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Learning online

Benefits and barriers in regional Australia – Volume 1

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Australian *Flexible* Learning Framework
Supporting Flexible Learning Opportunities

flexiblelearning.net.au

Publisher's note

Learning online: Benefits and barriers in regional Australia is published in two volumes. Volume 1 contains the main report, while volume 2, which can be found on the NCVER website (http://www.ncver.edu.au), contains the case studies.

Background

In August 1999, the Australian National Training Authority chief executive officers endorsed the *Australian Flexible Learning Framework for the National Vocation Education and Training System 2000–2004.* The Australian Flexible Learning Framework has been developed by the Flexible Learning Advisory Group and represents a strategic plan for the five-year national project allocation for flexible learning. It is designed to support both accelerated take-up of flexible learning modes and to position Australian vocational education and training as a world leader in applying new technologies to vocational education products and services.

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Executive summary

Online learning has the potential to expand the range of choices available to regional and rural Australia, but little is understood about how opportunities can be promoted and managed in regional communities, just as knowledge of the extent of the uptake of online delivery in regional and metropolitan Australia is uncertain. In regional Australia there are particular challenges to online delivery. Given that so little is known about the uptake and reach of online delivery, policy development in this area is problematic. The literature shows that there is some evidence that suggests that learning that is planned and negotiated with the involvement of local communities produces more successful outcomes, including building social capital in communities.

It is these questions of the extent of uptake of online learning of formal vocational education and training (VET) in regional and metropolitan Australia, the identification of the benefits of, and barriers to online learning for regional Australians, and how online learning and arrangements for its delivery may benefit regional communities, that are at the heart of this study.

For the purposes of this study a clear distinction is made between delivery and learning. Online delivery refers to a range of delivery modes, where being online (for example, email, using WebCT, Blackboard and so on) is a component of, or all of the processes designed for learning. Online learning is defined as learning processes which use online delivery. In addition, it is important to remember that learning occurs in a social context.

This study focusses on 'what' is happening in relation to online delivery in regional Australia and 'why' it is happening. Data on recent and current enrolments in online courses/modules were gathered from eight providers across four states. One provider in each state had its main campus in a regional location. From the quantitative data collected, nine courses were selected for more detailed analysis, one from each provider. Interviews with teachers in these courses supplemented interviews with current and recent students to gain a picture of benefits and barriers related to online learning. Stakeholders in eight communities with one or more students studying the selected courses were interviewed to provide information about the benefits and barriers related to online learning in regional communities.

Summary of findings

There is a lack of consistent, comparable enrolment data which can be used as a basis for resourcing allocation decisions. However, our research highlighted the following characteristics of online learning/learners in regional Australia:

- ✧ There is variation between providers in what they offer online.
- ✧ Online delivery attracts a wide cross-section of students in terms of gender, age and employment status.
- ✧ Student online enrolment patterns vary, but many enrol in only one or two units/modules with an online component.
- ✧ Online students are geographically scattered in relation to the location of the provider campus.

- ✧ Many online students reside in the locality of their provider's campus(es) and attend face-to-face classes for other units/modules.
- ✧ Students in regional areas do not have the luxury of choice from alternative delivery methods to match their preferred learning style (unlike students in metropolitan locations who are not prevented by distance from attending face-to-face classes).

Benefits, barriers and promoters of online learning

Benefits from the provision of online delivery and learning:

- ✧ Study opportunities are provided leading to careers and employment that would have otherwise required students to travel or move away from home, or were otherwise unaffordable.
- ✧ Mature-aged students who previously had little or no computer literacy developed their skills while using a range of computer programs and the internet.
- ✧ For those students who responded well to online learning, skills in problem-solving and greater self-reliance were further developed. These new skills increased confidence.

Barriers to online delivery and learning:

- ✧ Factors limiting access to online learning, such as the cost of hardware and software, a lack of adequate infrastructure in regional areas, poor design and layout of web platforms and inadequate instructions and induction procedures were issues for many students.
- ✧ Learning processes were hindered by subject content difficult to explain online; errors to online material; inadequate or lack of support for students; and confusion surrounding assessment requirements.
- ✧ Lack of interaction with peers (other learners) and insufficient interaction with teachers were perceived as substantial barriers.
- ✧ Learning is also hindered when there is limited support and professional development for teachers and a lack of an institutional learning culture.

Promoters of online delivery and learning:

- ✧ Access is promoted by having good induction processes, preferably some face-to-face contact; students who are self-motivated and have a problem-solving orientation; and encouraging community/industry links to ensure relevance.
- ✧ Learning processes are promoted when there is face-to-face peer and teacher interaction, and teachers are skilled in facilitating bulletin board use.
- ✧ For online learning to be efficient and responsive to the needs of students, adequate resources need to be allocated to professional development for teachers, appropriate industrial arrangements put in place and the practices in registered training organisations should take account of the time teachers spend supporting students.

Online delivery and learning highlights tensions and contradictions in existing systems as well as between the boundaries of stakeholders in the Australian VET system such as registered training organisations, state training authorities, the Australian National Training Authority, policy-makers, funding bodies, teachers and students. In this context the suggestions for further action resulting from this study point to changes to quality assurance systems and the resourcing of online delivery and professional development practices. Online delivery and learning requires not only appropriate resourcing but good change management.

Introduction

Background

Online learning is actively promoted as an important component of flexible delivery (see for example Education Network Australia [EdNA] VET Advisory Group 2000). In 2000 the Australian National Training Authority (ANTA) made the strategic decision to develop technological infrastructure to help ensure affordable access by all communities, learners and employers to online services (Education Network Australia [EdNA] VET Advisory Group 2000). The extent to which this goal has been realised has not yet been identified at the policy level. Futhermore, procedures for the collection of statistical information about those studying online are not yet established at a state or national level, and vary from institution to institution.

Australian Government policy has placed increasing importance on flexible delivery, and more recently on online delivery. The potential advantages of online delivery have seen it marketed as a universal 'fix-it' although ANTA qualifies this claim:

> There is a tendency to see the opportunities offered by rapid advances in communication technologies as a panacea to flexible delivery. These new technologies will create a greater range of training options. They will provide some solutions to barriers. However, they need to be applied within a broader approach which is aimed at solving the rigidities inherent in the VET sector. (ANTA 1996, p.3)

A range of supporting infrastructure, particularly broadband technologies, as well as skills and knowledge, are necessary to make the best use of these technologies for online delivery (ANTA 1996). ANTA points out that the new technologies will be most useful:

- ✧ where users have access to the hardware and software and are confident in its use
- ✧ in providing access to information and resources
- ✧ in improving interaction between tutors and learners.

Previous research, such as that summarised in Kilpatrick and Bell (1998), has identified benefits and barriers to learning using information technology and advanced technology. They note that, while the growth of information and communications technology and advanced technology will increase the access to education and training for people in non-metropolitan Australia, it has its own set of barriers which relate to cost and physical provision of reliable equipment and infrastructure (including technical support), and training of teachers and students to maximise the benefits of technology. They also identified individual learning styles as an issue to be addressed in this context.

Online learning has the potential to expand the range of choices available to regional and rural Australia, but little is understood about how opportunities can be promoted and managed in regional communities, just as knowledge of the extent of the uptake of online delivery in regional and metropolitan Australia is uncertain. However, there is some evidence that suggests that learning planned and negotiated with the involvement of local communities produces more successful outcomes, including building social capital in communities (OECD 2001; Centre for Research and Learning in Regional Australia 2000a, 2001; Hugonnier 1999).

It is these questions of the extent of uptake of online learning of formal vocational education and training (VET) in regional and metropolitan Australia, the identification of the benefits of, and barriers to online learning for regional Australians, and how online learning and arrangements for its delivery may benefit regional communities, that lie at the heart of this study.

Aim

The purpose of the study is to investigate the extent of uptake of online delivery in regional areas by comparison with metropolitan areas and the benefits deriving from online learning and barriers faced by those living in regional areas.

The objectives are to:

- ✧ map the extent of uptake of online learning delivered by providers in regional and metropolitan areas of four states
- ✧ investigate the benefits of online learning for individuals and communities in regional areas
- ✧ investigate the barriers to effective use of online learning by those living in regional areas
- ✧ report and make suggestions towards overcoming barriers and promoting online learning opportunities in regional areas.

What is online learning?

Online learning is a component of flexible delivery, and like the term 'flexible delivery' has multiple understandings of its meaning. Brennan, McFadden and Law (2001, p.12) suggest that definitions of online delivery can be as broad or as narrow as the predispositions of the author, concluding that there is a lack of rigour about the definitional base which underpins the term. Evans and Deschepper (1998, p.107) define online learning as something as simple as email contact between tutors to something as sophisticated as video conferencing. They suggest it can be technology-rich, interactive CD or print-based manuals with access to online references, tutorials, email and so on. They do emphasise that it is not a replacement for face-to-face contact. Harper et al. (2000, p.6) in their study note the greater importance on the processes enabled through the use of communications technology than on the nature of the software used. They suggest there is an attraction to the new possibilities for:

> … any-time, any-place access to information and the new opportunities for contact and interaction. (Harper et al. 2000, p.6)

Booker (2000, p.4) defines online delivery as that which includes existing print materials converted into HTML text and graphics which are placed on the server, either an internet or intranet site. Discussion groups are then set up for interaction between students and lecturers and for assessment processes. This model, she suggests, can be used for either a whole course or parts of courses and as an adjunct to other media.

For the purposes of this study a clear distinction is made between delivery and learning. Online delivery refers to a range of delivery modes where being online (for example, email, using WebCT, Blackboard and so on) is a component of, or all of the processes designed for learning. Online learning is defined as learning processes which use online delivery. We recognise that learning is a socially situated activity, where the relationship between what the individual learns and the situation and context in which knowledge is acquired and used, shape individual and collective understanding and practice.

Why online learning?

Flexible delivery of vocational education and training is perceived as a significant means of accelerating Australia's transition to the information economy (Education Network Australia [EdNA] VET Advisory Group 2000, p.7). Discussion about the reasons for moving to online learning is often contested, but intrinsic to such discussion is the changing nature of work within the context of globalisation. Such changes increasingly require workers to develop new skills and develop these skills within an ever-changing employment environment. It is argued that Australia requires well-trained, skilled workers to compete effectively. During the late 1980s and 1990s, unions, industry and government worked together, not always harmoniously, making fundamental changes in awards, industrial agreements and to the role of training. As a result, training is an integral part of career structures. There is a growing acceptance worldwide, that vocational education and training is a vital component of economic strategy (Gonczi 1992, p.2). As Marginson (1993, p.26) states: 'the integration of education policy with economic policy' has repositioned education as an arm of economic policy and part of the social process of commodity production (Marginson 1993, p.20).

Increasingly, responsibility for learning new knowledge and skills and keeping up to date has been placed on the individual. While the essentials of developing a highly skilled, flexible and motivated workforce (Phillips Curran 1997, p.3) remain the same, the focus has now shifted to the development of lifelong learning opportunities for all (Kearns et al. 1999, p.vii), a response to operating in a knowledge economy and global markets. Online learning offers increased flexibility for individuals and organisations to meet their training needs—if they have access to the technology and the appropriate skills and support to use it. These changes have placed significant pressure on the VET sector to meet these demands (Trood & Gale 2000, p.4).

On a more pragmatic level, online delivery, it is argued, is more efficient, less costly and has the potential to provide a unique environment for teaching and learning (Corbett 1999). It is a unique means of providing rapid feedback to learners (University of Illinois 1999; see for example Frederico 1999, who highlights the need for feedback). Furthermore, it promotes interaction with materials, interaction between learners and between learners and their teachers (Make et al. 2000).

Despite the increased policy push towards online delivery (Trood & Gale 2000), there are considerable challenges facing online delivery, and particularly online delivery within VET.

Challenges for online delivery

The vocational education and training sector, the last twenty years or so having undergone substantial and constant change and development, is a complex area. Changes have included:

- ✧ the purchaser–provider split resulting in public and private providers competing, often within tight markets
- ✧ moves to competency-based training through to the development of training packages with national accreditation, co-existing with different policies and protocols in each state
- ✧ a focus on the language of the market, of outputs and outcomes (NCVER 2000)
- ✧ an emphasis on the client, be it 'industry' or the learner
- ✧ industrial relations changes.

Changes in the nature of work (see for example, Hall, Bretherton & Buchanan 2000; Owen & Bound 2001), changing expectations of learners and technological changes, have made increasing demands on all connected with this industry.

