



Learning to Elearn Case Study 7

Development of a Transport Integrated Learning Information Service (TILIS)

by Robert Whitby and Dr Marcus Bowles⁺

1. Summary

This case study provides an insight into how both public and private-sector organisations within a major Australian industry have undertaken the building of a new education and training institution using electronically enabled learning solutions. Of note is how the major organisations involved adopted a 'greenfields' approach that advanced beyond available options. This case study outlines how stakeholders are deploying elearning tools and technology to build performance capabilities by improving mechanisms supplying learning, particularly from regulated providers such as schools, vocational institutions and universities. This use illustrates not only the importance of deploying electronic learning to better target individual and collective learning needs, but also the inability of the existing mechanisms in the market to quickly and effectively enable such exchanges.

2. Introduction

Major concerns of the State Government and the Federal Government in Australia about the need for an education and training strategy for the transport and logistics industry led to the New South Wales (NSW) Government — as a first step — undertaking a feasibility study on the industry. The Australian Transport University feasibility study was initiated not to establish a new university per se, but to reinvestigate the need for a high profile strategy to reinvigorate education and training services for the transport and logistics industry.

Given the Australian transport industry's 423,000 employees, or 4.6% of total Australian employment (which contributed \$43 billion to GDP in 2000/2001), improving the industry's competitive capabilities had long been recognised as a major means to generate significant multiplier effects in other industries (Dowrick, 2002). However, the industry's future ability to perform efficiently was under threat due to

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an aging work force and loss of knowledge, as well as fragmented education and training efforts across transport agencies.

Issues such as past reforms and restructures, knowledge loss due to an aging and downsizing workforce, difficulties in recruiting young people into the industry, generally low levels of workforce education and the duplication and fragmentation of training efforts are all threatening performance in both public and private sectors of the industry. These issues are of immediate concern to the NSW transport agencies with effects projected to worsen at both state and national levels by 2005 and their impact to worsen rapidly by 2010.

By mid-2002, when the NSW Government sponsored the ATU feasibility project, approaches to address such major issues were already matters of high-level discussion at a national level. From its commencement, the feasibility project rapidly expanded to engage other major private organisations, public-sector agencies in the state and national public and industry representative bodies.

The feasibility study was expected to find macro-level answers to:

- Why skills gaps are closing so slowly in crucial areas of the transport and logistics industry;
- What and where the immediate discontinuities are in the education and training market;
- What the trends and opportunities are for sectors in the transport and logistics industry and how these will affect planning and resource allocation; and
- What the transport and logistics industry's most immediate and/or long-term economic opportunity is for aligning education and training more closely with identified industry demand.

Given that the issues were of national significance, the leaders of the ATU feasibility study used as a reference point the freight transport logistics industry *Action Agenda*. This agenda identified as a priority the need for national leadership in the industry. This need was satisfied by establishing the Australian Logistics Council (ALC), a joint government-industry council consisting of high-level industry leaders and government representatives (Industry Steering Committee, 2002: Action 36). The *Action Agenda* also confirmed the need to create an education and training web portal (Industry Steering Committee, 2002: Actions 12 to 16).

Faced with dynamic shifts in employment across the industry and ongoing change, extensive research was undertaken by the ATU Project to determine how best to address transport industry education and training needs. What emerged were the following five possible approaches to improve education and training resources.

1. Business as usual **and do nothing**;
2. Information facilitation **and focus solely on providing better information on the dimension and size of the problem**;

3. Consortium model **to encourage and fund a network of service providers;**
4. Stand-alone provider, **which would involve creating a new kind of vocational university;** and
5. Staged option **that would take a blend of the most acceptable options and move ahead in stages.**

Following detailed analysis, the ATU feasibility study recommended the Staged Option as the approach that best met the needs of the transport industry.

To achieve this outcome the feasibility study confirmed that elearning, as both a content and information/knowledge reporting mechanism, needed to be advanced as a major means platform to the electronic enablement of the transport and logistics industry education and training market exchanges. The study also substantiated the need for a web portal providing access to assessed pathways, program providers and industry networks and forums.

