UTS [University of Technology Sydney], and the way it is delivered is nowhere near what it was in TAFE. It was a more of smaller groups, small focused, plus the price was cheaper as well.

(University of Technology Sydney)

Because I did the course, I mean the diploma, I liked it so much, they made me enjoy it so much, that I wanted to do the degree in it as well.

(University of Western Sydney)

I got to discuss with professional older people who had a lot of experience, what to do.

(University of Western Sydney)

The teacher we had was fantastic; he had a lot of experience and things in project management, so it just got me all excited about doing the work and going on to UTS.

(University of Technology Sydney)

The number of teachers was sort of more.

(University of Newcastle)

You were there more.

(Curtin University of Technology)

They really worked with you on assignments and things. (Deakin University)

At uni people just get up and walk out, at TAFE, they are involved in conversations. If I didn't go to TAFE, I would have missed that, but lucky I did, or else I would not have liked uni ... it would be strange to not talk to everyone at least for the first year. (University of Western Sydney)

In TAFE the difference is that when you sit in that room, they're focused on you, not 80 other students, and they'll be able to guide you step by step if you want to, and understand each concept, each principle, and then ... until you're ready to move on, you can move on. Not just the lecture's ended, so go home and do what you want to do. (University of Western Sydney)

The work is about the same, some subjects are different, but it has been mostly the same type of work. The difference is the smaller classes. You could ask a question of one of the teachers at TAFE and they would straight away be there to answer you. (University of Western Sydney)

These or similar views were expressed by nearly all of the students in our study, with one or two exceptions. The quotes demonstrate a common thread of a rich and positive learning experience in vocational education and training, which supported these students both in the VET environment and as the foundations for their studies in higher education. The difference with the university learning environment was noted:

Here the class sizes are much bigger and it's a bit hard too, it's more impersonal I'd say. It's not so much face-to-face time with your lecturers and you don't get to interact with them as much as you do at TAFE.

Strategy 3: Working together

The enablers in this matrix strategy comprise:

- collaboration in program/pathways development between different sectors and agencies and different stakeholders
- an approach that engages whole cohorts, that is, cohort-based.

Collaboration is critical to developing pathways and exists on many levels. As noted in the discussion of strategy 1 and people-rich enablers, VET teachers had a significant role in assisting and guiding the students in this study to continue on to higher education. That guidance presupposes collaboration through relationships forged by teachers across the sectors and built on knowledge and trust. Collaboration is also essential in developing specific pathways arrangements.

From the students' perspective such collaboration was evidenced through knowledge of the credit transfer/articulation arrangements in place and the parties involved, although this knowledge was certainly not detailed. Collaboration through integrated co-curricula teaching and learning was not part of the students' experience, indicating a continued separation between institutions. The students seemed to acknowledge the difficulties of combining vocational education and training AND higher education curricula:

I don't know why they do not do it, too many applicants I suspect. (University of Technology Sydney)

Well it is too hard to coordinate the two timetables I guess. (RMIT University)

As expressed in some of the earlier comments, the students were well aware and appreciative of the collaborations between their teachers and other parties, which laid the basis for going on to higher education.

I tried to speak with someone in construction here, it was a while ago, but each time I rang they spoke saying you have to do the diploma, then they all gave me the same advice ... do the diploma first. (University of Western Sydney)

I went for a job interview and they said to ring the uni, so I did and they said to apply with the diploma. (University of Technology Sydney)

The University of Western Sydney interviewees also indicated their awareness of active feedback between the UWS College and the university about the requirements for performance, quality and learning experiences of the various degrees and the need to prepare the students who would be transitioning to higher education.

Collaboration in a pathways context also includes other stakeholders beyond the institutions. The involvement of family has already been noted as part of people-rich resources. Family also plays an indirect collaborative role with those involved in pathways development, by reinforcing and encouraging their children or other family members to continue with their studies and assisting them in the transfer process. The role of employers in encouraging students has also been noted under the enabler of people-rich. It would seem that employers value students who have both VET and higher education skills and knowledge:

One student commented:

Oh definitely I got the job because I had a TAFE qualification. I was surprised, but the employer said he would take me ahead of just uni students you know. (University of Technology Sydney)

And:

Yeah, like, I can get jobs that the other students can't. (University of Western Sydney)

The other characteristic of the 'working together' strategy is developing an approach that engages with the cohort (VET pathways students) in order to change cultures and to provide supports to individuals within the cohort. One aspect of changing cultures is the size of the cohort: if very small it is harder to influence the prevailing culture. In universities with a history and policy focus of supporting VET pathways and where the intake is ten per cent or more of commencing students, the cohort is more influential and becomes part of the university's market image and culture. By contrast, universities with a limited intake of pathways students will be less likely to change the prevailing cultures relating to these students. In part, the students in this study were attracted to the universities with existing cohorts of pathways students in this field.

However, the actual number in a cohort is not as important as the contribution that the individual students can make in changing the attitudes of other students, teachers and institutions towards the cohort. Gale et al. (2010) made the point that the operational footprint could be statewide, even by the measure of one student. Influence may take many forms, such as participation in university groups or taking a leadership or mentoring role with other students. From an institutional perspective it is most visibly demonstrated through academic success: if the VET/TAFE cohort can show they are 'good students', then the cohort becomes more readily accepted by leaders, academics and administrators as a viable part of the university's student body.

