

CEET

Linking Economics and Learning: VET for Innovation

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**Leading Edge Skills and Innovation - The Role of Vocational Education and
Training**

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Abstract

ANTA has recently commissioned two pieces of work to determine the scope and demand for leading edge skills in manufacturing and innovative and creative skills across all industries. The results have been useful and enlightening with some preliminary advice and products produced. However, questions remain about the VET system capacity to lead in these areas and deliver practical and timely outcomes for individuals and industry.

What are leading edge and innovative work skills? What conditions are required for them to be developed, and how should Australian enterprises support the process?

Innovation is regarded as a critical factor in a successful modern economy. Vocational education and training is a critical component in any national innovation strategy that aims to create new industries. If Australia is to successfully nurture new ideas and technologies into emerging industries then the role of vocational education and training has to be recognized and it has to deliver the necessary skills for new industry workforces.

A simple innovation cycle is usually seen as involving:
Research ⇨ Development ⇨ Commercialisation ⇨ Industry Development

Commercialisation and industry development require a skilled workforce, and that is where the role of vocational education and training becomes critical.

While considerable emphasis has been placed on innovation in recent times, the ANTA Board, key people in the sector and representatives of industry have all expressed concern at the lack of emphasis on the potential contribution of vocational education and training. There are developments supportive of innovation in the sector despite the lack of support within innovation policies. The introduction of Innovation Strategies into the VET Plans of the States and Territories under the new ANTA Agreement is a system response, while the development of Innovative Work Skills as a training option enables companies to skill their workforce for innovation.

In considering how vocational education and training can support innovation and emerging industries there are three broad areas where activity can be enhanced:

- Commercialisation of innovation and creation of an industry workforce;
- Developing workforce capability and access to leading edge skills; and
- Enhancing innovation within vocational education and training.

Commercialisation of innovation and creation of an industry workforce

Once the research and development stages of innovation are completed, the new product, tool, system or practice needs to move out into the marketplace and be commercialised. This needs to happen in Australia if it is to lead to a new Australian industry, or improvement to an existing industry, in a way that gives a national competitive advantage. This requires a different set of skills to R&D, and the involvement or development of enterprises to utilize the innovation. Commercialisation and the

development of the skills for a new industry workforce are where vocational education and training becomes central. Analysis of emerging industries and the introduction of new technologies and work practices suggest that the majority of workers needed in the earlier stages of the introduction of innovation and creation of a new industry are skilled tradespeople and associate professionals (technicians and paraprofessionals), all primarily produced through the VET system. University educated researchers become a declining proportion of the relevant workforce.

The skills needed by this emerging workforce range from those to make operational new processes and systems, to those needed for the actual production work. While there will be some new skills required, the major need tends to be for new combinations of previously existing skills to be used in a new context. People who have the necessary combination of skills are generally not available for emerging industries, so training is required to achieve the right combination. Achieving this can require the restructuring of approaches to training to cross traditional boundaries and build new methods of delivery.

One emerging area of activity in the vocational education and training sector is the development and trialing of Innovative Work Skills. These are a set of competencies for workers and managers that are about creating the environment and systems that enable a company to make the step to introduce innovation. These competencies have been successfully trialed in 12 organisations during 2001. The challenge for the future is to roll them out widely for use by industry. As is the case for other activities to support innovation, this involves:

- Identification and development of the skills that are needed;
- Development of supporting products and services;
- Support for training organizations to deliver the skills to both the existing workforce and new entrants;
- Mechanisms for enterprises to assess their skill needs as they contemplate innovation;
- Opening up of learning pathways to meet the range of needs of individuals, including incorporation into New Apprenticeships; and
- Marketing and other activities to both inform and provide incentive for enterprises to embrace skilling for innovation.

Developing workforce capability and access to leading edge skills

There is a need across industry generally to develop a workforce that can readily adapt to change in technology, practices and industry structure by having the skills to underpin the shifts in the nature of work and be able to readily develop new skills. While this will support the production needs of emerging industries, it will also contribute to innovation and have a productive impact across a wide range of industries. Vocational education has been progressively improving its offerings to support these shifts, but the rate of change so far has been less than the rate at which industry itself is changing.

The need for general shifts in skill development and training can be seen when it is considered that many of the new technologies and processes that are regarded as part of emerging industries are actually also enabling technologies that will transform the way work occurs across a wide range of industries. The examples are:

- Information technology and its already visible impact on processes in almost every industry, including aspects such as E-commerce;
- Photonics, which has the potential to become as common as electrical systems across industry; and
- Microtechnologies, which have the potential to transform all areas of manufacturing and processing, from metal products through pharmaceuticals to waste management.

At present companies that utilise leading edge technologies and practices, and the leading edge skills that go with them, are relatively rare in Australia. Training organisations that can deliver those skills are also rare. Most training is in-company or through equipment suppliers in Australia or increasingly overseas. The time gap between the first companies introducing new skills and them becoming widespread in the industry is quite long – at least 5 years. The technologies and practices themselves may diffuse quicker, but effective utilisation tends to lag, and a major factor in this is believed to be the skills gap.