Online learning, one of the most recent and profound initiatives in the VET sector, brings with it the additional challenges of:

- ✧ meeting the skills and knowledge requirements for using and accessing the technology for learners
- ✧ issues of accountability and quality
- ✧ meeting the particular needs of rural and regional Australia.

Technology

The successful delivery of large-scale, effective, and reliable online distance education depends heavily on:

- ✧ the continued rapid development of digitally literate and well-supported users
- ✧ effective desktop computing capabilities (both hardware and software)
- ✧ further growth in affordable broadband network connections from homes and businesses to the public internet
- ✧ the continued evolution of the internet into a high-bandwidth global network over all national and global information technology infrastructures (Corbett 1999).

Vogel and Klassen (2001) claim that broadband internet, which provides a platform for sophisticated multimedia interactive applications, is becoming increasingly available, although it is still limited. They note that most interactive websites seem to be developed by instructors or students without specialised knowledge or training in multimedia development. Oliver and Omari (2001) suggest that students undertaking online learning experience considerable difficulties with the technology in terms of access, broken web links and long download times.

Institutions, to assist online learners, should inform them of the level of hardware and software required for participation and ensure their organisation has the internal technological capability to service learning via the internet (James 1999, p.208). James also recommends that learners be provided with introductory courses to enable them to become familiar with the use of online learning environments.

Quality and accountability

There is a question mark over whether market-driven indicators for quality standards will meet accountability demands (Corbett 1999). Within the market framework, competition has been adopted as the key principle for re-organising the financing and delivery of VET programs and services (Anderson 1997, p.1). Given the framework of the market, the issue of accountability is one for students, teachers, providers, industry, and relevant government agencies. Relying on the market also leads to tension in terms of resources and infrastructure, particularly for rural and regional Australia. Many rural and regional areas rely on the public provider, and Anderson argues that these facilities may be at risk.

Resource requirements for more flexible delivery options, such as online, are very different from classroom delivery which has higher requirements for resource development, and different facilities (ANTA 1998, p.2). Funding based on contact hours is a barrier to these forms of delivery.

Regional and rural Australia

Extensive interviewing in regional Australia in 1999 and 2000 (Centre for Research and Learning in Regional Australia 2000a, 2001) found a very low but gradually increasing use of online learning by those living in these regional areas. The apparent low penetration of online learning is confirmed by the National Centre for Vocational Education Research (NCVER) Student Outcomes Survey (2001) which shows that only 2.2% of all graduates, regardless of residential location, experienced some

online delivery. Over a third of graduates experienced multiple delivery modes, but online was the majority mode of delivery for only a tiny 0.8% of this group of graduates (NCVER 2001, p.191).

Benefits of flexible delivery in regional areas, including online delivery, identified in a Centre for Research and Learning in Regional Australia (2001) study included providing an educational option for youth to enable them to remain in the locality, and course customisation that achieved flexible and relevant training in workplaces. However, respondents reported that the quality of flexible training varied widely. Moreover, the benefits of online learning are not restricted to younger people. Recent Centre for Research and Learning in Regional Australia work with senior citizens learning online has found that, consistent with international studies such as Mott (2000) and Manheimer et al. (1995), many seniors are actively embracing online learning and deriving considerable personal and health benefits from that learning (Millar & Falk 2000; Hazzlewood & Kilpatrick 2001).

In many rural industries and non-metropolitan communities there is a lack of a tradition of education and training (Kilpatrick & Bell 1998). People and businesses with little experience of education and training lack confidence as consumers of education and training (Selby Smith, Selby Smith & Ferrier 1996). The Centre for Research and Learning in Regional Australia (2001) found that the isolation imposed on students in rural and remote locations by wholly or largely self-paced learning can be detrimental to learning outcomes. Specific groups do not relate well to flexible delivery. These include Indigenous people, migrants, middle-aged and people with learning difficulties. This study found a long list of reasons why students experienced problems accessing flexible delivery, including online delivery. These included lack of computer skills, preference for face-to-face learning, inadequate literacy skills, being accustomed to a traditional classroom environment, unable to negotiate courses and lack of confidence. It seems fair to say that online delivery in regional Australia has particular barriers to overcome.

The uptake of online learning

The extent of online implementation within the Australian VET sector overall is difficult to gauge—largely because of a lack of published information and the adoption of different models of implementation (Harper et al. 2000, p.9). Farrell (1999, p.4) identifies four categories of organisations using online technologies for course delivery:

- ✧ institutions involved in open learning
- ✧ educational institutions traditionally using face-to-face or classroom-based delivery
- ✧ the corporate sector providing workplace training
- ✧ private individuals providing niche or highly targeted training.

Many vocational education and training providers are using online delivery as an adjunct to other forms of delivery; that is, combining it with face-to-face delivery, with distance and on campus in computer suites. Other providers still use only some components of online delivery such as email and conferencing (Booker 2000, p.7).

In some states, online activities are dispersed, with individual institutes pursuing their own online projects. Limited funding for online development and a tendency to allocate resources to specific projects were proposed as reasons for a low level of online implementation. In other states development has been more centralised or resources have been focussed on a major initiative, making the extent of online delivery easier to assess (Harper et al. 2000, p.9).

As Brennan, McFadden and Law note, the problems of getting a snapshot of the extent of online delivery largely relate to the varying definitions of the term (2001, p.20). In addition, accurate data on the extent of online delivery of education and training in Australia are hard to find, and the data

that are available are sometimes confusing and contradictory (Brennan, McFadden & Law 2001, p.19). At this stage there is no national collection of statistics of courses delivered online or data on the number of students participating in these courses, since neither the NCVER nor the Australian Bureau of Statistics holds firm statistics (Brennan, McFadden & Law 2001). While lists of online courses are available from institutions, there is little information about the extent to which they are being used, by whom and in what ways (Brennan, McFadden & Law 2001, p.19). This situation is indicative of the early evolutionary stage of online learning.

Some studies have made claims about the degree of uptake in a general sense. These claims are contradictory, and in some cases not based on firm statistical data. In a review of the literature and of online courses available Harper et al. claimed that:

> While its extent is hard to gauge, and while significant on-line activities are evident in every State and Territory, on-line delivery in VET is yet to become a mainstream activity.
>
> (Harper et al. 2000, p.16)

Yet Trood and Gale (2000, p.7) comment that the uptake of flexible delivery has been disappointing. They suggest that the successful development of flexible delivery programs across the VET sector is more dependent on the informal, personal networks of vocational education and training practitioners than on the dissemination initiatives of government. In mapping the extent of uptake of online delivery of eight providers across four states, this study begins the process of addressing a significant gap in our knowledge of online delivery.

Research questions

The following research questions underpinned this study.

- ✧ What is the residential location of current and recent students of regional and metropolitan providers in four states (Queensland, Tasmania, Victoria and Western Australia) whose study mode(s) include(d) online, and what are the levels and fields of study of their courses?
- ✧ How do these data compare with the location of face-to-face delivery and other delivery modes of the same modules/courses in those states?
- ✧ What are the benefits to individuals from online learning in selected courses in terms of the learning experience, and work and other outcomes? Does this vary according to where students live?
- ✧ What are the barriers to individuals in making effective use of online learning for selected courses? Does this vary according to where students live?
- ✧ What are the benefits to regional communities from online learning?
- ✧ What barriers do communities face in making effective use of online learning?

Methodology

The study reported here used a multi-method, iterative research design that moved from a quantitative mapping of 'what' is happening in relation to online delivery in regional Australia to a qualitative examination of selected cases to investigate 'why' it is happening. Data on recent and current enrolments in online courses/modules were gathered from eight providers across four states. One provider in each state had its main campus in a regional location. Table 4 on page 23 lists the providers, the number of online students, the number of courses and types and levels of courses. From the quantitative data collected, nine courses were selected for more detailed analysis, one from each provider, with the exception of Challenger TAFE where two courses were selected because of small course enrolments. Where available, summaries of existing course evaluations for selected courses with an online component, and interviews with teachers (14 interviews) in these courses

supplemented interviews with current and recent students (115 interviews) to gain a picture of benefits and barriers related to online learning. Stakeholders in eight communities with one or more students studying the selected courses were interviewed to provide information about the benefits of and barriers to online learning for regional communities (11 interviews).

Limitations of the study

This study has collected data from technical and further education (TAFE) institutions and VET-in-schools programs only. Private providers are not represented in the data. The researchers experienced considerable difficulty locating private providers, particularly in Tasmania and other regional areas. The reason given to us by providers in regional areas for not undertaking online delivery related to the considerable capital costs required. Although the researchers are aware that a number of large enterprises deliver training using online environments, we chose not to include these providers as they have been studied elsewhere.

Structure of this report

Volume 1 begins with an overview of what is known from previous research about the benefits and barriers of online delivery and learning in order to identify issues that may be different in regional Australia. It goes on to map the online delivery of the eight providers who took part in this study. The experiences of students and teachers in nine courses delivered by the providers are analysed in detail in the following chapter. The report concludes by discussing the implications of the study findings and suggested directions for future policy and practice. Volume 2, which can be found on the NCVER website (http://www.ncver.edu.au), contains case studies of each of the nine courses.

Benefits and barriers of online delivery and learning

Introduction

The previous chapter discussed the environment in which online delivery is being advanced. This chapter will focus on the learning processes of online learning as identified from the literature. Since this study has as a major theme the benefits and barriers to online learning and delivery, the literature has been organised on this basis—under the topics of infrastructure provision for online delivery and learning, and learning processes and skills for teachers and students. Online delivery in regional communities is another significant theme and this topic is discussed under the heading of collaboration in regional communities.

What is afforded through infrastructure provision

Infrastructure or structural and cultural factors within an institution are important determinants of delivering benefits or creating barriers. The context, or environment within which an institution operates is also a determinant of achievable outcomes. Table 1 summarises the benefits to online learning of appropriate infrastructure provision and barriers to the provision of online learning.

Culture and structure determine the degree to which an organisation accommodates its environment and the ways in which it responds (Tosi, Rizzo & Carroll 1995, p.35). O'Reilly and Chatman (1996, p.160) explain that culture is a social control system based on shared norms and values that set expectations about appropriate behaviour and attitudes for members of the group. Social control is anchored in both a formal system such as rules, procedures and organisational hierarchies, and in personal relationships. Organisational culture can be viewed as a system of shared values defining what is important, and norms defining appropriate attitudes and behaviours (O'Reilly & Chatman 1996, pp.164–6). Institutions delivering online learning develop norms and values—culture—and structural arrangements for students, teachers and others involved in online programs.

Structural and cultural factors important in shaping online programs include:

- ✧ systems
- ✧ culture
- ✧ external factors
- ✧ technological capability.

This section will discuss systems and culture. External factors and technological capability were discussed in the preceding chapter.

Table 1: Benefits and barriers afforded by infrastructure

Benefits	Barriers
Participation is not bound by time and space (Harper et al. 2000; Holt et al. 1998).	A cultural shift in terms of resource allocation and pedagogy may be required e.g. allocation of resources for professional development and appropriate systems (Weller 2000); administration systems (Corbett 1999).
Its flexibility meets the needs of students with work, family and community commitments (Harper et al. 2000).	The technology can be unreliable and technical difficulties are experienced by students and staff (Harper et al. 2000).
Has the potential to meet the ongoing and rapidly changing needs of workers (Corbett 1999).	Broadband networks are not universal (Corbett 1999).
	Infrastructure costs are high for learners and institutions. Recurrent costs of some technologies often exceeds start-up capital (Harper et al. 2000).
	Resource needs increase, due to a higher need for resource development.
	Funding based on contact hours limits capacity and capability (ANTA 1998).

Systems

Systems may include administration systems, professional development processes, reward systems for staff, evaluation, tools and systems and work practices. These formal systems and the written and unwritten rules and procedures relating to them provide support or otherwise for online learning. Administration systems such as the library, academic counselling, career counselling, financial aid, registration and student support (Corbett 1999) all need to be in place and geared to distance students rather than to face-to-face students. In a pilot study in the use of computer mediated communication conducted in the Open University, Weller (2000) found that the administrative system assumes face-to-face contact and support structures have been developed within this model.

> Computer mediated communication operates on a model that is not geographically restrained, and therefore has a different set of needs that may be difficult to fit into the administrative structure. (Weller 2000)

Schrum (1998, p.59) points out that, to succeed as providers of online courses, institutions must address issues of faculty incentives, access and equity, credit decisions (accreditation recognised by other bodies), ongoing evaluation, and technical support for students and teachers. Long-term success depends largely on recognition in the promotion and tenure process for faculty who create and teach online courses. In his study, Weller (2000) proposes that:

> A shift towards a computer mediated communication based tutorial model means that many of the existing organisational structures and practices are no longer applicable, or at least need considerable modification … It is the author's contention that the problems encountered during this pilot study arose where there was conflict with the existing culture which is based around the notion of physical presence. (Weller 2000)

Work practices such as counting preparation as part of an instructor's load are critical factors (Schrum 1998, p.59). Harper et al. (2000, p.21) found that there was an awareness of the way new technological and pedagogical approaches impact on work practices, but little response had been received from management.