This concept of cohort is focused on how a cohort can influence others but another consideration is whether or how the pathways students see themselves as a cohort. The responses are nuanced. The strongest response related to the students' sense of themselves as being 'better' than other groups, as more able, more hard-working and more motivated. A number of the students shared this viewpoint:

Being at TAFE made us the most motivated of our uni cohorts ... gives a good understanding of what happens on the ground and motivates to get a job or a degree ... instils a better work ethic.
(University of South Australia)

And by comparison with school leavers going straight to higher education:

A lot of them don't really have the drive ... especially in first year, and these people like have dropped out, I haven't seen them since, and they come in kind of with a high school kind of attitude. You can see that. Also, coming into such a conceptual course, they're coming from high school ... they're quite lost for directions, they want directions, they need structure. I've found some of them struggle with that. But all the mature-age students I know definitely find it a lot easier.
(Curtin University of Technology)

Certainly, none of the students interviewed saw themselves as inferior to other cohorts, such as school leavers, although some indicated that they would not have had the current opinion of themselves as capable students without the experience of TAFE. While the majority of interviewees valued their VET background, they did not really see themselves as a specific cohort who 'stuck together' at university except perhaps at the beginning of their university experience:

They had a special meeting of all the TAFE kids to explain the procedures, but that was it really.
(University of Western Sydney)

It was hard because of the numbers [at university], but then there were a few of us, so that didn't matter so much.
(University of Technology Sydney)

Strategy 4: Building confidence

Two characteristics form the basis for this strategy in the matrix:

- communication/information about university life through digital and other media
- familiarisation and site experiences.

Surprisingly, the availability of web-based and other media communications/information about pathways did not feature highly as an enabler in the student interviews. It is surprising because these enablers are often referred to as an essential component of effective pathways. Phillips KPA (2006) focused on the importance of such systems in enabling students to make informed decisions. Policy on pathways has also emphasised the importance of effective websites and other sources as the means to access information provision on pathways.

In this study the students also identified communication and information provision on pathways and university life as extremely important where provided by teachers and other 'people-rich' sources known and trusted by the students rather than through digital and other media. These findings are similar to those Byrnes et al. (2011).

The importance of familiarisation and site visits became evident in a number of the interviews. Orientation and information nights were conducted in a number of university and college settings, at which briefings were provided to students about transition to higher education before they commenced higher education studies.

In the case of dual-sector organisations (RMIT), or co-located campuses (Sydney Institute of TAFE and University of Technology Sydney), the geography of the sites made such site visits easier.

The best part was the orientation and information night, because only us TAFE kids went.
(University of Technology Sydney)

They took us to Deakin one day and explained all the pathways and the different career paths that we could take from there. (Gordon TAFE to Deakin University)

At the University of Western Sydney, this experience was enhanced by using 'link' staff, who were familiar with both the students and the pathways model and who conducted special orientation nights. In these experiences, students were exposed to staff who had all been employed at the university for some time and who were able to give casual advice about university pathways and credit transfer.

Other students indicated they simply used the same orientation programs and supports available to all students or simply familiarised themselves.

Well I knew where to go, so that was fine. (Curtin University of Technology)

Another aspect of this strategy that came through the student comments was the transformation and boost in confidence levels created through the positive learning experiences of vocational education and training and consolidated by academic success in higher education. A number of the students had indicated feelings of anxiety and genuine concern about their ability to cope with university life but found they were well prepared by their experiences in the VET sector and often saw themselves as better prepared than students who had come straight from school. The researchers were continually presented with comments such as:

I didn't think I could go to uni then I went through TAFE and changed my mind. (University of Newcastle)

I just didn't think I was clever enough to go ... then I found out about TAFE here. (University of Newcastle)

Obviously I used TAFE as a stepping stone to here, but I learnt a lot along the way. I'm much better off, I've got much more than a stepping stone ... I had one-on-one learning; I learnt the environment [of tertiary education]. It was an adult environment. I'm more reliant on myself now thanks to TAFE. (University of Newcastle)

I probably think it was the best thing that I did, was to do that first and then go through to university because I don't think that I could have gone from school and had the same sort of success that I'm having now at university as I would if I hadn't gone through the path that I had. (Curtin University of Technology)

In some cases, students commented that they were performing better than their non-pathway peers and that they were more motivated.

I definitely think TAFE helped build my confidence to cope here ... the ones straight from school are not as motivated.

You want to be there so you work well ... the kids are not so dedicated. (University of South Australia, student with first class honours)

If I'm going to be there I'm going to do the best I can. (Curtin University of Technology)

I work much harder to do well at uni. (Deakin University)

It [the pathway] has been really good for me I think, in like maturing as a person and also in giving me a better understanding of where I want to go in the future.

One of the reasons students propose for their increased self-confidence, high motivation and success in higher education is the pathways model itself. By undertaking vocational education and training first they had developed a far clearer understanding of the degree's focus and the industry/career they

had chosen compared with some of their peers; they knew from their VET studies what the degree entailed and from studying in a tertiary environment they knew what they needed to do to succeed.

Whether the students' views and perceptions are accurate cannot be verified in this study. Such verification would need to be determined through appropriate evidence-based research and this is outside the project's scope. We note that the University of Western Sydney has undertaken initial longitudinal studies of pathways students. The early indications are that these students are performing at equal or above average levels by comparison with non-articulating peers, but these studies are still in the collection phase. Other such evaluations are also regularly undertaken as part of some university systems on pathways. Further research in this area is warranted.