Further the ATU feasibility study established the need for a body that would focus on building the Australian transport industry capability. This body would:

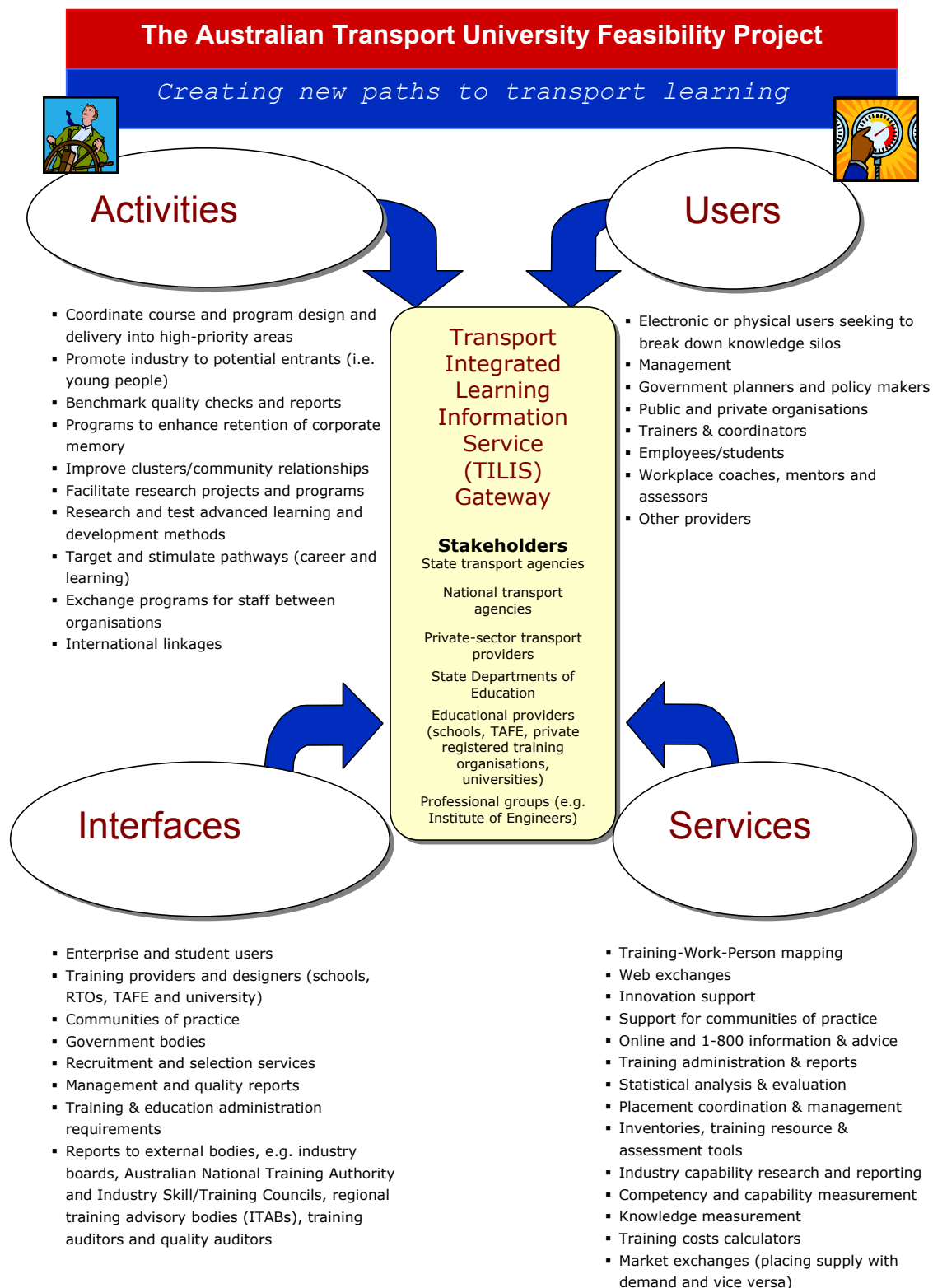
- Act as a facilitator and broker on industry's behalf, promoting industry needs and demands with education providers across Australia;
- Identify gaps in industry skills and education programs;
- Promote accredited programs and pathways with industry to increase or maintain industry capability; and
- Focus on accelerating change to work practices resulting from changing markets and technologies.