Culture

Institutional cultures may hinder or enhance online delivery. Where innovative practices are valued, integrated into reward systems and recognition is given that time is required for design and development (Schrum 1998, p.59), online delivery may be enhanced. What is valued pedagogically and is resourced appropriately will shape the degree of interaction. What is now being described as a

constructivist approach (that is, where learning is seen as an active process, with learners constructing new ideas and concepts based on their current or past knowledge), where interaction, democracy and learner control are valued, 'will not just happen automatically and magically' (Holzl & Khurana 2000). Holzl and Khurana add that institutional support is required for change. Similarly, decisions about the balance between social and academic content in interactive online environments will be determined by cultures and their structures.

Where there is appropriate provision of infrastructure, including support for teachers, and support of student learning, online delivery provides flexible arrangements for study, allowing students to juggle work, family and community commitments and also to choose where they study, be it at home, work or elsewhere (Harper et al. 2000, p.26). The saying that online learning is not bound by time or space becomes a reality under these circumstances.

Learning processes and skills

There is an assumption in much of the literature that learning online is interactive, dialogic, democratic and collaborative (see for example, James 1999, p.206; Nowak 1998, p.118; Lally & Barrett 1999, p.153). However, these processes must be designed into online learning programs and experiences if learning processes and skills are to be enhanced. Learning to learn for example, involves the explicit and conscious application of learning strategies and related cognitive processes in extracting meaning and transferring it to other settings. This involves both inductive and deductive thinking and thinking in systems (Moy 1999, p.9). Teachers and students require skills different from or, in addition to those used in face-to-face interaction (Cahoon 1998). This section explores the skills learners need, and skills teachers need to create and teach in online environments.

Table 2 sets out the benefits of online learning where it is interactive, and the barriers created by online learning processes.

Table 2: Online learning processes and skills—benefits and barriers

Benefits	Barriers
If online learning is interactive it can reduce the isolation of distance learners (Lally & Barrett 1999; Harper et al. 2000).	Interaction must be designed in (Snewin 1999).
It has the potential to provide additional skills for learners in collaboration, co-operation (Oliver & Omari 2001; Schrum 1998).	Students may not have adequate literacy and computer literacy skills (Harper et al. 2000).
Additional information technology skills (Make et al. 2000).	
It can lead to greater control and responsibility towards learning (Schrum 1998) challenging learners to develop new skills and reconceptaulise their identity as learners (Harper et al. 2000, p.25).	Observation and intervention are more difficult than in a face-to-face context (Chen et al. 2001).
An interactive, well-facilitated online environment can assist in the development of critical, reflective thinking (Holt et al. 1998).	Requires appropriate hardware and software skill development for staff and students. Students and teachers may not be familiar with online learning environments (Lally & Barrett 1999; Eastmond 1995).
Online learning can facilitate the development of metacognitive skills (Frederico 1999; Oliver & Omari 2001).	Students may not have the necessary metacognitive skills (Frederico 1999).
Learners have time to formulate responses and may therefore participate more than in a face-to-face environment (Holt et al. 1998, p.49).	Silent ('lurking') participants remain invisible to the group (Holt et al. 1998).
Everyone can see everyone else's contribution and build on them (Holt et al. 1998).	Coping with the volume of online data may be overwhelming (Holt et al. 1998).
	Loss of face-to-face interaction affects development of group identity (Holt et al. 1998).

Note: Learning styles and orientations influence positive or negative responses to online learning

Online learning processes

As with any group interaction, attention to group processes is required to create an effective learning environment. Participants need to know and understand appropriate forms of interaction and of the possibilities and limitations of the particular environment to gain the most from it.

Online learning is most appropriate when employed within a framework of 'co-operative goal structure' (Lally & Barrett 1999, p.153–4). This exists when students can only obtain their goal if their fellow students also obtain their goals. In this environment student interaction becomes an integral part of learning. Lally and Barrett (1999) also suggest that, because the development of each individual in an online learning community may be more dependent upon the community as a whole, learning in an electronic environment may depend significantly upon group processes and, in particular, 'notions of social cohesion and co-operation'.

In their study of 16 first-year medical students using email accounts, asynchronous computer discussion facilities and with readings on the server, Lally and Barrett (1999) also reported passive participants. They conjecture that this may have been due to 'communication anxiety' referring to technical anxieties and fears about the appropriateness of style, tone and content of the message. Cognitive maturity, or being unfamiliar with the co-operative approach to learning were additional explanations proposed. Their suggestion for effective participation is that there must be some degree of commitment to the group and to the co-operative principles of learning. Moreover, there is a need for the community to accommodate such anxieties and provide a 'safe' framework. Online groups were not supportive of all participants, and discussions sometimes became more competitive than collaborative. It appears necessary for students to develop strategies for managing peer behaviour and meta-context. Eastmond also reported that some students found these conversations time-consuming, disjointed, time-delayed and intimidating. Eastmond (1995) reported that students experienced little interactivity when they did not keep up with or contribute actively to discussions.

Barrett and Lally (1999), using the same database as in the previous study, found that there were gender differences in participation and collaboration. Although women's participation increased as a result of formal events, men contributed more and longer messages. They suggest that men and women may take different roles in online processes, for example, men's messages included greater levels of social exchange whereas women's messages were more 'interactive' as they included implicit or explicit references to previous contributions (Lally & Barrett 1999, p.52).

Participant reflection in a web conference may be greater because of the ability to read an entire sequence of postings while composing a response. Holt et al. (1998) in their research into an online journalism course noted that students had time to reflect on their responses and by reading the responses of others, evaluated their own beliefs and feelings.

Learning behaviour also appears to be influenced by the purpose or orientation with which students approach online learning. Frederico (1999), using a quantitative approach to survey 234 naval postgraduate student volunteers and Kolb's learning style inventory as an analytical tool found that:

> Students with assimilating [reflective observation and abstract conceptualisation] and accommodating [concrete experience and active experimentation] learning styles demonstrated significantly more agreeable attitudes toward varied aspects of network-based instruction than students with converging [abstract conceptualisation and active experimentation] and diverging [concrete experience and reflective observation] learning styles. (Frederico 1999, p.376)

'Learning orientation' largely determined the extent to which students found computer conferencing activity important (Eastmond 1998). Those who saw learning as a means of mastering an external body of knowledge found the online course less important than those whose aim in learning was to construct personal meaning through interaction with course content and their peers.

Motivation is an issue with which educators have long been concerned. There appears to be little reference to the considerable body of literature on motivation to understand the ways in which being online affects learning and motivation.

Learner skills

Skills that served experienced students well in the classroom are inadequate for learning via the world wide web (Carlson et al. 1998, p.144). To exercise learner control in multimedia environments, individuals must develop and employ the appropriate cognitive skills, in addition to those typically applied in ordinary instructional settings (Frederico 1999, p 665).

> The development of these skills is centered around one's ability to make mindful navigational selections. While the ability to control one's instructional sequence can enhance learning and heighten attitudes and self-efficacy, unrestricted control and lack of learning goals can dampen the power of learning in such an environment. (Lawless & Brown 1997, p.127)

This has obvious implications for students who do not have the necessary metacognitive and cognitive skills. Many students, particularly low achievers, lack the knowledge and motivation to make appropriate decisions regarding such conditions as pacing, sequencing of content, use of learning aids and amount of practice (Chung & Reigeluth 1992, p.14).

> … students who do not possess the required cognitive and metacognitive characteristics will likely need guidance or coaching in order to exercise effective and efficient learner control for navigating multimedia subject matter. (Frederico 1999, p.666)

Therefore there is a need to feed back information on learning performance and make suggestions to assist students in developing these skills.

Even when online communication tools are available and accessible they are not necessarily used unless there is a requirement to do so. Harper et al (2000, p.22) found there was a lack of structured activity or facilitation to focus discussion and a lack of interest because students did not see a need to communicate as tasks were not required for assessment. A number of the respondents to their research reported that they were not utilising communication tools in online environments.

The nature of the student community, the skills that students bring to that community and the skill of the facilitator are clearly important factors in online learning—just as they are in other learning environments.

There are a number of important advantages of online learning when students have the necessary skills and the learning experience is designed for challenge and interaction. In a quasi-experimental design comparing an online psychology course with the traditional lecture courses, Make et al. (2000, p.237–8) found that students in online courses reported higher increases in computer use and greater decreases in computer anxiety. Online students did more interactive learning with the computerised exercises and claimed they had to work harder than in other courses. Design influenced by principles of situated learning, using constructivist pedagogies which encourage students to construct their own meanings and emphasise the importance of interaction and socialisation among learners can increase problem-solving, critical thinking and metacognition (Holt et al. 1998, Oliver & Omari 2001).

Teachers involved in online learning need to be aware of the additional skills students require for online learning environments.

Teacher skills for delivering learning online

The creation of online learning environments and teaching in them requires specific skills and knowledge. Teachers and other staff involved in online development need support in developing the necessary skills and knowledge to design in (Eastmond 1998; Khan 1997) interactivity, dialogue,

reflectivity, student control and collaborative learning. Skills are also required to facilitate these processes online. Aspects of online learning which teachers need to be aware of encompass the following:

- ✧ Time is needed for a sense of group identity to emerge (Lally & Barrett 1999, p.155).
- ✧ Social and interactive contributions increase with increased contact over time (Barrett & Lally 1999).
- ✧ Participation in chat rooms is slow to start and requires formal structures to encourage such participation (Snewin 1999).
- ✧ Meaningful feedback using the web is especially problematic (Khan 1997, p.319).
- ✧ Some students prefer one-to-one contact (Khan 1997).
- ✧ Students value interaction with 'instructors' particularly when they respond quickly, keep the class discussion on track and are readily available for individual attention (Eastmond 1998, p.37).
- ✧ The teacher needs to take an active role to keep dialogue alive and provide discussion points which assist in the creation of a socially cohesive group (Weller 2000).
- ✧ Assessment is best integrated into online activities (see for example University of Illinois 1999; Vogel & Klassen 2001) so that learning is assessed as it is happening.

Oliver, Omari and Herrington (1997) recommend that pedagogical strategies for the design of online learning include:

- ✧ carefully planning group composition
- ✧ requiring learners to provide feedback on their outcomes in order to maintain focus and ensure completion of learning activities
- ✧ introducing learning activities after learners become familiar with the WWW environment
- ✧ employing more adaptive forms of scaffolding for selective assistance.

The role of the teacher in online environments has been described as that of a 'moderator' (Feenburg 1989). The role can be summarised into three parts—contextualising functions, monitoring functions and meta-functions. The role of the first two functions is to compensate for the absence of any physical cues. For example students' comments may be monitored to assure that all are participating and they understand the meeting mode. Metacognition is needed to resolve problems and comments are needed to summarise the state of a discussion and provide a sense of accomplishment and direction. Teachers require considerable skills to develop learning tools and processes and to facilitate the development of generic skills. They also need the capacity to assist students to develop skills to negotiate their learning in and through online environments successfully.

Group participation is enhanced by making the role of group members explicit. Oliver and Omari (2001) in their study suggest it is necessary to define intermediary steps in the problem-solving process and place these against defined roles. They also suggest providing a private bulletin board for each group within the whole group as a means for students to record the roles and activities of each group member. Other sources recommend the use of some form of face-to-face or at least phone contact early in the course for students to 'get to know each other'. This has a positive impact on participation (Snewin 1999, p.321).

Technological expertise is also required of those teaching in online environments. For example, it is far more difficult in an online environment to observe and intervene appropriately than in face-to-face learning situations. It is difficult to know when students are not participating, and what cognitive strategies are being used. Chen et al. (2001) suggest that using a data-mining tool provided by database management systems can assist teachers to identify learning behaviours.

Such an in-depth knowledge of information technology suggests that the development of teams of teachers with content expertise, and technological expertise, administration and support staff (Harper et al. 2000, p.23; Schrum 1998, p.60) is desirable.

Any planning for the use of the internet must include provision for investment in staff in the form of training (Sobski 1997). Staff need time and training to become familiar and comfortable with the technology and time to meet the specific teaching requirements of online facilitation. Online environments require considerable time commitments from teachers together with appropriate resourcing and professional development. Changing and influencing professional practice does not happen overnight.