In the context of this study, verification is not the point; rather, it is the students' perceptions of themselves as more focused, more motivated and prepared to do as well or better than other cohorts that is important. Two individual capacities emerge from these responses, both developed through the pathways experience:

- the sense of self-belief/self-confidence
- the capacity for self-directed learning.

Each of these constitutes a specific enabler within the strategy of building confidence. This combination of motivation and capacity for self-directed learning are two key facets of the Organisation for Economic Co-operation and Development's (OECD) concept of lifelong learning (OECD 2007).

In summarising the outcomes from the student interviews, the most commonly identified enablers were:

- people-rich resources, particularly teachers (strategy 1)
- the recognition of difference, expressed as credit (strategy 2)
- enhanced curriculum through positive learning experiences and quality teaching in TAFE/VET (strategy 2)
- the building of self-confidence and self-belief through the pathways experience (strategy 4).

While these were the most common enablers, it is not appropriate to rank or prioritise them, given the qualitative focus of the research and the limited number of interviewees.

Perspectives from industry representatives and other stakeholders

Roundtable forums of industry and other stakeholders were held in each stage of the project to:

- provide industry and other stakeholders with information about the project, as part of communication and dissemination procedures
- enable the participants to discuss the research findings and consider the issues raised
- elicit ideas and options on improving pathways in this industry to further inform the project impacts.

The first roundtable reviewed aspects of the collated education and industry data. The second forum considered the outcomes from the student interview data. To guide the proceedings, a discussion paper was developed for each roundtable containing specific questions designed to focus consideration of the issues. The participants showed keen interest in discussing the issues and all were cognisant of the project's relevance to future workforce development and skill needs in building and construction. All recognised the importance of building improved pathways between vocational education and training and higher education as part of meeting industry skills needs.

One of the key points to arise from the discussions was industry recognition of the important role it can play in fostering and developing pathways for this industry and in developing tertiary models of education that address the skills requirements of the industry. The industry representatives indicated that this was an area in which they had played an insignificant role in the past but which was now urgent in the light of skills shortages in construction management and the important economic role the industry played. It was suggested that the time might be right to consider a national industry workforce development policy, one involving vocational education and training, higher education, government and themselves.

In relation to more specific assistance in building pathways, the industry representatives identified improved career advice in schools about jobs in the industry at paraprofessional and professional levels and pathway opportunities as essential, recognising also that they needed to take a more proactive role, not only in guiding careers advice, but in providing opportunities such as cadetships for students studying in higher education. In addition, the industry representatives saw a need for industry associations to advocate more effectively with individual employers on the need for constant upskilling and the provision of upskilling opportunities. The link to licensing was also raised.

Further issues considered in the forums were the low student numbers in and graduates from diplomas and the small supply of student places in the degree. The current levels of provision in both the Diploma of Building and Construction and degree-level studies present a significant constraint to improving the actual numbers of students who might make use of a pathway. In examining this issue the roundtable participants suggested that, rather than focus only on the Diploma of Building and Construction as a pathway, more pathways could be opened up by the creation of alternatives such as a pathway from the Certificate IV in Building, which has a greater number of student enrolments, into an associate degree or even from certificate III into this qualification. An alternative might be to modify

a generic diploma of project management (currently a qualification of another skills council) to include an elective focus on construction and to use this as a key pathways qualification in the industry.

An overall point of agreement was that much greater flexibility is needed in the creation of 'building and construction' pathways, with different combinations of VET and higher education qualifications used to create rolling entry and exit points and enabling students/employees to upskill in chunks that suit their work and other commitments. Greater use of the associate degree qualification was supported as a destination pathway qualification, as long as it provides an ongoing pathway into the degree.

Greater flexibility in pathway combinations may go some way to ameliorating the supply-side constraints of provision in higher education. However, one of the main reasons for the low student numbers in building and construction degrees is the lack of suitably qualified academics and the availability of space. The greater use of industry in higher education provision, through work-based and blended learning, was identified as one mechanism that may help to address these pressures and also provide students with the real-world experiences of construction management.

A specific concern raised by the roundtable discussions is the limited upskilling undertaken by graduates/employees with a certificate III/trade qualification by means of higher vocational education and training, followed by higher education. One of the constraints to further study identified by the industry representatives is the perceived loss of pay and benefits for these workers. The higher education in VET model described above may be one approach to support increased access for these workers as well as offering an appropriate learning model. However, it does not support a continuous vocational learning pathway for existing employees who may want to scaffold their learning from the certificate III into certificate IV and through to diplomas.

This lack of pathways from and between VET qualifications was identified by the educators in the roundtable, who suggested the current restrictions on the nesting of qualifications within training packages as the principal issue. Nesting qualifications creates an articulation pathway that supports a continuum of learning with multiple entry and exit points and is very common in postgraduate higher education courses and was common in previous VET qualifications. Given the huge numbers of students and workers with these certificate III qualifications, this gap in the pathways chain in vocational education and training is an issue that needs to be addressed.

One measure supported by the roundtable participants that may prove helpful is the much wider use of recognition of prior learning by both VET and higher education providers. This point was raised in both forums as an area needing urgent attention: if existing workers could be assessed and given recognition through credit, then this may provide a strong incentive for undertaking a higher qualification.