At its February 2003 meeting, the ALC endorsed the ATU as the 'best model' for development of an education and training strategy for the transport and logistics industry. As a result of the ATU feasibility study and national support from the NSW State Government and private industry, the New South Wales Transport and Logistics Centre of Excellence (CoE), was initiated. The CoE is considered a prototype offering value not only to NSW but also nationally as a model for elearning and coordination of education and training and as a means to better integrate knowledge management and learning in the industry.

Under the Transport and Logistics CoE, as proposed by the ATU feasibility project, the web portal solution was advanced as the Transport Integrated Learning Information Service (TILIS) Gateway.

Figure 1 provides a 'snapshot' of the ATU project and the TILIS Gateway activities, services, users and interfaces (reporting interoperability).

Figure 1: ATU Project Transport Integrated Learning Information Service (TILIS) Gateway



3. The Elearning Challenge

The research and applied consultation during the feasibility study produced a more refined view on how to better coordinate efforts and formally link the best available courses from schools, vocational registered training providers (RTOs), universities and providers of unrecognised training; this relationship would transfer the capabilities not only to perform, but also to reinforce the cohesive career and learning pathways that underpin sustainable competitiveness.

The proponents of the feasibility study strongly argued that existing education and training providers lacked the necessary mechanisms to facilitate cross-sector integration of the regulated suppliers (school, vocational and university).

Therefore as a high priority the ATU project was chartered to build a 'web portal'. The portal is considered a proactive means to implement more effective education and training and to exchange knowledge while also improving how organisations source more appropriate content and services. The build, which is discussed in detail in this case study, became a gateway called the Transport Integrated Learning Information Service (TILIS).

The key challenge to implementing TILIS has been to provide a web-based Gateway for learning and development, which can scale beyond the NSW transport industry to organisations located in other regions (both public and private). The solution also had to provide services across multiple types of network connections (from dial-up, to wireless, to fibre optics) and link content and data services using multiple technologies. The model developed has been designed to provide a prototype for the national industry and, with existing significant support from private-sector companies, provide a reference site that can leverage significant changes desired by organisations seeking to source training and education.

Addressing transport industry education and training demand

Despite having more than 800 registered training organisations (RTOs) offering courses in transport and logistic fields, the industry spent only \$290m of a total potential \$590m per annum, or less than 50%, on services from regulated training and education providers. While many companies did not spend anything on learning because they thought their workforce was already competent, many companies invested in unaccredited learning because they were not able to source services in the form and manner they required (ATU, June 2003).

Further research commissioned by the ATU feasibility project team in 2003 suggests an even bleaker picture on transport and logistics industry spend on education and training. Research figures sourced from the Australian Bureau of Statistics suggest that of the \$590m spent by the transport industry on education and training services, 83% was on unaccredited, unstructured work-based courses (ATU, May 2003). Compared with other industries this was the lowest in Australia. During the year ending June 2002, 81% of all Australian employers provided some training for their employees. Of total employers, 41% provided structured training and 79% provided unstructured training. However, structured training provision was lowest in Transport

and Storage (17%) and the next lowest (34%) in both the Manufacturing and Retail industry (ABS, 2002b). Only 3% of spend in the transport industry was on university providers.

Major transformations in the industry are impelling a corresponding change in demand for learning services. These transformations have included the transport and logistics sector growing in the three years to 2001/2002 at a rate faster than the overall economy, doubling of freight transport tasks (Department of Transportation and Regional Services [DOTARS], 2002: 12) and a projected growth rate of 1.3% in urban passenger transport tasks until 2020 (DOTARS, 2002: 16). Global changes and increased economic competition continued to stimulate changes in specific sector and enterprise work practices.

Education and training services are therefore under pressure to build not just the capabilities of the workforce, but also the capabilities of organisations to effectively compete.

To be more competitive, many transport and logistics businesses — whether public or private sector — have become highly focused on acquiring learning that translates into improved productive outcomes. How well education and training providers can meet these expectations has been influenced by a number of factors. Beside the very low levels of spend on structured training some of the core attributes to emerge from the ATU feasibility research can be synthesised as follows.