Collaboration in regional communities and online delivery

In regional Australia there is a need for collaboration between registered training providers serving small markets across dispersed isolated centres and individuals. The greater need for collaboration in regional Australia to assist in overcoming a range of barriers to online learning is highlighted in the conclusions of the Else and Hicks study (1998) which examines the feasibility of technology in the delivery of vocational training in remote North West Australia. While the conclusions do suggest that learning online is feasible in this remote region, it emphasises that it will only be effective if the following issues are addressed:

- ✧ low levels of computer literacy
- ✧ low levels of general literacy
- ✧ prohibitive costs of the technology and its unreliability
- ✧ limited meeting of community needs due to lack of customisation of curriculum
- ✧ limited support for the programs from local tutors and mentors.

Collaboration between registered training organisations, other relevant organisations and government at all levels is an important means of addressing these issues. Table 3 lists the benefits of collaboration in regional communities and the barriers to collaboration taking place.

Table 3: Benefits and barriers for regional communities

Benefits	Barriers
Clients have an improved level of information about available training providers and programs and providers have improved knowledge of client need (Kilpatrick & Bound 2001).	Small markets with institutions delivering across dispersed isolated centres (Centre for Research and Learning in Regional Australia 2000b; Kilpatrick, Fulton & Bell 2001) within a competitive environment driven by a market economy (Marginson 1993).
Providers can adapt to the constant change that continues to take place in the rural community (Kilpatrick, Fulton & Bell 2001).	There is a lack of infrastructure in rural and remote areas (Harper et al. 2000).
Course development can be managed in order to accommodate, respond to and possibly lead towards wider changes in the community (Taylor 1997).	Lack of shared purpose (Centre for Research and Learning in Regional Australia 2000b).
Enhanced uptake of new practices because learning is directly relevant to participants and the community (Kilpatrick, Fulton & Bell 2001).	

The Centre for Research and Learning in Regional Australia (2000b) study into the role of VET in regional Australia provides examples of regional communities working together, communities such as Broken Hill, Port Lincoln, Ceduna, Orbost and other sites providing learning opportunities within the community. Factors which facilitated collaboration include:

- ✧ a culture of working together

- ✧ co-ordinators of training often government department personnel working with farming communities or local council community workers
- ✧ access to resources such as a building providing a focal point.

Barriers to collaboration include tension between competitors, which requires information to be kept confidential, and collaboration which requires information sharing. Other features working against collaborative training arrangements include the small size of the community, funding arrangements and the structure or procedures of the group and the lack of shared purpose (Centre for Research and Learning in Regional Australia 2000b, p.29). Kilpatrick, Fulton and Bell (2001, pp.18–19) also note these inhibitors and adds further inhibitors to effective collaboration:

- ✧ insufficient continuity of programs or local personnel
- ✧ a lack of understanding of each group's cultures
- ✧ a lack of understanding or clarity of purpose.

Conclusion

As with other delivery modes, collaboration in delivering online learning appears to be growing and is particularly important in regional communities. Contrary to those who perceive online learning as the panacea for the future, there is no evidence to suggest that online learning is better than other forms of leaning for students or that it is cheaper for students or institutions. There is evidence to suggest that learners require sets of skills not necessarily found in face-to-face learning situations. Situated, constructivist pedagogies provide opportunities for the development of critical thinking, problem-posing and problem-solving, collaborative learning processes, strategies for managing peer behaviour online and for navigating and decision-making in an information-rich environment. Teachers in online environments need to be mindful of these requirements and build in processes to manage interaction and develop skills. Designing in these factors is critical to success and may require a commitment and resource allocation to professional development for all staff involved in online learning development and implementation. Structural and cultural factors within institutions are important determinants of a commitment to online learning. Only by attending to these factors is it possible to deliver on the many benefits of online learning. While there are benefits to online learning, there are also many barriers which must be overcome if this form of delivery is to successfully facilitate quality learning.

Mapping online delivery

Introduction

Using data collected from the eight providers, this chapter reports on the uptake of online delivery. Data from 1654 students, enrolled in 8373 units/modules, is discussed in relation to the residential location of students—how distant they are from their provider and characteristics of student study patterns. The data relate to all units/modules delivered by the eight providers in 1999, 2000 and 2001 which had an online component, with the exception of the Tasmanian rural schools, which commenced online delivery of community services only in 2001.

Five of the eight providers offered a wide range of fields and levels of study online, while the other three had more specialised offerings. Bendigo and Tropical North Queensland Institute of TAFE delivered the most units/modules, while Bendigo and TAFE Tasmania had the largest numbers of students studying online (see table 4).

Finding 1: There is variation in the scope of online delivery by providers in both regional and metropolitan areas.

Table 4: Provider online delivery

Provider	No. of students	No. of units/ modules	Online courses	Levels of main online courses
Bendigo Regional Institute of TAFE (BRIT) Victoria	552	4462	Wide range, including horticulture, harness racing, modules in electrical and electronics, mining safety, information technology	Certificate II, III, IV, Diploma
TAFE Tasmania (TAFE Tas)	393	367	Wide range, including call centre, information technology, business, fire-fighting, tourism, hospitality, building, library technician, engineering, law	Certificate II, III, IV, Advanced diploma
Tropical North Queensland Institute of TAFE (TNQIT)	167	1927	Wide range, including information, business, hospitality, tourism, workplace training, nursing	Certificate II and III
Central West College of TAFE (CWCT) Western Australia	173	640	Wide range, including information technology, business, tourism, hospitality, visual arts and technology, children's services	Certificate II and IV
William Angliss Institute of TAFE (WAI) Victoria	158	263	Hospitality VET-in-schools	Certificate II
Challenger TAFE Western Australia	123	244	Wide range, including business management, agriculture, offender management, information technology, maritime operations and assessment and workplace training	Certificate II and III
Wide Bay Institute of TAFE Queensland	58	220	Hospitality and tourism, small business management and workplace training and assessment	Certificate IV
Tasmanian rural schools (TRS)	30	250	Community services VET-in-schools	Certificate II
Total	**1654**	**8373**		

In collecting data on the number of students enrolled in online learning and their characteristics, we found that each provider used different procedures and different definitions of what was meant by online for collecting this statistical information. Most providers had to run special programs to retrieve data that pertained only to online delivery. This was supplemented in many cases by verbal information from the departments teaching the relevant courses. Inconsistencies in information recorded and difficulties in retrieving data from record systems are exemplified by the situation whereby one provider recorded a number of courses as online when the only online component was a bulletin board and chat room to supplement communication in what were otherwise print-based distance courses. Providers used unit/module codes not recognised by the National Training Information Service in a wide range of courses, indicating considerable variety in ways of recording modules and units.

Finding 2: The use of multiple procedures and criteria for the collection of statistical information about those studying online (and by other modes) makes it difficult to build an accurate picture of the uptake of online delivery.

Provider and student characteristics and student study patterns

An analysis of the data found that students enrolled in online learning had the following characteristics and study patterns:

- The largest group of students are studying at certificate IV level (34%). Many of these students are also undertaking units at certificate II and III level. Only two providers, Bendigo and TAFE Tasmania, have more than a handful of students studying at diploma or advanced diploma level (see the appendix, table A1).
- The spread of fields of study varies according to provider. Across the eight providers, services, hospitality and tourism is the most common field of study (27% of all students), followed by engineering and surveying (21%) (see table A2 in the appendix).
- Over a third of students studying online are employed. (It should be noted that employment status is unknown for 32% of students.) TAFE Tasmania has the highest percentage of students who are employed (60%), Wide Bay has the highest percentage of unemployed (29%) and William Angliss the highest percentage not in the paid workforce (42%), reflecting that this is a VET-in-schools program.
- Student gender breakdown by provider generally reflects provider specialties. For example, at the Tasmanian rural schools which offer traditionally female-dominated, aged, child and disability care courses online, 93% of the students are female, while at Bendigo, which offers traditionally male-dominated, electrical, mining and harness racing, 85% are male. The sample has slightly more males (56%) than females (44%) (see table A3 in the appendix).
- All age groups are represented, with a quarter being less than 20 years of age, partly due to the VET-in-schools emphasis of William Angliss. Bendigo and Central West both have approximately one-third of their cohort aged under 20. Students 65 and over made up 8%, and there were students aged 80 and more (see table A4 in the appendix).
- Two-thirds of the students had no previous post-school qualifications, although education levels were unknown for 30%.
- Student online enrolment patterns vary, but many (52%) enrol in only one or two units/modules with an online component. Twelve enrolled in more than 50 modules over the three-year period (see table A5 in the appendix).
- The contact hours of units/modules with an online component ranged from 1–2130 hours. Most units and modules were between 15 and 39 hours. Tasmanian rural schools, Bendigo and TAFE Tasmania had a higher proportion of units/modules with longer contact hours, consistent with their diploma and advanced diploma courses (see table A7 in the appendix).

- ✧ Only four of the providers were able to supply unit/module completion status for a substantial proportion of the units/modules with an online component. Students had withdrawn from 14.2% of units/modules with known status. About half the units/modules that were not yet complete were 2001 enrolments, the year the data were collected.

Location of students: Rural or metropolitan?

The sample is biased toward students residing in rural postcodes (as defined by the classification used by NCVER), as is to be expected from the location of the providers and the focus of the study on online learning in regional Australia (see table 5). However, with the exception of the Tasmanian rural schools, the regional providers all have students who live in capital cities and in distant rural and remote locations, and the city-based providers have students living in rural and remote areas.

Bendigo and Central West, situated in rural areas, have a high percentage of rural students. William Angliss on the other hand, situated in the city of Melbourne has nearly three times more metropolitan students than rural. This is also the case with Challenger which has campuses in Perth. Tropical North, with campuses in Cairns and smaller centres in far north Queensland and Wide Bay with campuses at Bundaberg, Hervey Bay and Maryborough (all classed as rural) have about half of their online students living in metropolitan centres. Further analysis of postcodes shows these students are mainly in Brisbane and to a lesser extent, Townsville.

Table 5: Student residential location by provider

Provider	Metropolitan	Rural	Remote	Total	
	%	%	%	No.	%
Bendigo	4.9	93.8	1.1	**552**	**100.0**
Tropical North	47.3	42.5	8.4	**167**	**100.0**
William Angliss	75.3	22.8		**158**	**100.0**
TAFE Tasmania	48.1	50.9	*	**393**	**100.0**
Tasmanian rural schools		100.0		**30**	**100.0**
Central West	3.5	80.3	16.2	**173**	**100.0**
Challenger	90.2	9.8		**123**	**100.0**
Wide Bay	51.7	48.3		**58**	**100.0**
Total	**33.9**	**62.5**	**3.0**	**1654**	**100.0**

Notes: * cell count less than 6.
Unknowns account for differences in the totals.

All providers have some 'local' students who reside in the same postcode area as the provider's campuses or adjacent postcode areas. Overall, just over half the students fall into this local residential category. The proximity of some students to their provider reflects the fact that many units/modules are from courses that were not offered entirely online, as discussed in the next chapter. Sixty-nine students were studying with interstate providers (see table 6).

A significant number of students studying online had a choice of delivery modes. Some 35% of students from the nine courses had access to nearby providers offering face-to-face delivery. These providers included other TAFE institutes, colleges, group training organisations, community houses and so on. Of this 35%, 46% had the choice of more than one provider, with up to six within some postcodes.

Table 6: Student proximity to provider

Provider	Local**	Same state, not local	Interstate	Total	
	%	%	%	No.	%
Bendigo	49.3	49.1	1.4	**552**	**100.0**
Tropical North	26.3	64.1	7.8	**167**	**100.0**
William Angliss	62.7	35.4		**158**	**100.0**
TAFE Tasmania	42.0	47.6	9.9	**393**	**100.0**
Tasmanian rural schools	100.0			**30**	**100.0**
Central West	83.2	15.6	*	**173**	**100.0**
Challenger	78.0	21.1	*	**123**	**100.0**
Wide Bay	22.4	67.2	10.3	**58**	**100.0**
Total	**52.2**	**43.1**	**4.2**	**1654**	**100.0**

Notes: * cell count less than 6.
** local refers to the same postcode as a campus of the provider, or an adjacent postcode.
Unknowns account for differences in the totals.

Finding 3: Online students are geographically scattered in relation to the location of the provider campus. Many online students reside in the locality of their provider's campus(es) and attend face-to-face classes for other units/modules. Online learning is a choice for most students in metropolitan locations who are not prevented by distance from attending face-to-face classes.