Conclusions

This study has examined the enablers for improving student pathways between vocational education and training and higher education in building and construction through a number of different lenses. These include:

- consideration of the workforce needs of the industry, in particular, for construction managers, and the implications for pathways
- the levels of current educational provision in diplomas, advanced diplomas and bachelor degrees in this field, along with pathways data between these qualifications and the consequent implications
- the enablers as expressed through the voices of pathways students
- stakeholder perspectives on the research.

Information supporting the project has been collected through a mix of quantitative data from nationally published statistics and reports, interviews with students from a number of universities and roundtable dialogues with stakeholders.

The contextualisation of the research in relation to industry workforce needs places pathways in a broader context and provides a further rationale for pathways development. As set out in the context section of this report, the industry currently has a shortage of construction managers, the destination degree and principal occupation of the students in this study. This occupation has also shown the most significant growth in percentage terms of any occupation in the industry in recent years. The industry stakeholders represented at the roundtables also confirmed this workforce need. The Australian Workforce Productivity Agency identified this occupation as ‘specialised’, that is, requiring a long lead time in formal education. Where once the required skills and knowledge were grounded in informal learning, the reality is that a degree is now necessary and expected for people entering this occupation.

This industry recognises that one of the means of addressing skills shortages is improving the upskilling procedures of existing workers and students with lower-level AQF qualifications through pathways into higher-level qualifications, with due recognition for relevant knowledge and skills. Projecting a workforce development need on to pathways development represents an enabler, providing a workforce rationale.

There is perhaps a greater role for employers in this industry, one that involves being part of the collaborative process of pathways development, possibly as an equal player working with VET and higher education institutions to build pathways related to workforce needs. Collaboration with industry could also involve an improved dialogue between employer and professional bodies in the building industry and the relevant skills councils to support skills needs and pathways into professional work.

The pathways students themselves can also be interpreted as an ‘enabler’, in the sense that they provide higher education institutions with a valuable source of capable students. Certainly, many of the pathways students interviewed for this project considered themselves as equal or ‘better’ students and who were more focused and motivated than some of their peers. Where evidence-based research confirms these capabilities, it is a powerful tool in addressing the cultural or other barriers in higher education facing these students.

Based on the interviews for this study these pathways students demonstrated:

- high levels of motivation to study and succeed at university
- a clear focus on the value of the degree, the work and career it leads to and the industry of choice
- the value of existing knowledge and skills brought to the degree studies through vocational education and training and which other higher education students don't possess
- commitment and perseverance in making the VET to higher education transition successful
- ongoing building of confidence as learners
- a capacity for self-directed learning.

Pathways build both student motivation and the capacity for self-directed learning. Each of these could be considered as student-centred 'enablers'.

Other enablers identified by the students were:

- people-rich resources, the most significant being the teachers and other VET staff who gave guidance and advice to these students in areas such as future study, upskilling options and career opportunities for higher-level qualifications, and information on specific universities, credit and other relevant issues
- the recognition of difference by the destination universities, expressed through recognition of prior VET studies in the form of credit and guaranteed entry (where provided) or ease of admission and the support given to transition students as individual learners
- enhanced curriculum in vocational education and training, expressed through quality learning experiences and teaching. In the case of the UWS College students, this enabler was further enhanced by the modified curriculum in the VET diploma to include foundation skills and a guaranteed pathway into the second year of the degree
- collaboration and communication between staff in the VET and higher education providers, expressed through familiarity activities such as orientations, strong communications between staff and 'link' personnel in both institutions.

One of the key constraints to improving pathways in this field is the size of provision in both VET diplomas and in higher education degrees. As the NCVET data on student enrolments and the data from the Student Outcomes Survey showed, the number of students and graduates in building-related diplomas is pitifully small. The national statistics on higher education also highlight the extremely small student numbers in building-related studies.

NCVER data from 2010–11 also show that, at diploma levels, graduates from this field of education move into higher education at around the same rate as the average of all fields, with 16.5% enrolled in a bachelor degree six months after graduation. This suggests no 'industry' difference in transfer between this and other fields at these qualification levels. The main issue for this field, it would seem, is not the pipeline but the size of the pipe.

If the numbers of pathways students into degrees are to improve (and assuming the current percentage rate of transfer is maintained), the pool of students and graduates in diplomas must be expanded and the number of higher education students must also increase.

One of the most obvious sources for extending the diploma pool is graduates from certificate III/IV qualifications, but as the 2010–11 Student Outcomes Survey data indicate, only 3.1% of this cohort

enrol in diplomas the following year. One reason so few graduates continue with further study may be that the employment outcomes are very high for 'trade' graduates; another may be the lack of structured pathways into higher VET qualifications.

Whatever the reasons (a subject worth exploring further), the data suggest that, if pathways are to be enhanced, a range of additional strategies is needed to extend the pool of students from vocational education and training who go on to higher education. Stakeholders identified a number of ideas that were discussed and broadly supported. These included:

- building and construction industry bodies taking a greater role in providing information and advice to school students on different careers and the different education routes into these careers, including the option of VET diploma to higher education pathways. It was noted that, while some school students are aware of pathways, a greater emphasis by careers teachers working with industry could expand interest
- extending the range of pathways available, for example, by building a pathway directly from a certificate IV or diploma into an associate degree, followed by completion of the bachelor award. This approach would give great clarity and continuity to students, including guaranteed admission and credit
- improving vocational learning pathways for older workers with certificate III qualifications to return to study at diploma levels and then on to degrees
- improving recognition of prior learning in general for industry employees so that it is not seen as a complicated and onerous process and extending understanding of the availability of this assessment within the industry.