- Domination of certain workforce profiles:
- Male dominated in certain occupations;
- Traditional practices, approaches and prevalence of routine work;
- Low information and technology capabilities;
- Lack of young people entering the sector and older people leaving in large numbers;
- The average age exceeds 50 years old, retirement and exit from the Australian industry by 2005 is expected to account for at least 10% of the transport sector's truck drivers (ATA, 2002) and approximately 15% of the maritime officers (AMSA, 2002: 12);
- The 15- to 35-year-old age group in the transport and distribution workforce has declined as a percentage of the total workforce from 40.8% in 1990 to 35% in 2000 and is estimated to be around 32% in 2002 (Industry Steering Committee, 2002: 50–51);
- Training of existing employees unable to keep pace with both performance and competitive capabilities required in the industry:
- Skill/capability gaps are appearing in jobs critical to not just current performance but also capacity to evolve and compete;
- The sector attracts only 1.6% of vocational education and training funding yet contributes 9% to Australia's GDP and represents some 4.5% of total employment (Industry Steering Committee, 2002: 7);

- Local education and training capacity is struggling;
- Inconsistent learning culture and commitment to acquire or develop qualifications:
- Survey results indicate only 30% of employers in logistics receive subsidised or funded education and training and 41% are satisfied with delivery of logistics education and training (Industry Steering Committee, 2002: 58);
- Nearly six out of every 10 employers did not provide structured training to employees; and in transport, storage and communication services sectors, no training was provided by one in two companies (the lowest of all industry sectors in Australia); and
- Despite the workforce showing long-term stability and engagement in the transport and logistics industry, only 42% have post-compulsory schooling qualifications (ABS, 2002) and in some sectors post-compulsory education levels are below 15% (e.g. shipping industry where in 2000 only 10% held maritime-related qualifications) (AMSA, 2002: 48).

4. Analysis of the Elearning Strategy

By late 2003 it is intended that the Australian Transport University (ATU) feasibility study project will orchestrate the development of a Transport Integrated Learning Information Service (TILIS) to connect suppliers of education and training with consumers in the transport industry. This Gateway, based on a web portal and elearning technology, will create communities of practice; distribute information; and support, enable and accelerate learning and knowledge management across the industry.

A focus on capabilities

To ‘neutralise’ the growing schism between the national vocational education and training sector (and its emphasis on competencies and training packages and applied ‘skills’ development), and the school and university sector (and its emphasis on learning outcomes and academic development), ATU has focused on capability. The research undertaken by the ATU feasibility study indicated that transport and logistics require a balance of skills, knowledge, cognitive and other attributes within career pathways and even within specific courses.

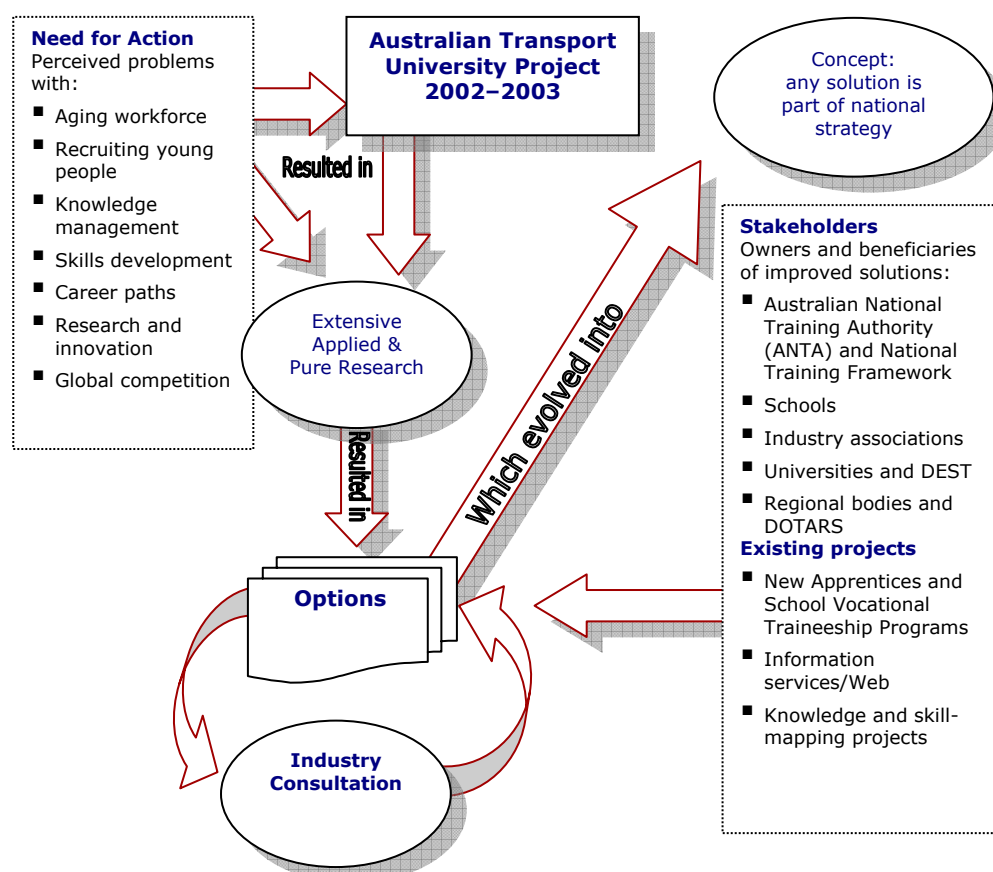
The ATU feasibility study also used capabilities as a means to highlight the danger of loss of national capability as interest in employment in the sector is declining, leading to diminishing commitment of education and training providers to service the sector. This loss of capability will eventually degrade the ability of the education and training sector to recruit, train and provide world-class teachers and researchers; to support diverse career pathways; and to provide organisations with the necessary content and delivery infrastructure.