Student characteristics by residential location

There is little difference in highest previous education level according to the residential location of the students (see table A7 in the appendix). However, despite the influence of the metropolitan VET-in-schools students from William Angliss, metropolitan students are slightly more likely to have post-school qualifications.

Gender, age and employment status by residential location are heavily influenced by the gender, age and employment status composition of the providers' student cohorts and the location of their students. For example, a large proportion of Bendigo's student body is male, under 20 and lives in a rural area. Bendigo has the most students of all the providers in the study. Hence a larger proportion of the male students overall are in rural than metropolitan areas. Similarly, a larger proportion of rural than metropolitan students are aged under 20.

Study patterns by residential location

The pattern of field of study by residential location largely reflects the fields of the units/modules delivered online by the providers, and the residential spread of their students (see table A8 in the appendix). Of interest is the relatively large proportion of the remote students studying science and information technology (18 out of 49 or 36.7% of remote students, compared to 10.1% of all the students). The pattern of Australian Qualifications Training Framework level by residential location also reflects the online delivery of the providers.

Finding 4: Student characteristics and study patterns by residential location reflect provider online offerings and the make-up of their online student cohort.

Conclusion

The research was hindered by the use of multiple procedures and criteria for the collection of statistical information about those studying online (and by other modes) and by differing definitions of online.

There is variation between providers in what they offer online. Online delivery attracts a wide cross-section of students in terms of gender, age and employment status. Student online enrolment patterns vary, but many enrol in only one or two units/modules with an online component. Online students are geographically scattered in relation to the location of the provider campus. Many online students reside in the locality of their provider's campus(es) and attend face-to-face classes for other units/modules. The data suggest that online learning is a choice for some students in metropolitan locations who are not prevented by distance from attending face-to-face classes.

Nine courses

Introduction

The nine courses selected for interviews reflect a range of delivery modes, levels and fields of study. Five of the courses were delivered using mixed mode (a combination of online and face-to-face delivery) with two of these courses having moved from 100% online to a mixed mode of delivery. Four courses were delivered 100% online. The data for this section are based on interviews with teachers, students and community stakeholders from nine courses, detailed in table 7. A case study of each course appears in volume 2.

Table 7: Nine online courses

Provider	Course	Nature of online delivery
1	Electronics course cert IV	two modules are 100% online, but provided in an optional classroom context, the remainder of course face-to-face
2	Information technology cert IV	100% online
3	Hospitality (operations) cert II	100% online in classroom, supplemented by teacher–mentor, practicum at institute
4	Telecommunications (call centres) cert II/III	some modules partly delivered online (mixed mode), remainder of course face to face
5	Visual arts and technology cert III	one module 100% online, remainder of course face to face
6	Community services cert II	all units/modules mixed mode, plus work placement
7	Small business cert III and Information technology (web-design) cert IV	both 100% online
8	Assessor and workplace trainer cert IV	100% online

Institutional support of student learning and of teachers

Support for student learning

Support of student learning involves far more than supporting students through difficulties in overcoming hardware or the operation of software, it requires collaborative learning strategies that produce deeper learning of concepts, theories and the co-creation of knowledge (Treleaven & Cecez-Kecmanovic 2001, p.170). McKavanagh et al. (2002, p.9) suggest that good teaching in web-based, flexible learning will involve 'engaging learners in rich conversations'.

Outcomes from these collaborative approaches to learning include developing generic workplace skills such as communication, and skills required to develop and participate in self-managed teams (Donaldson & Topping 1996; Gibbs et al. 1994), collaborative interchange and experiential learning (Kolb 1984). To achieve these outcomes, teachers require support and considerable skills (see for example, Montague & Hopkins 2002).

The mixed-mode delivery courses in this study involved face-to-face interaction between teacher and peers, with regular opportunities for students to work through and engage in conversations in relation to information technology problems and course content. Students from these courses all used email, and although bulletin board discussion was available, many did not use it, as it was not designed into the learning activities. Only two courses incorporated online dialogue and interactive learning activities.

Communication for the 100% online delivery courses was conducted online and via phone. Information technology support was provided by the institution that organised online delivery for the particular state (Western Australia or Queensland), and content support was provided by teachers of the institute facilitating the course. Although bulletin boards were available, they tended not to be used, again because learning activities did not require peer exchange. Email between teacher and student was the major form of communication. This was generally used to clarify the meaning of terminology or instructions.

A considerable number of students from mixed-mode delivery courses and the 100% online delivery experienced various degrees of frustration. The tensions between the reality and student expectations are highlighted when there is a total dependency on the teacher as the only source of clarification and when that teacher cannot easily be approached during, before or after class. The situation is exacerbated when there is no communication between peers. This was the case in all the 100% online courses. Typical responses from students included:

> I had one [teacher] … when you enrol he actually emailed back saying hey, I'm responsible for this subject but that's the only time—that's once it ever happened, all the rest has just been confusion. They don't know who's doing what—so it's a bit confusing on that point of view.

and

> It was so frustrating. I mean when you've got a lecturer or a tutor, you can go to them and ask them questions, but on line you have to email them, then they email you back and this can take a week. Because one of them—the [name of city] lecturer was as slack as anything. You're flat out getting an answer back from him.

The opportunity for students to learn by engaging in 'rich conversations' appears to be limited, particularly in courses which are 100% online. The provision of bulletin boards and chat rooms does not mean participation will follow. Participation and engagement require attention to the design of the learning experience.

Teachers

The overriding perception is that teachers are concerned to provide quality learning experiences but struggle to do so within the confines of institutional requirements, lack of support and the need to meet state and federal administration requirements. It was not unusual for teachers to express disappointment at the lack of professional development in how best to deliver online, how to interact with students online, and how to make learning 'easy or fun'.

In this study many teachers spoke of their nominal online learning delivery time being allocated to duties other than teaching, so teachers were considered not to be 'taking a class'. One course was an exception to this with the allocation of teaching contact time of one hour per student over the whole course. Even this allocation was found to be insufficient to meet demand by students. Others had seen colleagues' hours cut back once they began facilitating online delivery, because these teachers 'did not see students'.

Teachers undertake multiple forms of delivery and reported that management has a poor grasp on the time required to effectively deliver online:

> I look after trainees, so I'm out and about all the time—I could be gone for two days at a time. If I have to go out and visit a regional trainee, then I could be away for at least two days.

> So yes, there is a problem there in that for me being involved in teaching online, also delivering face-to-face material and also dealing with trainees as well, it is difficult for me, even though I might sit down and allocate a certain amount of time each day for looking after, I can never guarantee that I'm going to be able to commit to that time. That's been my number one concern and I think it's also management doesn't necessarily understand just how long, just exactly what's involved.

Many teachers were aware of the need for dialogue, but were locked into the confines of the program or lacked the pedagogical and/or information technology skills or time and support to develop more interactive courses. Typical teacher responses to the limitations of online delivery include:

> There's lots of technical difficulties … trying to get it so it's user-friendly … You can throw stuff on like a page of text, but to make it friendly to use and sort of meaningful—more than just a page torn out of a book and stuck on a screen, is actually quite hard.

and

> There is so much you don't know or feel online. There's no body language, none of that sort of thing to give you that effective feedback. I don't sense at any stage I developed any personal contact with the people just purely through an online process and I'm always more inclined to have a chat to them on the phone and see where they're at, get to know them a little bit, get a picture of their background where they are working and so on, so that you can at least be somewhat in tune with their needs and where they're coming from.

For teachers interested in developing online materials, funding is not available, nor is there allocation of time and other resources. For example, one teacher who offered to develop resources in his own time, asked the institute to fund the costs of accessing the institute's online resources from home, and was 'laughed out of the boardroom'. Another teacher who had undertaken postgraduate study in online learning requested his HECS (Higher Education Contribution Scheme) fees be reimbursed as he had developed resources for the institute during his studies. This request was denied.

Online delivery appears to be a 'lonely' act where teachers spend increasing amounts of time in front of their computers, and less time interacting with each other. Not one of the teachers interviewed indicated there was support in the form of peers working together either informally or formally. There appeared to be little opportunity for reflection, expression and exploration of frustrations, highlights, and concerns.

Many teachers interviewed in this study had limited professional development in delivering online. The information technology skills required for this type of delivery were either gained through the only professional development offered—how to access web-based platforms—or through self-development or study of online delivery undertaken through a university.

Most teachers interviewed worked with online courses or units designed by others. Those who did have design input had limited time to further develop or make the learning experience more interactive. To deliver quality learning experiences to their students, teachers need appropriate time, skills, resources and support.

Design of online learning

This study highlights a number of issues in relation to the design of online learning, including:

- ✧ the need for collaborative learning and peer interaction
- ✧ limitations of electronic communication

- ✧ student motivation, learning styles and skills
- ✧ assessment issues.

Collaborative learning and peer interaction

Many teachers view online learning not as a single learning strategy but as one of many strategies. One teacher suggested that it's 'like cloning yourself in the classroom' allowing [the teacher] to provide students with individualised attention and use a range of classroom management techniques. This preference for mixed-mode delivery is because of the recognised need for peer interaction and the difficulties of effectively designing this in and maintaining it for 100% electronic environments.

In this study only two courses (call centre course and the visual art unit in visual arts and technology, both mixed-mode delivery) had online interaction designed into their content. Most other courses did provide bulleting boards but did not require students to use it. Consequently there was very limited use of this facility. In the two courses nominated above, the teacher would post discussion points, with most students participating in the subsequent discussions. Both these courses received an overwhelmingly positive response from students who enjoyed both the bulletin board discussions and the motivational contact with their teacher. Online dialogue in the call centre course was used as a means of keeping focus and motivation, as well as intensifying the learning experience between weekly face-to-face class sessions.

> What I [the teacher] also do is I try to set them additional tasks each week which will be related to what we do in class face to face. So it's either reflection on what we've done the previous week and/or in preparation for the coming week. So they've got school holiday homework which is to answer a couple of customer queries they think went wrong or what would they do better, and in class the first day back we'll actually have a talk about those scenarios and they have to post their discussions on the website during the holidays. And I've done that most weeks, tried to get the students to maintain that momentum. I'm finding it's a long time between classes.

Both these courses appeared to apply elements of Salmon's five-step model in e-moderation (Salmon 2002). Salmon suggests that to effectively facilitate online interaction, considerable time is required to establish access and motivation. Time is also required for online socialisation (in these courses this took place face to face). Subsequently there is a stage where information exchange begins to take place, followed by the construction of knowledge and development.

The need to design these stages into online delivery and also to facilitate problem-solving processes requires a range of skills for teachers. For example, a teacher of electronics noted that, while they have good information technology skills, they do not necessarily have adequate knowledge about learning processes in online delivery. So then if you get:

> Non-technical people [developing graphics and putting it on the web] they don't have the technical expertise to make it sensible either, so you need a good mix to actually make a clever design.

Limitations of electronic communication

Electronic communication is problematic, requiring many conversational turns over time to clarify and problem-solve. It was considered not a 'very clever way of trying to solve a problem'.

> Most of the time when people don't understand concepts it works best if there's one to one, you know, with someone assisting them verbally or graphically or whatever, next to them.

Many students, but particularly those enrolled in the 100% online courses, repeatedly commented on the slowness of communication. One student withdrew from her course because she preferred not to communicate online and the cost of phone calls was prohibitive.

Mixed-mode delivery does provide opportunities for addressing these limitations. The call centre course offers an example of how the combination of online and face-to-face contact can provide both rich conversations and reflection.

Communication between student and course instructions and design on a web board can be limited by lack of accuracy, clear layout and clarity of explanations. It was not unusual for students to report on instances of instructions which they found confusing. This was particularly the case for newly developed courses, where there were often wrong default settings, resulting in student answers being marked as incorrect in some of their assessment items—although their response was correct.

Student motivation, learning styles and skills

Student motivation and participation may depend significantly upon group processes and, in particular, 'notions of social cohesion and co-operation' (Lally & Barrett 1999). In the electronic environment many students lack the knowledge and motivation to make appropriate decisions about learning processes, such as conditions like pacing, sequencing of content, use of learning aids and amount of practice (Chung & Reigeluth 1992, p.14). Students also require skills to navigate multimedia environments effectively and to exercise control. There is a need for teachers to feed back information on learning performance and to make suggestions for routes that assist students in developing these skills.

The most common reasons students chose online learning in this study were because it provided flexibility in managing study, work and or family commitments, it allowed them to 'work at their own pace', and/or because it was the only way the course or unit was offered.

Students who enjoyed online study and completed courses quickly and successfully describe themselves as motivated and organised. A small number of these students also indicated they did not find it necessary to take part in online discussions. Often these students completed their courses in less than the generally specified time. For example, one student studying information technology completed a six-month course in ten weeks.