However, even if the VET pool of students and graduates at diploma levels is increased by such strategies, the other major constraint is the size of higher education provision and the limited availability of university places. If current higher education levels are maintained, then the capacity to take on more pathways students from vocational education and training is constrained. Why higher education provision in building is so small, particularly in the context of projected industry need, is beyond the scope of this project. One mechanism suggested by stakeholders that could increase current capacity within higher education institutions is to extend the work-based learning and integrated work and learning models developed in collaboration with construction companies to the delivery of bachelor courses. This partnership approach would also give industry a greater role in undergraduate education and, for students, improved access to real-world project management experiences.

It is hoped that this study has contributed to wider understandings of the importance of pathways to the workforce needs of the building and construction industry and the factors/enablers that assist students in using these pathways, and offered further ideas and policy options upon which to build and improve pathways.

References

- Abbot-Chapman, J 2011, 'Making the most of the mosaic: facilitating post-school transitions to higher education of disadvantaged students', *Australian Educational Researcher*, vol.38, no.1, pp.57–71, viewed 29 May 2013, <www.springerlink.com/content/tq316154117510p6/>.
- Anderson, D & Vervoorn, A 1983, *Access to privilege: patterns of participation in Australian post-secondary education*, ANU Press, Canberra.
- ABS (Australian Bureau of Statistics) 2008, *Education and work*, cat.no.6227.0, viewed 20 February 2012, <[www.ausstats.abs.gov.au/ausstats/subscriber.nsf/0/656CB57FE56C0491CA25750C000EF65B/\\$File/62270_may%202008.pdf](http://www.ausstats.abs.gov.au/ausstats/subscriber.nsf/0/656CB57FE56C0491CA25750C000EF65B/$File/62270_may%202008.pdf)>.
- 2010, *A statistical overview of the construction industry*, *Australian economic indicators*, viewed 20 February 2012, <www.abs.gov.au/AUSSTATS/abs@.nsf/Lookup/1350.0Feature+Article1Oct+2010>.
- 2012, *Year book*, cat.no.1301.0, ABS, Canberra.
- Australian Qualifications Framework Council 2009, *Building better connected learning through improved student pathways*, AQF Pathways Project, technical report, viewed 17 January 2013, <www.aqf.edu.au/Portals/0/Documents/Projects/Pathways%20Project%20Technical%20Report%20November%202009.pdf>.
- 2011, *Australian Qualifications Framework*, viewed 17 January 2013, <www.aqf.edu.au/Portals/0/Documents/Handbook/AustQuals%20FrmwrkFirstEditionJuly2011_FINAL.pdf>.
- 2013, *Australian Qualifications Framework*, 2nd edn, viewed 5 February 2013, <www.aqf.edu.au/Portals/0/Documents/2013%20docs/AQF%202nd%20Edition%20January%202013.pdf>.
- Australian Workforce Productivity Agency 2010, *Australia's workforce futures*, viewed 18 February 2013, <www.awpa.gov.au/our-work/national-workforce-development-strategy/documents/WWF_strategy.pdf>.
- 2012a, *2010 Industry snapshots – construction*, viewed 18 February 2013, <www.awpa.gov.au/our-work/national-workforce-development-strategy/2012-workforce-development-strategy/documents/Construction.pdf>.
- 2012b, *Specialised occupations fact sheet*, viewed 21 September 2012, <www.awpa.gov.au/labour-market-information/skilled-occupation-list/documents/2012FactSheet.pdf>.
- 2012c, *Australia's skills and workforce development needs – a discussion paper*, viewed 18 February 2013, <www.awpa.gov.au/publications/documents/Future-Focus-Australias-skills-and-workforce-development-needs-Discussion-Paper.pdf>.
- Bradley, D, Noonan, P, Nugent, H & Scales, B 2008, *Review of Australian higher education: final report* (the Bradley report), viewed 12 February 2013, <www.innovation.gov.au/HigherEducation/ResourcesAndPublications/ReviewOfAustralianHigherEducation/Pages/ReviewOfAustralianHigherEducationReport.aspx>.
- Brown, M, Withers, E, Down, C, Figgis, J & McManus, J 2011, 'Pedagogical practices across the tertiary sector: summarising the literature on pedagogical support for students moving from VET to universities', paper to 2011 Australian Vocational Education and Training Research Association Conference, Melbourne, April.
- Byrnes, J, Beaumont, P, Paez, D, Jackson, A, Blacker, J & Dwyer, C 2010, *Student awareness of articulation and credit transfer in Queensland: results of a web-based survey*, Integrated Articulation and Credit Transfer (IACT) Project, viewed 31 January 2013, <http://3darticulation.com.au/wp-content/uploads/Student_Awareness_Final_Sept_2011.pdf>.
- Byrnes, J, Paez, D, Jackson, A, Dwyer, C & Blacker, J, 2011, 'Literature review, Integrated Articulation and Credit Transfer (IACT) Project', viewed 31 January 2013, <<http://3darticulation.com.au/wp-content/uploads/Lit-Review-Final-2011.pdf>>.
- Carnegie, J 2009, *Policy and regulatory analysis background report*, AQF Pathways Project, viewed 17 January 2013, <<http://aqf.edu.au/Portals/0/Documents/Projects/Pathways%20Final%20Report%20-%20Policy%20and%20Regulatory%20Analysis.pdf>>.
- Construction and Property Services Industry Skills Council 2011, *Workforce development strategy: a policy paper*, viewed 19 February 2013, <http://www.cpsisc.com.au/Resources/CPSISC/WD/Workforce_Development_Strategy_FINAL_Paper_220211.pdf>.
- 2010, CPC50210 Diploma of Building and Construction (Building), viewed 19 February 2013, <http://training.gov.au/TrainingComponentFiles/CPC08/CPC50210_R3.pdf>.
- Cram, B & Watson, L 2008, 'Managing credit transfer from VET to higher education: the case for cross sectoral collaboration', Australian Vocational Education and Training Research Association Conference, Adelaide, April.