Businesses benefits

The research results that emerged from the ATU feasibility study, and generated the Transport and Logistics CoE prototype solution, are clear and unambiguous (ATU, 2003b). Quantitative and qualitative analysis highlights a strong sense of frustration and dissatisfaction in the NSW public sector and private-sector companies surveyed during the ATU feasibility study. Industry members expressed a desire for improved education and training services at all levels from graduates of school, vocational training and education and university courses. The demand in NSW also was not geographically limited, but mirrored in locations across Australia, and found in all forms and sizes of organisations employing transport and logistics capabilities.

The feasibility team has focused on working with industry users in the transport and logistics sector. This has resulted in a clear view of how the Gateway can add value to existing education and training services. Nevertheless, the Gateway service and establishment of a CoE — engaged to improve how the training and education supply and demand market forces are enabled — has significant implications for players in the existing education and training marketplace. These consultations, which are evolving, shape overall implementation options and structural decisions.

Figure 2: Action and consultative landscape



Research completed during the ATU feasibility study indicated elearning content and information could better enable market exchanges and capability transfer. The TILIS Gateway services therefore had to address specific challenges. These included the need for:

- A common interface for the industry, which would add value to the transport and logistics industry;
- Pathways for building capability within the NSW transport industry;
- Information on preferred transport-related learning and development providers;
- Learning and development resources for the transport industry including available courses and programs, research and development;
- Information on transport agencies, professional groups and associations, including hyperlinks to websites;
- Links to schools and provision of web-based teaching resources for various programs including Transport in Secondary Schools programs;
- Support for learning and knowledge management by creating communities of practice and distributing information across industry;
- A cost-effective Internet service for staff and students;
- Online library catalogues; and
- Initiation of research and development programs.

Informing policy

The information collected by the Gateway will help integrate how organisations access and generate the knowledge to:

- Confirm what businesses of all sizes seek in terms of learning products or services;
- Raise awareness of emerging capability needs or evolving career pathways;
- Better deploy funds to enable identified courses and providers that can support policy initiatives (i.e. regional development or specific sector support such as rail infrastructure maintenance, maritime safety);
- Access information on current initiatives (e.g. opportunities, policies or latest training package information, translation of in-school vocational programs into further learning or work, success of pathways between vocational and university courses);
- Identify duplication of education and training as well as ‘gaps’; and
- Evaluate overall success of interventions in economic development by measuring outcomes caused by resolving market discontinuities and enhancing capability.