Teachers added to the list of characteristics of online students who thoroughly enjoyed online learning, the need for a problem-solving orientation and being self-reliant. The ability to be organised, and have a problem-solving orientation is more than attitude, there are specific skills required. Many students did not have these skills, they preferred the structure provided by face-to-face contact and/or the motivation provided through the face-to-face dialogue. The opportunity to take part in an ongoing dialogue was an important factor in motivation for many students. This student gives what was a typical response:

> It was—like you had to be really motivated to do it, and sometimes it was hard not actually having a class, because you couldn't discuss things much.

Assessment

Assessment items ranged from objective tests to essays and videoing or the design of web pages as demonstrations of skill development and knowledge application. Mixed-mode courses, such as the electronics, hospitality, and community services courses required practical work at the institution, or in the case of community services, in the workplace. Most courses included multiple-objective tests, designed to be computer-marked. Incorrect default settings caused considerable frustration.

There was little evidence of assessment items requiring collaborative activity in most courses in this study. Students were not always clear on what was required for assessment.

These findings indicate that design of learning experiences/courses needs to address the development of 'the group', and teachers need to apply their facilitation skills to the online environment. Teachers require a range of pedagogical strategies and knowledge on how best to use them in online environments. When designing learning experiences online, it would seem that this is best done with a team of personnel which includes teachers, those with technical expertise and if required, content expertise, with assessment being integral to the learning experience.

Regional students

In this study more distant students experienced greater frustration than those closer to their provider. The sources of frustration ranged from technical difficulties, lack of or inadequate induction, relatively poor computer literacy skills, time delays associated with asynchronous communication, to not being able to gain clarification of a problem easily and quickly. Those courses delivered 100% online had the least interaction designed into the course, and students here experienced the greatest difficulties in gaining continued access to and support from teachers. The further away students were from their provider, the less likely was their experience of online learning to be positive.

Teachers of mixed-mode delivery courses noted that, in some instances, the more remote students were potentially disadvantaged compared to metropolitan students.

> Some of the other schools, and they're more regional ones, to some extent we have lost some of them because they may have only had small numbers and it's the remoteness, where there's that kind of—that lack of contact. A number of schools have problems with their system maybe slower than ours because of the restrictions on their systems in the schools …
>
> There was one—it was a school in the sticks and the teacher's wife was sick a lot and he was never around too often, I think they really didn't know quite who to turn to in the end, so they probably weren't kind of being kept on track and they do need to have somebody who says, 'Have you submitted this work today'.

These data add further evidence to the mapping data which illustrate that metropolitan students have greater choice of delivery modes. Regional students are more reliant on online delivery, and require greater support and the creation of opportunities for interaction to assist with motivation, and completion.

Communities and online delivery and learning

The community services course was an excellent example of co-operation between organisations within one small, rural town. The town has a committee of representatives from the council, local businesses and public infrastructure, all of whom provided work placements to facilitate the VET-in-schools program. The committee works through issues ranging from occupational health and safety, the workbook, and workers' compensation. Contact and dialogue between the local school and organisations offering work placements is ongoing.

Committee members interviewed were strongly of the view that these programs (there was a range of courses offered through the VET-in-schools program) were important in enabling young people to stay in the community for longer, and with the potential to gain employment locally. This was also the case for the many mature-aged students in this course.

> Employment is an issue, we're in a depressed socio-economic climate anyway and being a rural area there's inherent issues around unemployment and isolation, access to services generally or access to training and opportunities.

Stakeholders reported that having local people to draw on was important, as locals were committed to the growth of the area and remained with the organisation for some time, with many taking the opportunity to work through the possible career paths now available to them. These people provide a ready source of recruitment without the additional travel costs that outsiders would need to bear.

> By employing local people you get a commitment to the community because they live here and are committed to the growth of the area and to the facility, so normally you find they stay with you for quite some time. And they are also more likely to advance, to go on the pathway. So because of what they've already accomplished, then they get confidence to move on. So it actually is a ready source, if you like, of employees.

The call centre course had developed strong links with industry. The program director explains that the development of these industry links provides ready opportunity to respond to industry needs.

> We had a situation just recently whereby an employer was concerned that we were offering these prerequisite units in total because it really jeopardised their funding for traineeships … most of the students that do gain employment go through as trainees. Industry are suggesting to us that we don't offer the full core, we offer not all of the core but we can add an elective to that course which would mean that they would still be entitled to their full funding. It is quite important to employers and we need to take that feedback on board. So statewide we've made a decision just recently to offer an elective instead of one of the core units. We're working with industry not against industry and it doesn't jeopardise our students' prospects of getting employment in a job. So quite—we're very industry driven. We need to be. Our reason for being.

The program works with industry to design customised training, although the degree of customisation is limited due to the requirements of the training package.

Historical relationships built over a number of years have led to an ongoing dialogue on an informal basis, so that the employers feel there is the capacity for input into the course. Respondents reported that having local people with the necessary skills provided positive outcomes for the firm and for the state. The link between industry and an educational institution was highly valued for the opportunity provided for exchanging information and developing a sense of support within the industry, since, in a regional centre, there is little professional specific peer support.

Developing relationships with industry through work placements or a culture of responding to industry needs assists in employment outcomes for students, and provides the rationale for developing community linkages. Despite this, other courses had limited or no contact with their local or industry community. The VET-in-schools hospitality course had some links to industry to help students enter a career path. Other community representatives expressed interest in online learning and the opportunities it could bring to their communities, but were unable to comment on specific courses, or in many cases, specific providers.

To assist community involvement, institutions are to be encouraged to develop ongoing relationships with local and regional organisations to meet the needs of the local community more adequately. In this context there appears to be a role for client-focussed training brokers (see Kilpatrick & Bound 2001) to assist clients to establish self-sustaining relationships between client (individual and organisation) and provider.

Benefits, barriers and promoters

As identified earlier in this report, there are many benefits to be derived from online delivery, just as there are major barriers to be addressed, if effective learning through online delivery is to be realised. The following section sets out the barriers and benefits identified from examination of the experiences of students and teachers in the nine courses, and identifies a number of factors which promote online learning.

Benefits

Positive outcomes from the provision of online delivery and learning included study opportunities leading to careers and employment that would have otherwise required students to travel or move away from home. These courses included electronics, hospitality and the VET-in-schools community services course. This latter certificate I/II course offered through the VET-in-schools program was open to all in the community and attracted many mature aged students. For many students, costs and time constraints meant that study would not have been possible without online delivery. The community services course was an excellent example of study opportunities leading to work in the local community. Many rural communities are depressed, and not surprisingly, their youth, and often whole families, leave to seek further study opportunities or work.

Mature-aged students who had little or no computer literacy developed their skills in using a range of computer programs and the internet. Improved information literacy skills resulted in many mature-age students proudly reporting they could now assist their children with homework by searching the net for information. For those students who responded well to online learning, skills in problem-solving and greater self-reliance were further developed. These new skills increased confidence. Confidence also increased as a result of undertaking study and working towards or gaining a qualification in the students' chosen field.

Opportunities for study and potential employment were increased for students undertaking study in subjects or courses not locally available. The lower cost of online study compared to travelling to access face-to-face delivery, increased study opportunities for some students.

Online learning provides a number of benefits to learning processes, not least of which is increased flexibility in juggling multiple demands and responsibilities on student time. One student noted that:

> You can do it in your pyjamas while you're stuffing your face with a cream bun!

Some courses are particularly suited to online delivery, and given the nature of the work for which students are training, online learning almost becomes a requirement, as in the call centre course. Furthermore, online learning better suits the learning style of some students—they are able to work through the material quickly. For others online learning allows time to think about the materials and not to feel pressured. The benefits of online delivery and learning are summarised in table 8.

Table 8: Benefits of online delivery and learning

Outcome	Increasing opportunities	Learning process
Career, study and employment opportunities not otherwise available	Being able to study a course or subject not otherwise available	Flexibility of pace, time and place of study
Keeps some students in their rural communities for longer	Training available in a depressed area with no other opportunities for training	Online delivery is an excellent way of learning some work-related skills (e.g. call centre work)
Improved information technology skills, better information literacy	Cost savings for students	Learning to learn online
Students develop independent learning skills		Able to express 'voice' online; where there is not necessarily time in the classroom
Increased confidence		Suits learning style of some students

Barriers

Barriers to online learning centre round the lack of, or an inadequate, national industrial relations system covering teachers. The lack of institutional cultures of online learning also presents a significant barrier. Student access to online learning is decreased or even denied in the absence of adequate national and institutional systems and cultures enabling teachers to support their students. National industrial relations arrangements are predicated on traditional classroom delivery and permanent employment, conditions which are becoming increasingly outdated and irrelevant. Barriers identified from investigation of the nine courses are set out in table 9.

Table 9: Barriers to online delivery and learning

Access issues	Institutional culture and national system issues	Learning processes hindered
Cost of home computers	Inadequate teacher skills	Inadequacies of platform for subject content
Information technology and bandwidth problems	Poor understanding by management of requirements to support online learning	Minor errors in material are major impediments to learning
Poor layout and unclear instructions	Insufficient professional development	Insufficient/inadequate support for students from institute
Lack of clear instructions on how to study and about assessment processes and requirements	Not enough teacher time allocated	Slow response to student emails, no phone contact from teachers
	No resources to replace teacher, e.g. when ill	Lack of information about what was required for assessment
	Lack of peer interaction	Inadequate feedback on assessment

Promoters

There was evidence of a number of factors promoting online learning and delivery (see table 10). Access for students is increased when induction processes take place face to face and students are clear about expectations and requirements. When course design allows for limited or no peer and teacher interaction, students need to be self-motivated and well organised—to have the 'right' learning style. A number of courses had excellent links with industry in the local community, increasing employment opportunities as a result. It is easy to overlook student pathways to local, accessible employment when students are not physically present and 'local' is many locations. Factors which support online learning include an appropriate platform which allows interaction and enables teachers to track students and 'intervene' as required. The call centre course and visual art unit provided good examples of teachers promoting discussion through bulletin boards and structuring or designing discussions into their teaching. As identified in the previous section, institutional support in the form of adequate resource allocation is essential for successful online learning.

Table 10: Promoters of online delivery and learning

Access	Resources	Learning process
Good induction	Teacher's skills and professional development activities	The suitability of the platform
Student motivation and having the 'right' learning style	Time allocated by institution for teacher	Face-to-face peer and teacher interaction
Culture encouraging industry links		Teacher encouragement and modelling of bulletin board use

Conclusion

Quality learning experiences depend on institutions ensuring well-resourced support for students and staff. The lack of support teachers have identified indicates a need for the establishment of learning cultures and professional development structures which provide support, skills and knowledge.

The further away students are from their provider, the less likely their experience of online learning is to be positive. Regional students, largely reliant on electronic communication, require not only interaction and collaborative learning, but also benefit from face-to-face contact or at least regular telephone contact with teachers and fellow learners. There continues to be potential for collaboration between provider and community to meet the needs of both the community and the learner.

Implications and suggestions for further action

Introduction

> There are few bridges between the online experiences of teachers, students, designers and policy makers … The new technologies make for new ways of doing, being, working, seeing, responding and thinking. These changes and their ripples need far greater levels of institutional and professional support and evaluation if they are to deliver one-tenth of the promised educational and training advantages. (Brennan, McFadden & Law 2001, p.17)

The introduction of online delivery and learning—a new tool for learning—necessarily highlights tensions and contradictions in existing systems. It also highlights tensions and contradictions in the boundaries between the network of interacting bodies which constitute the Australian VET system, bodies such as registered training organisations, state training authorities, the Australian National Training Authority, policy-makers, funding bodies, teachers and students. As a new approach, online delivery and learning demands not only appropriate resourcing, but good change management.

The findings discussed above and in the previous chapter reveal that:

- ✧ Consistent, comparable enrolment data are not available, and different institutions use different definitions of online.
- ✧ Online learning is a choice for some metropolitan students who are not prevented by distance from attending face-to-face classes.
- ✧ Students in regional areas do not have the luxury to choose from a number of alternative delivery methods to best match their preferred learning style.
- ✧ Institutional support and learning cultures impact on the learning experience of the student.
- ✧ Teachers generally feel unsupported by their institutions.
- ✧ Course design, particularly with new courseware, requires quality control.
- ✧ Courses which incorporated interactivity along with face-to-face contact were received much more positively by students than courses without or with limited interaction.
- ✧ Regional needs are not necessarily best met by online delivery.
- ✧ Awareness of online delivery by local community organisations is limited.