- Curtis D, 2009, *Student transfer at a glance*, NCVER, viewed 17 January 2013, <www.ncver.edu.au/publications/2144.html>.
- Department of Education, Employment and Workplace Relations 2011a, 'Skills info, construction report', viewed 23 September 2012, <<http://skillsinfo.gov.au/NR/rdonlyres/253AA502-8ED7-4CB3-AFD2-DA27B2C35B18/0/2011ConstructionReport.pdf>>.
- 2011b, *Skill shortages in construction*, viewed 20 February 2012, <www.deewr.gov.au/Employment/LMI/SkillShortages>.
- 2012a, *Construction industry report, construction employment outlook*, viewed 24 January 2013, <www.deewr.gov.au/lmip/default.aspx?LMIP/Publications/IndustryReports>.
- 2012b, *Skills shortages in the construction trades*, viewed 22 January 2013, <www.deewr.gov.au/employment/lmi/skillshortages/pages/publications.aspx>.
- Department of Industry, Innovation, Science, Research and Tertiary Education, *Selected higher education statistics, 2009, 2010, 2011*, viewed 31 January 2013, <www.innovation.gov.au/HigherEducation/HigherEducationStatistics/StatisticsPublications/Pages/default.aspx>.
- Eddington, N & Toner, P 2012, *Skills formation strategies in Queensland: a skills shortage?*, OECD Local economic and employment development (LEED) working papers, 2012/07, OECD Publishing, viewed 21 January 2013, <www.oecd.org/cfe/leed/Queensland%20Skills%20Formation%20Strategies%20FINAL.pdf>.
- Gale, T, Hattam, R, Comber, B, Tranter, D, Bills, D, Sellar, S & Parker, S 2010, *Interventions early in school as a means to improve higher education outcomes for disadvantaged students*, National Centre for Student Equity in Higher Education, University of South Australia, Adelaide.
- Guthrie, H, Stanwick, J & Karmel, T 2011 *Pathways: developing the skills of Australia's workforce*, NCVER, viewed 17 January 2013, <www.ncver.edu.au/publications/2376.html>.
- Harris, R, Rainey, L & Sumner, R 2006, *Crazy paving or stepping stones? Learning pathways within and between vocational education and training and higher education*, NCVER, viewed 17 January 2013, <www.ncver.edu.au/publications/1722.html>.
- Integrated Articulation and Credit Transfer Project 2011, 'Toolbox of enabling resources', viewed 17 January 2013, <<http://3darticulation.com.au/>>.
- King, R, Dowling, D & Godfrey, E 2011, *Pathways from VET awards to engineering degrees: a higher education perspective*, Australian Engineering Taskforce, viewed 21 January 2013, <www.anet.org.au/wp-content/.../06/ANET-Higher-Ed-pathways.pdf>.
- Moodie, G 2010, 'Change and transformation in student transfer from Australian vocational education to higher education', Australian Vocational Education and Training Research Association Conference, Fremantle, April, viewed 18 January 2013, <<http://avetra.org.au/wp-content/uploads/2010/04/44.00-Gavin-Moodie.pdf>>.
- NCVER (National Centre for Vocational Education Research) 2011a, *SOS on line, VET graduate outcomes, salaries and jobs, 2011*, viewed 29 January 2013, <http://www.ncver.edu.au/resources/sos_online.html>.
- 2011b, NCVER data, VET student outcomes by industry and field of education – 04 Architecture and Building 2010–11, table 8, viewed 4 June, 2012, <www.ncver.edu.au/resources/sos_online.html>.
- 2012a, *Student outcomes 2012*, viewed 25 January 2013, <www.ncver.edu.au/publications/2572.html>.
- 2012b, NCVER data, table 8: VET student outcomes by industry & field of education – 04 Architecture and Building 2011–12, viewed 25 January 2013, <www.ncver.edu.au/resources/vsi/vsi_table.html?table_list_class_type_id=4&table_list_table_nr=8&table_list_filter_id=4&filter_name=04+-+Architecture+and+building&classification_name=Field+of+Education>.
- 2012c, *Australian vocational education and training statistics, students and courses 2011*, viewed 11 March 2013, <www.ncver.edu.au/publications/2509.html>.
- 2012d, NCVER data, VET students by industry, field of education, table 1, VET students enrolled by selected characteristics, Architecture and Building, 2007–2011, revised August 2012, <www.ncver.edu.au/resources/vsi/vsi_table.html?table_list_class_type_id=4&table_list_table_nr=1&table_list_filter_id=4&filter_name=04+-+Architecture+and+building&classification_name=Field+of+Education>.
- 2012e, *Vocational education statistics, students and courses and training 2011, publicly funded training providers*, revised December 2012, viewed 11 March 2013, <www.ncver.edu.au/publications/2516.html>.
- OECD (Organisation for Economic Co-operation and Development) 2007, *Qualifications systems bridges to lifelong learning*, OECD, Paris.
- Paez, D, Byrnes, J, Blacker, J, Jackson, A & Dwyer, C 2010, 'Skills shortages but who's talking? The Integrated Articulation and Credit Transfer Project: a report on research in progress', presentation to the Australian University Community Engagement Alliance National Conference, 5–7 July 2010, University of Tasmania, Launceston, Tasmania, viewed 21 January 2013, <http://3darticulation.com.au/wp-content/uploads/AUCEA_2010_Final.pdf>.