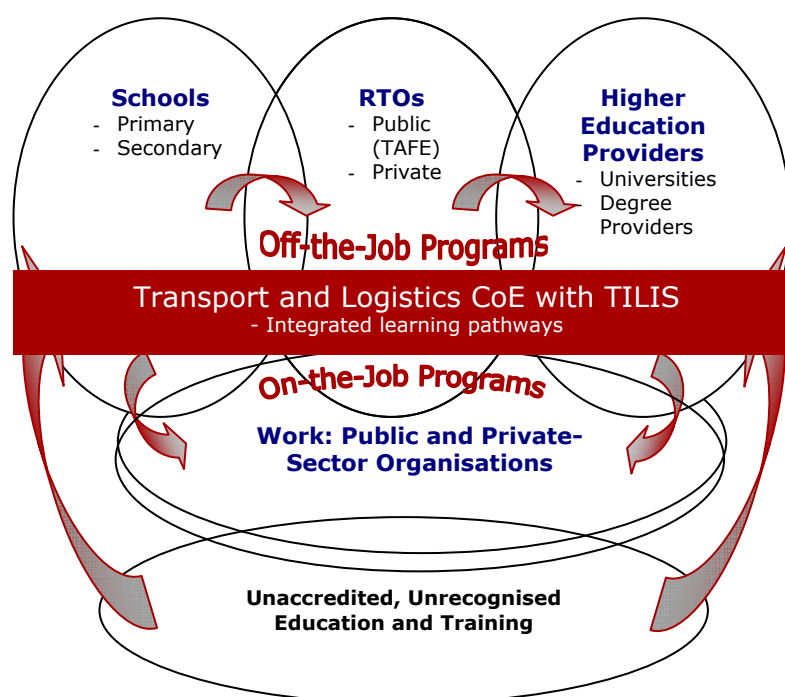
The TILIS Gateway as a market exchange mechanism

The ATU feasibility study and resulting implementation of the CoE includes the development of a Gateway to overcome market discontinuities in how the Australian

education and training market responds to the transport industry. These discontinuities are not necessarily indications of the failure of supplier efforts, but more of problems with the market structure. More specifically they are an indication of industry diversity and how different levels and types of transformation make it very difficult for existing regulated providers to respond to transport education and training market demand. The proposed Gateway should also be 'expandable' to include the online delivery of courses.

As the major initiative to originate from the ATU feasibility study and underpin the CoE initiative, the TILIS Gateway will enable better alignment of market forces. As such, the Gateway will effectively provide a mechanism not only for targeting education and training supply to industry demand, but also for planning and facilitating the processes by which individuals and organisations can best source the education and training required to meet their capabilities and contextual needs.

Figure 3: The ATU Project and TILIS Gateway as a market enabler



The arrows in Figure 3 represent significant discontinuities in the pathways both between the existing education and training supply sectors and between suppliers and industry demand. Resolving the issues associated with the arrows will also address the transport and logistics industry needs for:

- Progressing young people from school to work and school to further education and training;
- Progressing people from applied vocational qualifications and competencies into higher education;
- Transitioning vocational- and university-qualified students into work with not just competencies and learning but also an applied, employable mix of capabilities; and

- Integrating and providing better services and quality for the 50% of learning that occurs on the job and is neither formally recognised nor integrated into the existing national education and training market.

Functions of the TILIS Gateway

Data-driven capability management information systems can be developed within organisations or outsourced to provide capability profiling and management systems that can be benchmarked across organisations. The ATU feasibility study seeks to improve organisational learning that focuses on profiling, mapping and developing capabilities. Implementation of TILIS within a CoE will translate research findings from the feasibility study into a secure service delivering the following:

- Maintenance of a central database of information related to relevant industry, cross-industry and enterprise standards and training packages;
- Establishment and management of quality-assured, accessible and consistent competency reporting and recognition frameworks;
- Transfer of competency attainment by individuals into further training and/or career pathways;
- Tracking and reporting of competency acquisition by individuals, industry area, jobs/occupations, courses/modules, workplaces, regions, etc. (skills passports);
- Mapping and monitoring of enterprise-wide competency levels (by position, groups, occupations);
- Surveying of special capability needs or projects (e.g. OH&S, high-priority skill gaps);
- Provision of an integrated cross-sectorial approach to qualification and career pathways;
- Promotion of an integrated learning delivery platform, which will be compliant with SCORM and other specified regimes that promote interoperability, and will offer improved content and data sharing;
- Tracking and administration of providers, courses and registered assessors; and
- Reporting and trend analysis of competency counts, usage and coverage, training provision, expenditure, etc.