The data also showed that considerable changes are required of funding bodies and institutions delivering online learning if the benefits of online delivery are to be fully realised. This section explores the policy implications for addressing the above points.

Data collection

The findings from this study support the claim made by Brennan, McFadden and Law (2001, p.19) that it is extremely difficult to find accurate data on the extent of online delivery of education and training in Australia, and that available data are sometimes confusing and contradictory. In

collecting data for this study it was evident that, not only did different providers collect and organise data differently, but they had different definitions of online delivery and the understanding of 'online' varied from department to department within institutions. Brennan, McFadden and Law also state that there is a 'lack of rigour about the definitional base' of online delivery.

Implication

Without adequate data collection methodologies, there is limited information on which to base the allocation of resources.

Suggested action

That an agreed definition and formats for data collection be designed and implemented.

Institutional culture, structure and support

This section addresses both student and teacher needs in relation to culture and structure.

Students

Montague and Hopkins (2002) posit that, to deliver effective support to learners, there needs to be appropriate organisational features and learning cultures within the institution. In this study students experienced a wide range of frustrations with online delivery—from a lack of induction or inadequate induction, operational instructions that were not clear, instructions and design too advanced for student computer literacy skills, to unclear explanations of material and concepts. In the 100% online courses, interaction was generally limited to emails between teacher and student, and in some instances, assessment requirements were unclear. A number of students also found it difficult to make contact with their teacher. Others withdrew because they could not build and sustain the self-motivation required. In the 100% online courses students did not have contact with each other, and were therefore unable to gain motivation and reassurance from their peers.

Choy, McNickle and Clayton (2002) found that learners indicated the support they require includes:

- ✧ comprehensive orientation programs in a variety of modes
- ✧ allocation of a mentor who remains with them throughout their study
- ✧ clear statements about what they are expected to learn and assessment requirements
- ✧ resources in a variety of modes, including hard copy.

Meeting the needs of online students requires different skills from teachers. Weller (2000) points out that teachers have an active role to play in keeping online dialogue alive, and in the process, developing a socially cohesive group. This is supported by Feenburg (1989) and Salmon's five-stage computer-mediated communication model (2002) referring to online teachers as moderators. Chariot (2001) provides basic strategies for e-moderators when they have students new to the online experience. These include ensuring everyone knows how to post messages onto the website, that they know and feel comfortable with each other, that they are aware of etiquette and respect each other's opinions. The provision of guidelines on the length and frequency of postings and the establishment of small groups are also important strategies teachers need to be cognisant of.

Implications

Many (not all) students need ongoing interaction with peers and teachers to develop and maintain motivation and for quality learning experiences.

It cannot be assumed that students have the necessary skills and motivation to learn online.

A learning culture is important in providing support for student learning in online environments.

Suggested action

Appropriately and adequately resource the delivery of online learning. This may require the development of different funding criteria.

Quality assurance requirements should be developed requiring online courses to incorporate interactive, collaborative learning experiences linked to assessment.

The quality assurance requirements should stipulate:

- *the development and maintenance of comprehensive induction programs which include study skills, awareness of learning styles, how to use the technology interactively, conventions for communicating electronically and what is expected of students, including assessment requirements*
- *regular contact with students using different modes (for example, phone as well as email).*

Teachers

The literature informs us that systems, culture and external factors are important in shaping online programs. While institutions generally offered teachers a course in how to operate on a web-based learning environment, there was no evidence of institutions offering teachers professional development or support and mentoring relating to pedagogical issues and to approaches in the delivery of online learning. In addition, teachers consistently reported the lack of allocated time to work with online students and to develop online courseware.

Bonk and Cunningham (2002) explain that different pedagogies require different learning strategies.

> If learning is predominantly information processing, then instruction should provide for efficient communication of information and effective strategies for remembering. If learning is predominantly experiential growth, then instruction should focus on experiences and activities that promote the individual development of the appropriate cognitive networks or mindmaps. And, finally, if learning is predominantly a sociocultural dialogic, then instruction should provide opportunities for embedding learning in authentic tasks leading to participation in a community of practice. But each of these views assumes the availability, in the world of experience, of tools and structures to support them. (Bonk & Cunningham 2002, p.26)

The reality is that skilled teachers use all of these strategies, depending on the content and the purpose of the learning. Brennan (forthcoming) found that the technology, rather than student and teacher needs are driving pedagogical practice. There is a serious gap between the espoused theory and practice. Young, Mitchell and Wood (2001, p.3) state that high levels of staff development are required throughout the VET sector to successfully implement the National Training Framework.

A number of teachers in this study expressed unease about the content of their courses online, particularly those teaching in the affective domain such as Certificate IV in Assessment and Workplace Training. Teachers need forums, informal or formal, in which to explore and develop a dialogue about these issues. There are implications for resourcing and management, so dialogue needs to be both vertical and horizontal.

There are different views within organisations about the role and validity of online delivery and learning. Horton et al. (forthcoming) suggest that this contributes to 'a lack of clear direction' in institutional support of online students and teachers, confirming comments made by many teachers in our study who would typically state that other teachers and departments looked upon them with suspicion. Institutions in this study appear to be struggling with this new form of delivery and seem

not to have developed an overall direction and policy. A whole-of-organisation approach to change management is required. Management within VET institutions also requires professional development, in this instance, in change management (Mitchell & Young 2002, p.1) and to engage in processes which provide them with a greater understanding of teacher work and workload.

The Australian Flexible Learning Framework emphasises building the capacity of training organisations and their staff to offer clients more choice in when and how they learn, and increasing the knowledge pool about teaching, learning and assessing online. Fullan (2000) claims that, in line with developments in professional learning in other sectors of education, the national knowledge pool may be best increased through creating professional learning communities. Commentators on educational change and educational leadership commonly agree that if we want to produce deep change in education institutions we need to provide forms of collegiality that lead to the development of communities of practice (Hargreaves et al. 2001). Given the growth of casual employment arrangements in the VET sector (Centre for the Economics of Education and Training 2000) and the recognition that formal training is the least valued form of training, the development of collegiality both vertically and horizontally in institutions opens up opportunities for change.

It is also necessary to note the nature of the environment in which institutions operate. Brennan, McFadden and Law (2001) note that:

> In a world where economic imperative seems to be to reduce the costs of delivering teaching and training through casualisation of staff, reduced spending, user choice, competition and a concerted move to privatisation of these marketplaces, teachers and trainers are confronted by increasing workloads. The sometimes mandatory policy-driven requirements to add 'technology' to an already crowded schedule represents another layer of imposition. Resistance has been noted in a number of studies as a significant factor impeding the implementation of new delivery strategies. (Brennan, McFadden & Law 2001, p.57)

Implications

An organisational learning culture is important in providing managerial and peer collegial support for teachers to deliver in a new and rapidly changing environment.

The professional development needs of the teachers in this study are largely unmet.

The Certificate IV in Workplace Assessment and Training is no longer adequate.

Suggested action

Implement change management practices which provide vertical and horizontal support for the teaching and delivery of online learning.

Encourage the development of communities of practice within and across providers to provide collegial support and ongoing professional development.

Encourage the development of cross-disciplinary teams to develop and deliver online learning.

Resource (funding and paid release time) professional development for teachers.

Course design and development

Course design reflects the pedagogical philosophies, resourcing and quality control policies of an institution. The literature suggests that online learning and dialogical constructivist pedagogies are automatically aligned. This study found limited evidence of constructivist pedagogies being implemented in online learning environments. There is also a growing appreciation of sociocultural perspectives—one which emphasises social participation, being active in the practices of social

communities and structuring identities in relation to those communities (Brown & Duguid 1991; Lave 1996; Wenger 1998). However, as Sobski (1997) posits, specific pedagogical perspectives must be incorporated in the design of online learning systems. This requires considerable skill, knowledge and teamwork. Brennan, McFadden and Law (2001) suggest that the more interactive, navigationally focussed and communication-hungry technologies require structured support for students, and teachers who are confident and comfortable with this new way of working. These authors also explain that:

> Under the financial and competitive pressures of intellectual profit making, students are often expected to make the best of what they have, and materials sometimes remain stagnant in their conception, flat in their design and unaccommodating in the styles of learning which they match. (Brennan, McFadden & Law 2001, p.52)

In this study, a number of courses, including all the 100% online courses, were supported by email contact between teacher and student, but there was no element of peer interaction incorporated. Evidence from this study suggests that a lack of interaction can limit the potential for extending student horizons. The following typical student response explains the importance of hearing the voices of others in developing understandings of the possibilities, both negative and positive, of a problem.

> I suppose the immediate feedback is the biggest thing really [compared to classroom delivery]. You haven't got other students coming in with questions that you may not have even considered when you were dealing with stuff.

Online learning can provide the opportunity for students to construct their own meaning (Oliver & Omari 2001), to collaborate (Lally & Barrett 1999) and to develop reflective thinking and problem-posing and solving skills (Holt et al. 1998). However, because of the lack of feedback normally received through body language in face-to-face situations, different processes and skills are required (Holt et al. 1998). Anderson and Garrison (1995) cite interaction between and among students and teachers as necessary to meaningful learning. Through conversation, negotiation of shared meaning, and critical discourse, higher-order thinking skills develop (Holt et al. 1998, p.45).

Apart from the 100% online courses, much design and development work seemed to be undertaken by individual teachers. An exception was the call centre course which had recently gained funding for team development of online resources. A number of studies suggest that teams of teachers, including those with content expertise, technological expertise, administration and support staff (Harper et al. 2000; Schrum 1998) is desirable.

Quality control in the design of online units was also an issue for a number of students. Students reported problems with poor accuracy of computer-assessed tasks, poor layout of the web pages, problems with links, unclear explanation of content and concepts. Technical limitations of design intersect with different learning styles, different levels of proficiency and different preferences for the media in which the learning is taking place (Ikegulu & Ikegulu 1999). Design then, is not just concerned with the overall pedagogical implications, it is also a matter of addressing quality control issues.

Implications

Designing online learning requires in-depth knowledge of learning processes and skills in operating in online environments.

The provision of online courseware requires careful attention to quality control to avoid confusion and frustration for students and teachers.

Suggested action

Pre-service and continuing professional development must address pedagogical and instructional design issues.

Quality assurance requirements need to be in place and courseware thoroughly tested before being released.

Appropriate resourcing needs to be dedicated to this process.

Regional needs

In this study students who were furthest from their provider were more likely to experience frustration than those closer to their provider. The sources of frustration ranged from technical difficulties, lack of or inadequate induction, relatively poor computer literacy skills, time delays associated with asynchronous communication and not being able to gain clarification of a problem easily and quickly. Those courses delivered 100% online had the least interaction incorporated into them, and students from these courses experienced the greatest difficulties in gaining continued access to and support from teachers. The further away students are from their provider, the less likely is their experience of online learning to be positive.

The students in this study echoed Cashion and Palmieri (2002) who found that, given the choice, many students would prefer mixed-mode delivery. Ease of use was important for students, particularly processes and design features which avoid problems such as confusion, excessive download time for resources and other information, and unclear learning structures.

Where online learning is the only available option for students, the learning experience needs to be supported by a raft of measures such as those outlined in the section above on support. In addition, face-to-face contact early in the course or learning experience is to be encouraged. Face-to-face interaction is required for effective online delivery (Mitchell & Bluer 1996). Snewin (1999) recommends the use of some form of face-to-face, or at least phone contact early in the course to enable students to 'get to know each other', noting that this has a positive impact on participation. The advantages of face-to-face contact, or an alternative such as tele-tutorials, are that contact takes place in real time and students are in touch with their peers and their teacher. Face-to-face contact also assists those whose computer literacy skills are not well developed and adds another dimension to the accommodation of a range of learning styles, with an emphasis on the aural, as opposed to the visual or printed text of the online medium.

For students remote from their campus, interaction and attention to group dynamics becomes particularly important. Course design issues listed below are important in any online environment, but especially so for remote students.

- ✧ Attention to group processes are critical (Lally & Barrett 1999), requiring clear structures, roles and responsibilities (Oliver & Omari 2001).
- ✧ Interaction, dialogue, reflectivity, democracy and student control have to be designed into the course (Eastmond 1998; Khan 1997) by, for example, structuring in formal interactive sessions which are facilitated, and requiring learners to provide feedback on their outcomes in order to maintain focus and ensure completion of learning activities (Oliver, Omari & Herrington 1997).
- ✧ Students require additional cognitive skills to successfully navigate, make choices and exercise control (Lawless & Brown 1997; Frederico 1999), as well as skills to assess new situations and appropriate processes for decision-making in online learning environments (Frederico 1999)
- ✧ Feedback is paramount (Frederico 1999) (Evans & Deschepper 1998).