- Phillips KPA 2006, *Giving credit where credit is due: a national study to improve outcomes in credit transfer and articulation from vocational and technical education to higher education*, viewed 17 January 2013, <www.innovation.gov.au/HigherEducation/Quality/Documents/QualityAssurance/Giving_Credit.pdf>.
- 2010, *Innovative tertiary pathways models, final report*, viewed 13 January 2013, <www.bvet.nsw.gov.au/pdf/KPATertiarymodelsfinalreport.pdf>.
- Walls, S & Pardy, J 2010, *Crediting vocational education and training for learner mobility*, NCVER, Adelaide.
- Watson, L & McIntyre, J 2011, *Scaling up building engineering workforce capacity through education and training*, final report, University of Canberra, viewed 21 January 2013, <www.anet.org.au/wp-content/uploads/2011/06/ANET-Scaling-Up2.pdf>.
- Wheelahan, L 2009a, 'The problem with CBT (and why constructivism makes things worse)', *Journal of Education and Work*, vol.22, no.3, July, pp.227–42.
- 2009b, 'What kind of access does VET provide to higher education for low SES students? Not a lot', paper to National Centre for Student Equity in Higher Education, Launch and Forum, University of South Australia, 25–26 February 2009, viewed 17 January 2013, <<http://w3.unisa.edu.au/hawkeinstitute/ncsehe/student-equity-forum-2009/wheelahan-what-kind-of-access.pdf>>.
- 2009c *Programs and pathways report*, AQFC Pathways Project, viewed 20 August 2012, <www.aqf.edu.au/Portals/0/Documents/Projects/Pathways%20Final%20Report%20-%20Programs%20and%20pathways.pdf>.
- 2010, *Rethinking equity in tertiary education: why we need to think as one sector not two*, L H Martin Institute for Higher Education Leadership and Management, University of Melbourne, viewed 18 January 2013, <http://dtl.unimelb.edu.au:80/R/T6K2I2J4QA4RH4NHLTAAHIVSS96I969YBNPPEPEY32VXCYYAJ6-01195?func=dbin-jump-full&object_id=264301&local_base=GEN01&pds_handle=GUEST>.
- Wheelahan, L, Moodie, G & Buchanan, J 2012, *Revitalising the 'vocational' in flows of learning and labour*, NVETRE discussion paper, NCVER, viewed 21 January 2013, <www.ncver.edu.au/publications/2535.html>.
- Wheelahan, L, Moodie, G, Billett, S & Kelly, A 2009, *Higher education in TAFE*, NCVER, viewed 12 February 2013, <www.ncver.edu.au/publications/2167.html>.
- Wheelahan, L, Arkoudis, S, Moodie, G, Fredman, N & Bexley, E 2012, *Shaken not stirred? The development of one tertiary education sector in Australia*, NCVER, viewed 18 January 2013, <www.ncver.edu.au/publications/2450.html>.

Appendix

Additional data on students, qualifications and providers in the field of architecture and building

Vocational education and training

Depending on which NCVET dataset is used, there were 135 697 students enrolled in this field of education across all qualifications and courses of study in VET in 2011 (NCVER 2012c, table 4) or 168 029 students by training provider and field of education (NCVER 2012e, table 3).

Extrapolating from NCVET data (2012e, table 3), and cross-referenced with details of registered training organisations (RTOs) on the national register, provision is highly concentrated in the public sector and in two states, Victoria and New South Wales. Of 2250 registered training organisations, only 222 are registered in this field of education, with over three-quarters of all provision in this field undertaken by TAFE institutes. Victoria had the highest number of TAFE enrolments, followed by New South Wales. Together these two states accounted for some 63% of all TAFE provision, followed by Queensland, Western Australia, South Australia, the Australian Capital Territory, Tasmania and the Northern Territory.

Public provision is further enhanced when government schools/enterprises are taken into account in NSW, Tasmania and WA. Private, industry and community registered training organisations accounted for around 16% of all enrolments, with Queensland having the highest number from this group, followed by Victoria and NSW.⁷

In 2011, the ten main institutions by enrolment delivering VET studies in this field were:

- Holmesglen Institute (Vic.; 9908; TAFE)
- Skillstech Australia (Qld; 9022; TAFE)
- TAFENSW – South West Sydney Institute (7562)
- Northern Metropolitan Institute of TAFE (Vic.; 5490)
- Skills Institute (Tas.; 5433; government enterprise)
- TAFENSW – Sydney Institute (4966)
- Chisholm Institute (Vic.; 4613; TAFE)
- TAFENSW – North Sydney Institute (3940)
- Victoria University (Vic.; 3912; TAFE)
- Polytechnic West (WA; 3829; TAFE).