Manipulating capability data

By storing and/or interfacing to information the ATU project Gateway can:

- Maintain and disseminate:
- Capability profiles of individuals, occupations and groups;
- Registers of competency-based training and general education courses relevant to the sector;

- Registers of education providers within general vocational and university sectors (degree, non-degree and unrecognised) relevant to specific courses;
- Registers of training packages and Australian Qualification Framework alignment;
- Registers of competent assessors, providers of course resources, support and related services;
- Maintain, map and link (by matching) available:
- Courses delivered face to face and electronically with assessment required to complete a program/course, by workplace, region and course;
- Learning, capability and competency outcomes by course;
- Analyse and report on:
- The acquisition of capabilities of individuals, occupations, identified communities and sectors by location, course, date, etc.;
- The provision of courses by providers, region, workplace, area (rural/remote), etc.;
- The activity of delivery and assessment by classification (on the job, teachers, etc.); and
- Monitor customer satisfaction by obtaining user feedback on the scope and efficiency of services.

Gateway sustainability

Revenue for the Gateway may be generated by:

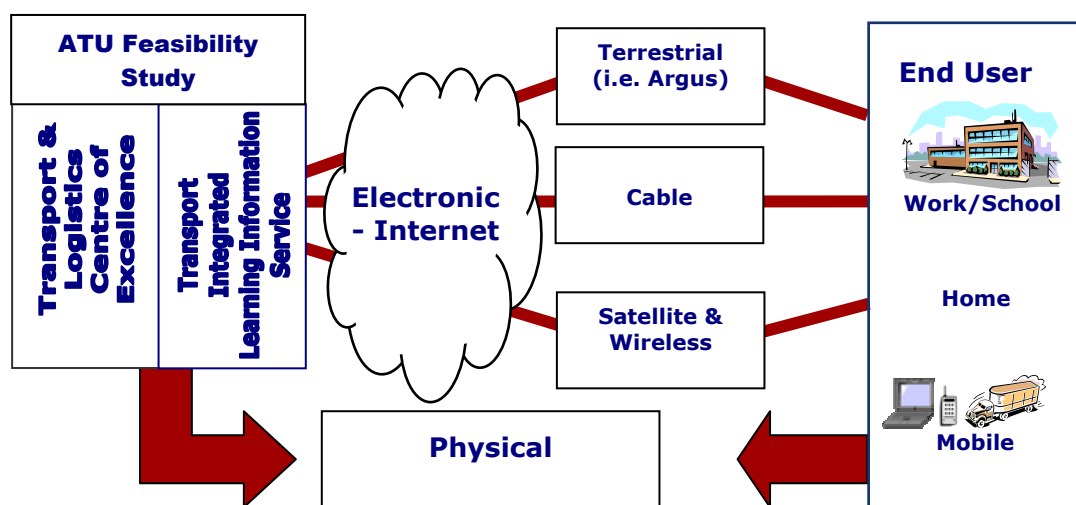
- Licence and brokerage fees from education providers based on student enrolment in courses registered on TILIS;
- TILIS (web portal) registration fees from program providers; and
- Fee-for-service consultancies on matters such as review of training materials, monitoring and reporting quality, surveys and data on satisfaction with courses and providers, and related services.

5. Implications for Elearning

For companies, the ability to use elearning to enhance connections between knowledge capital and productive outputs is important. Elearning can also support change strategies and build unique competitive capabilities. Because industry partners with both state-of-the-art and very limited infrastructure will require access, the design of the supply chain and how content and services are packaged for open access across these different networks are important considerations. For that reason, the TILIS Gateway will be accessible not just via electronic means, but also across a number of different technologies. These technologies include terrestrial networks (dial-up connections, broadband ADSL, fibre optics, cable and such like), satellite and

wireless radio technologies, and physical means (hard-copy reports and content transfer). Figure 4 depicts the basic access, distribution and supply chain design.