Implications

To encourage participation and to facilitate development and maintenance of motivation early, face-to-face contact with peers and teachers, followed by regular contact through alternative modes is highly desirable for all regional students and essential for a section of the regional cohort.

Some students drop out due to cost factors, lack of or inadequate feedback, or as a result of feeling they are not capable of undertaking online study.

Suggested action

Online courses should hold short 'residential schools', at least at the beginning of a course or series of units. If this is not possible, then tele-tutorials are an alternative.

Early and consistent intervention is required and options should be explored to alleviate cost factors. Skills development support should be provided.

The skills required for online learning should be integrated into the learning experiences.

Teachers need to be allocated the time necessary to provide support and feedback.

Community awareness of online delivery

With two exceptions, there appeared to be limited awareness of online delivery from local organisations and industry bodies identified as stakeholders in the nine courses examined in this study. This is hardly surprising when the local institution could not readily inform us what was delivered online, and what they meant by online. Despite online delivery being capital-intensive to establish and costly to service (Curtain 2002), there was no evidence of collaboration between institutions. The potential advantages of collaboration were highlighted when a teacher discovered that a nearby (300 km distant) institution delivered a core unit online which her students had no access to. As a result they had been unable to complete their qualification. These two instances suggest a lack of awareness of potential partnerships among institutions and with other organisations in regional communities. Partnership arrangements, whereby resources, knowledge and skills are pooled, could deliver advantages not only to individual students, but to the whole community.

There are considerable advantages to be gained from partnerships between industry and provider. These include:

- ✧ Clients have an improved level of information about available training providers and their programs.
- ✧ Industry and providers benefit from information exchange which can then be reflected in relevant training.
- ✧ It is more likely that information and functions, such as research and development contributing to innovation, are effectively utilised (Kilpatrick, Fulton & Bell 2001).

The effectiveness of online delivery organised from a central state provider, and supported by delivery from a regional registered training organisation must be questioned. Such an arrangement sets up barriers to inclusion of local content, and therefore local relevance. VET which focusses on meeting individual and/or community economic and/or social needs, as opposed to VET which is delivered off the shelf, is more likely to benefit individuals and communities (Centre for Research and Learning in Regional Australia 1999).

The lack of awareness of online delivery suggests a role for training brokers. Kilpatrick and Bound (2001) demonstrate that training brokers improve the effectiveness of matches between client needs and training provision. This is particularly the case with not-for-profit, client-focussed brokers who

emphasise self-development, the establishment of dialogue which facilitates learning and the provision of ongoing support in developing lifelong learners.

Implications

There is limited awareness between institutions of what is offered online.

Community development organisations have limited awareness of the potential and availability of online delivery.

Suggested action

Regular dialogue should be established between institutions, including at the field or subject level.

Quality assurance process should include checking of national training system databases for potential partner institutions before online units/modules are developed and when they are revised.

Partnership arrangements between providers should be encouraged.

Client-focussed training brokers should be encouraged to develop relationships with online providers, clients and community organisations.

Providers should be encouraged to develop ongoing relationships with local and regional organisations in order to better meet the needs of local communities.

Conclusion

This study highlights the lack of consistent, comparable enrolment data, indicating there is a lack of information on which to base resourcing allocation decisions. Institutions require adequate funding and resources, based on models which reflect the reality of online delivery and learning. The lack of support teachers feel indicates a need for the establishment of learning cultures and the provision of professional development which offers support, skills and knowledge. Metropolitan students have far greater choice between modes of delivery than do regional students, whose only choice may be online delivery. The further away students are from their provider, the less likely their experience of online learning is to be positive. Regional students, reliant on electronic communication, require not only interaction and collaborative learning, but preferably also face-to-face contact with teachers and fellow learners. There continues to be potential for collaboration between provider and community to meet local needs, and between institutions.

Online delivery and learning, a new tool with great potential, necessarily highlights tensions and contradictions in existing systems. The suggestions for future direction resulting from this study point to changes to quality assurance systems, the resourcing of online delivery and professional development practices. This study also highlights tensions and contradictions in the boundaries between interacting systems such as registered training organisations, state training authorities, the Australian National Training Authority, policy-makers, funding bodies, teachers and students. As a new approach, online delivery and learning demands not only appropriate resourcing, but good change management.

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Appendix

Mapping online delivery

Table A1: Australian Quality Training Framework level, by provider

Provider	Australian Quality Training Framework level						
	Cert. I & II	Cert. III	Cert. IV	Diploma & advanced diploma	Unknown	**Total**	
	%	*%*	*%*	*%*	*%*	***No.***	**%**
Bendigo	26.7	21.7	28.6	46.4		**552**	**100.0**
Tropical North		64.7	35.3			**167**	**100.0**
William Angliss	99.4					**158**	**100.0**
TAFE Tasmania	15.3	29.0	34.9	23.0		**393**	**100.0**
Tasmanian rural schools	100.0					**30**	**100.0**
Central West	12.7		85.5	3.4		**173**	**100.0**
Challenger	68.3	25.2	4.9		*	**123**	**100.0**
Wide Bay			100.0			**58**	**100.0**
Total	**30.1**	**22.6**	**34.3**	**21.2**	*	**1654**	**100.0**

Notes: * cell count less than 6
Unknowns account for discrepancies in totals

Table A2: Field of study by provider

Provider	Field of study											Total	
	Land & marine resources, animal husbandry	Architecture, building	Arts, humanities & social sciences	Business, administration, economics	Education	Engineering, surveying	Health, community services	Science, information technology	Veterinary science	Services, hospitality, tourism	VET multi-field education		
	%	%	%	%	%	%	%	%	%	%	%	*No.*	%
Bendigo		1.1	18.7	5.8	0.4	62.3	0.4	1.6	2.2	6.5	1.1	**552**	**100.0**
Tropical North				16.8	5.4			25.1		52.7		**167**	**100.0**
William Angliss										100.0		**158**	**100.0**
TAFE Tasmania	*	38.7	*	12.0		2.0	19.6	16.5		9.7	*	**393**	**100.0**
Tasmanian rural schools							100.0					**30**	**100.0**
Central West			13.9	12.7			15.6	24.3		32.9	*	**173**	**100.0**
Challenger		*		27.6	*			7.3		63.4		**123**	**100.0**
Wide Bay	*		43.1	51.7								**58**	**100.0**
Total		**9.6**	**9.3**	**11.7**	**0.7**	**21.3**	**8.2**	**10.1**	**0.7**	**27.5**	**0.6**	**1654**	**100.0**

Notes: * cell count less than 6
Unknowns account for discrepancies in totals

Table A3: Student gender by provider

Provider	Gender			
	Female	Male	Total	
	%	%	*No.*	%
Bendigo	15.0	85.0	**552**	**100.0**
Tropical North	68.9	31.1	**167**	**100.0**
William Angliss	62.0	38.0	**158**	**100.0**
TAFE Tasmania	44.0	56.0	**393**	**100.0**
Tasmanian rural schools	93.3	6.7	**30**	**100.0**
Central West	79.8	20.2	**173**	**100.0**
Challenger	56.9	43.1	**123**	**100.0**
Wide Bay	48.3	51.7	**58**	**100.0**
Total	**44.3**	**55.7**	**1654**	**100.0**

Note: Percentages are within provider, as for all following tables

Table A4: Student age group by provider

Provider	Age group							
	Less than 20	20–24	25–39	40–64	65 or more	Unknown	Total	
	%	%	%	%	%	%	*No.*	%
Bendigo	33.0	28.6	22.5	14.8	*	*	**552**	**100.0**
Tropical North	15.6	21.6	41.3	21.6			**167**	**100.0**
William Angliss	94.3		*	5.0			**158**	**100.0**
TAFE Tasmania		5.1	43.8	13.5	33.1	4.6	**393**	**100.0**
Tasmanian rural schools	*		*	60.0		20.0	**30**	**100.0**
Central West	34.1	9.8	31.2	21.4		3.5	**173**	**100.0**
Challenger	*	12.2	40.7	35.8	*	*	**123**	**100.0**
Wide Bay	*	*	51.8	31.1			**58**	**100.0**
Total	**25.8**	**15.2**	**30.5**	**17.9**	**8.4**	**2.2**	**1654**	**100.0**

Notes: * cell count less than 6
Unknowns account for discrepancies in totals

Table A5: Number of units per student by provider

Provider	Number of units									
	1	2	3	4	5	6 to 12	13 to 20	More than 20	Total	
	%	%	%	%	%	%	%	%	*No.*	%
Bendigo	6.0	12.0	23.4	11.4	8.5	20.9	13.0	5.2	**552**	**100.0**
Tropical North	56.9	18.0	10.2	4.8	5.4	4.2		*	**167**	**100.0**
William Angliss	*			7.6		82.3	9.4		**158**	**100.0**
TAFE Tasmania	61.3	26.7	6.1	3.1	*	1.8			**393**	**100.0**
Tasmanian rural schools						3.3	96.7		**30**	**100.0**
Central West	65.9	29.5	3.5	*	*				**173**	**100.0**
Challenger	65.0	22.0	5.7	*	*	*		*	**123**	**100.0**
Wide Bay	29.3	*	19.0	*	6.9	29.3	*		**58**	**100.0**
Total	**35.1**	**17.2**	**11.7**	**6.2**	**4.1**	**16.8**	**7.0**	**2.1**	**1654**	**100.0**

Notes: * cell count less than 6
Unknowns account for discrepancies in totals

Table A6: Contact hours of units/modules with an online component per student by provider

Provider	Contact hours							Total	
	1–14	15–39	40–59	60–99	100–399	400 or more	Unknown		
	%	%	%	%	%	%	%	*No.*	%
Bendigo	1.1	6.4	24.9	25.1	22.9	15.0	4.6	**4462**	**100.0**
Tropical North	29.4	62.1	2.7	5.7				**367**	**100.0**
William Angliss	46.2	37.5	8.7		1.3		6.2	**1927**	**100.0**
TAFE Tasmania		7.8		*	13.4	44.2	34.2	**640**	**100.0**
Tasmanian rural schools						100.0		**263**	**100.0**
Central West	25.4	51.6	11.5	11.5				**244**	**100.0**
Challenger	3.2	86.8	10.0					**220**	**100.0**
Wide Bay	17.6	60.4	18.0	4.0				**250**	**100.0**
Total	**13.9**	**20.9**	**16.5**	**14.1**	**13.5**	**14.5**	**6.5**	**8373**	**100.0**

Notes: * cell count less than 6
Unknowns account for discrepancies in totals

Table A7: Highest previous education level, by residential location

Highest previous education level	Residential location				Total	
	Metropolitan	Rural	Remote	Unknown		
	%	%	%	%	*No.*	%
School	62.9	69.1	69.4	*	**1106**	**66.9**
Certificate I or II	1.1	1.8	*		**27**	**1.6**
Trade, advanced trade certificate	*	0.8	*		**13**	**0.8**
Associate, advanced diploma	*	*	*		**3**	**0.2**
Undergraduate diploma, degree	*	0.7	*		**10**	**0.6**
Unknown	34.9	27.6	18.4	*	**495**	**29.9**
Total	**100.0**	**100.0**	**100.0**	**100.0**	**1654**	**100.0**

Notes: * cell count less than 6
Unknowns account for discrepancies in totals

Table A8: Field of study by residential location

Field of study	Residential location				Total	
	Metropolitan	Rural	Remote	Unknown		
	%	%	%	%	*No.*	%
Land & marine resources, animal husbandry	*	*			**5**	**0.3**
Architecture, building	16.6	6.2	*	*	**159**	**9.6**
Arts, humanities & social sciences	7.0	10.7	*		**153**	**9.3**
Business, administration, economics	11.4	11.8	12.2	*	**193**	**11.7**
Education	*	0.6	*	*	**12**	**0.7**
Engineering, surveying	*	33.5	*	*	**352**	**21.3**
Health, community services	7.1	8.5	16.3		**136**	**8.2**
Science, information technology	8.7	9.7	36.7		**167**	**10.1**
Veterinary science		1.2			**12**	**0.7**
Services, hospitality, tourism	48.0	16.8	16.3	*	**455**	**27.5**
VET multi-field education	*	0.8			**10**	**0.6**
Total	**100.0**	**100.0**	**100.0**	**100.0**	**1654**	**100.0**

Notes: * cell count less than 6
Unknowns account for discrepancies in totals

The National Centre for Vocational Education Research is Australia's primary research and development organisation in the field of vocational education and training.

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