An effective response to this issue needs to look at both companies and the training system. Companies need to be sensitised to the role of skills in effective introduction of innovation, and encouraged to consider workforce skills and learning as a critical factor within their business strategies. The intention would be that skills and their development would be treated more strategically across industry, and support and investment would follow that treatment as they strove to achieve best possible workforce skills. Products and services to assist in this process can help. Companies are already using skilling based on Training Packages within the VET system as a means of redefining themselves and improving their performance. A particular example is Taylor's Wines in South Australia, which is reinventing itself as a more productive premium wine producer through the enhancement of the skills of its workforce coupled with changes in work organisation, technology and product range.

The training system needs to introduce leading edge skills further into its specification of outcomes (as set out in the industry developed Training Packages) and make sure they are accessible and delivered through training organizations. This can be difficult to achieve, particularly where skill development is intended to proceed widespread industry demand – which is critical where skills have a long lead time to develop. An example of the gap between skill specification and delivery is research that indicates that the only about 50% of the flexibility in skill combinations built into the current Metal and Engineering Training Package is actually accessible by individuals and companies through Registered Training Organisations.

Existing activity in the vocational education and training sector is moving towards supporting the achievement of a skilled and capable workforce. At one level improvements to the training system support this, as does work on ways of enhancing the importance of workforce capability to enterprises. Another level is to support those individuals and organisations that have performed well. This is done through the Australian Training Awards held each year, and the work of Worldskills which focuses on

individual skill achievement and channels Australian participation into the World Skill Olympics. This is also reinforced through marketing and promotional activity.

Enhancing activity to improve workforce skills could include:

- Early incorporation of leading edge skills and generic skills that support change and learning for the workforce into industry Training Packages;
- Development of support materials and services for both enterprises and training organisations that assists introduction of these skills;
- Expansion of learning pathways available to support the range of potential learners, particularly people in the existing workforce. This could include expansion of apprenticeships and traineeships to Diploma and Advanced Diploma levels to better support technician level training;
- Support for change within training organisations to cope with new skills and increase the speed at which they are available in the delivery system; and
- Marketing of the benefits of change, and promotion of existing success stories.

Enhancing innovation within vocational education and training

There is a strong need to enhance innovation within the vocational education and training sector itself. Cultural issues within the sector and the changing nature of both work and learning technologies and practices means that the sector has trouble keeping pace with the rate of change in the wider economy. This problem is not confined to VET, but is present in all sectors of education.

Education and training organisations have many challenges to face, including:

- Rapid shifts in the nature of demand for skills, which includes the need for new skills and for learning that delivers new combinations of skills that cross traditional boundaries;
- A widening of the range of clients to include learners from 16 to 65 from a wide range of backgrounds and abilities, with varied motivations and varied relationships to the workforce and employment;
- The need to adopt a more client focused approach, producing more customised training and a shift from traditional mass approaches;
- Widening of the range of learning pathways available in response to the range of clients and the pressures on those clients, such as time availability; and
- An aging workforce that has trouble keeping up with change in both learning and industry practices.

A vocational education and training system that is performing at its best to support innovation in Australian industry will itself need to be able to innovate to do that. The training organisation of the future will need to be more innovative and flexible than the present, It will be an organisation that responds to individual learner needs, and acts as a support and partner to enterprises. There has been support for innovation in specific areas previously, covering specific areas like flexible delivery and on-line learning as well as more general encouragement of staff development and innovation through Framing the Future and Reframing the Future.

Activity to improve innovation in the vocational education and training system might include:

- Development of products and services to assist training organisations to innovate;
- States and Territories giving an emphasis to innovation in their management of their training systems, particularly the Government owned TAFE system;
- Professional development for training organisation staff, including exposure to new learning methods and return to industry activity to maintain currency of industry experience;
- Support for partnerships between enterprises and training organisations, building new innovative models of learning, including work based learning; and
- Introduction of innovative approaches to skill development and learning to enable training organisations to respond quickly with relevant approaches to industry and workforce training needs, including new business practices and learning technologies such as e-business and e-learning.

Maximising the contribution of vocational education and training to innovation

Vocational education and training can make its maximum contribution to supporting innovation in Australia where its activities link into the wider approach of Government to innovation. This includes a whole of government approach to considering policies that support innovation and lead to the widest possible enhancement of Australia's competitiveness. The centrality of skills and learning issues to many areas of government emphasise the need to consider and involve the VET sector.

Cooperation across areas of government is as valuable in areas of implementation as it is in areas of policy and program responsibility. Government expenditure can achieve greatest leverage if the activity of all agencies is considered. Duplication is reduced and the best use is made of available expertise. An example of this is recent ANTA work with the Commonwealth Department of Industry, Science and Resources (DISR) around Industry Action Agendas.

Industry has a common need for leading edge skills and these tend to be similar irrespective of the sector. Leading companies identify trends and resource requirements pro-actively and other enterprises follow. VET organisations and other educational institutions can usefully make a concerted response to these demands and operate collectively across organisational and institutional boundaries. Modelling innovative and capacity building behaviour organisationally will be a significant start to helping students achieve their career aspirations.