Figure 4: Centre of Excellence access and information supply chain



The ATU project, through its relationship with the Rail Infrastructure Corporation (RIC) in NSW, can promote solutions using some of the most advanced communication networks in Australia. The possible networks include Argus's fibre-optic backbone laid along the rail lines and connecting all major and minor physical sites on the rail network. Argus has a direct relationship with the NSW State Government and RIC.

As the NSW Government's physical manifestation of the ATU feasibility study, the future NSW Transport and Logistics Centre of Excellence also has partners (e.g. TAFE NSW and the Department of Education) with investments in elearning content, student reporting systems, content authoring systems, virtual classrooms and technology platforms that can be imported as third-party solutions within a CoE's elearning technology solution.

The proposed TILIS Gateway offers a salient example of an integrated approach to electronic enablement of a sector's education and training needs. It also provides an example of elearning beyond content delivery. Electronic enablement is being used as a means to enhance market exchanges (a business-to-business typology) and as a mechanism to provide the technology and reporting capabilities that are sensitive to infrastructural needs across all organisations, irrespective of location and size.

6. Contact Information

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8. Addendum — Research Implications

While this case study does not explicitly align its findings to the eight Uitas Learning to Elearn principles derived through the initial research, such an alignment has been provided by the research team.

The Transport Integrated Learning Information System (TILIS) has strong relationships with other case studies seeking to implement cross-organisational or trans-regional solutions. It is useful to read this case study in conjunction with others; for example, those on Norway (Case Study 8) and New Zealand (Case Study 9) and, with respect to adoption of technology to enable data exchange within a sector, the Telehealth Tasmania Network (Case Study 12).

This case study has some important research findings. Its central theme is an industry sector's search for the capabilities demanded in the workplace. Those involved in the Australian Transport University Feasibility Study (ATU) and the resulting TILIS Gateway underpin their agenda with a need to augment how existing institutional education and training providers link learning to the performance and knowledge required at an enterprise level and to determine how they can then service the market. The drive to use capabilities, not just skills and competencies, and the need for learning to meet higher order thinking that can underpin industry transformation, reinforce two elearning principles (Elearning Principle 5: *Elearning is a strategic activity that integrates both business processes and technologies. If this thesis is accepted then the need for new elearning metrics logically follows*; and Elearning Principle 1: *Elearning has maximum strategic impact when it is used to enhance both performance and thinking*).

The TILIS Gateway is ultimately not just a market exchange. It is also a means to use electronic enablement to align transport and logistics industry demand for learning with suppliers able to meet this demand, anywhere, anytime and for any user in the industry. Given the current lack of an integrated learning information 'portal', the ATU identified, and the national Australian Logistics Council supported, the apparent fact that no national learning or innovation strategy (such as that which may be advanced under a proposed Centre of Excellence) could provide an integrated approach to addressing severe skill gaps or translating acquired capabilities into areas where enterprises could improve future performance and effect change. While endeavouring to connect existing providers of learning and those having specific demands, electronic enablement also encompasses planning and reporting activities across different educational sectors (schools, vocational/workplace providers and universities) and across different organisations, locations and cultures. TILIS embodies the recognition that any elearning strategy can play a major role in learning strategies that seek to enhance individuals' learning for the benefit of groups of individuals, or multiple organisations, occupations or regions (Elearning Principle 4: *There is a direct and proven correlation between the variables limiting the optimisation of individual and collaborative elearning outcomes and the variables affecting organisational learning, agility and competent performance*).

This case study also addresses two other research principles, as follows.

By adopting a market exchange role, the proposed TILIS Gateway would influence or improve the delivery of flexible learning. This suggests an awareness that TILIS elearning systems and architecture will enhance and complement distance and elearning architecture, content design, delivery, and data capture and reporting systems in place within both learning providers and transport and logistic organisations (Elearning Principle 8: *Elearning systems and architecture must support both the content delivery and the design, learning, evaluation and reporting processes for elearning*).

The market exchange model also assumes a business-to-business model and an electronic enhancement of service processes or transaction mechanisms already in place within the marketplace.

It appears that TILIS will be an important study to monitor because its deliberate national or industry strategy will provide an electronic environment for the enhancement of learning not primarily through content design and delivery, but through integrated services and the capture, exchange and reporting of essential data (Principle 7: *Elearning is an activity that inherently involves service exchanges between humans moderated by technology in an electronic context*).