The data available through NCVET (2012e) on provider enrolment by field of education cover all courses and qualifications in this field. No enrolment data are publicly available cross-tabulated by institution, field of education and qualification level.

⁷ Data from NCVET (2012d, table 1) with the lower enrolment figure of 135 697 for 2011 also show Victoria with the highest number of enrolments, followed by NSW and Queensland. Based on these data, 60.8% of all enrolments (public and private) are in these two states.

However, data are available on enrolments by AQF qualification in this field. This data demonstrate the importance of the certificate III/trade level, which accounted for 52% of all enrolments in 2011 (n = 62 223 in certificate III of total enrolments by AQF qualification of 120 196) (NCVER 2012d).

Diploma-level enrolments in 2011 accounted for 7.2% of the total, while advanced diplomas made up just 2.3% of all enrolments (NCVER 2012d). Enrolments have remained fairly static over the last five years as set out in table A1.

Table A1 VET enrolments, architecture and building, diplomas and advanced diplomas, 2007–11

Qualification	2007	2008	2009	2010	2011
Advanced diploma	1 121	1 201	1 583	2 360	2 725
Diploma	9 685	9 411	8 740	8 274	8 685
Totals	10 806	10 612	10 323	10 634	11 410

Source: NCVER (2012d, table 1).

This compares with significant growth in diploma/advanced diplomas across all fields in the same period, particularly in diploma qualifications.

Table A2 VET enrolments, all fields of education, diplomas and advanced diplomas, 2007–11

Qualification	2007	2008	2009	2010	2011
Advanced diploma	34 900	35 000	38 100	39 300	39 600
Diploma	129 200	135 300	157 800	189 700	217 700
Totals	164 100	170 300	195 900	229 000	257 300

Source: NCVER (2012c, table 4).

The main diploma-level courses offered in vocational education and training in this field by students are the:

- Diploma of Building and Construction (Building)
- Diploma of Building Design and Technology
- Diploma of Building Surveying
- Advanced Diploma of Building Design (Architectural).

Higher education

In higher education, the main providers for architecture and building and construction studies by student load are:

- Royal Melbourne Institute of Technology
- University of Melbourne (mainly postgraduate)
- Queensland University of Technology
- University of New South Wales
- Curtin University of Technology
- University of Technology Sydney
- University of South Australia

- Deakin University
- University of Newcastle.

Details of all higher education providers are set out in table A3.

Table A3 Actual student load in the field of architecture and building by higher education provider, 2011

State/providers	Student load
<i>New South Wales</i>	
Charles Sturt University	9
Macquarie University	19
Southern Cross University	0
University of New England	112
University of New South Wales	1 735
University of Newcastle	967
University of Sydney	941
University of Technology Sydney	1 321
University of Western Sydney	368
University of Wollongong	0
Non-table A/B providers	35
<i>Victoria</i>	
Deakin University	986
La Trobe University	67
Melbourne College of Divinity	0
Monash University	262
RMIT University	2 115
Swinburne University of Technology	226
University of Melbourne	1 861
University of Ballarat	0
Victoria University	6
Non-table A/B providers	141
<i>Queensland</i>	
Bond University	186
Central Queensland University	172
Griffith University	301
James Cook University	26
Queensland University of Technology	1 826
University of Queensland	645
University of Southern Queensland	45
University of the Sunshine Coast	50
Non-table A/B providers	11
<i>Western Australia</i>	
Curtin University of Technology	1 492
Edith Cowan University	34
Murdoch University	12
University of Notre Dame Australia	0
University of Western Australia	832
Non-table A/B providers	39
<i>South Australia</i>	
Flinders University of South Australia	0
University of Adelaide	574
University of South Australia	1 073
Non-table A/B providers	0

State/providers	Student load
<i>Tasmania</i>	
University of Tasmania	402
Non-table A/B providers	0
<i>Northern Territory</i>	
Batchelor Institute of Indigenous Tertiary Education	0
Charles Darwin University	17
<i>Australian Capital Territory</i>	
Australian National University	0
University of Canberra	393
Non-table A/B providers	0
<i>Multi-state</i>	
Australian Catholic University	0
Non-table A/B providers	0
Total EFTSL	19 300
Total in 2010	18 470
% change on 2010	4.5%

Source: Department of Innovation, Industry, Science, Research and Tertiary Education (2012, table 4.6).

Table 3 sets out total student load in architecture and building across all higher education qualifications.

The bachelor degree qualification is the most significant, accounting for 75% of all student load in this field. At the bachelor degree level, the subfield of building comprises 3260 EFTSL out of 14 549 (11 289 in architecture) or just 22%. (Department of Innovation, Industry, Science, Research and Tertiary Education 2012)

Approximately half of the higher education providers offer qualifications within the subfield of building, covering some 30 different relevant bachelor degree titles. Common titles include Bachelor of:

- Construction
- Construction Management and Property
- Construction Management and Economics
- Building and Construction Management
- Construction Management/Architecture
- Applied Science (Construction Management)
- Environment (Construction)
- Urban development (Construction Management/Property Economics).

This subfield also includes bachelor degrees in quantity and building surveying.

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