NCVER

Online learning

Research readings

Edited by
Hugh Guthrie

Australian *Flexible* Learning Framework
Supporting Flexible Learning Opportunities

flexiblelearning.net.au

Background

In August 1999, the Australian National Training Authority chief executive officers endorsed the *Australian Flexible Learning Framework for the National Vocational 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.

An initiative of the Australian Flexible Learning Framework for the National Vocational Education and Training System 2000–2004.

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Peter Kearns is managing director of Global Learning. His special interest in lifelong learning and strategies for building learning communities has led him to a number of studies examining the role of information and communication technology in promoting learning. In 2002 he directed a study of policy for information and communication technology in education in Australia in all sectors and in 13 other countries. His chapter is based on this study. He has worked with learning communities in all states and is chair of the Canberra Learning Community Committee.

Sue Kilpatrick is director, Centre for Research and Learning in Regional Australia at the University of Tasmania. Sue has extensive experience in learning at a distance dating back to work as an editor and subsequently an instructional designer of print-based materials in the 1980s and as a distance education student in the early 1990s. She has written distance materials for print and CD-ROM format and her teaching includes WebCT-based material and discussions.

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Overview

Hugh Guthrie

COMPUTERS AND THE internet offer exciting opportunities for learners, teachers and providers alike. Companies, too, seem to be showing an increasing interest in using online approaches to support their education and training.

In fact, the potential market for online learning and delivery is huge. Australian Bureau of Statistics data (ABS 2002) from the last census show that over six million Australians have ready access to computers and the internet, whether at work, home, or both. So it is not surprising that there has been considerable interest in the use of these technologies to deliver formal and other types of education and training programs.

For its part, the vocational education and training (VET) sector has been active in exploring ways of using these technologies to help deliver more appropriate, effective and flexible training to its clients. There has been a lot of experimentation with the online mode—and considerable funds have been provided to develop and support it.

Background

The Australian Flexible Learning Framework provides a five-year strategic plan designed to enhance the VET sector's role in the development of the knowledge economy through the accelerated uptake of flexible learning modes. It contains a range of activities in the following five key goal areas:

- creative capable people
- supportive technological infrastructure
- world-class online content development, applications and services
- enabling policies
- problem-solving regulation.

In addition, the Australian Flexible Learning Framework has been underpinned and supported by a body of strategic research which the National Centre for Vocational Education Research (NCVER) has managed.

Currently nine research projects have been undertaken as part of the Australian Flexible Learning Framework research programs for 2000 and 2001. This book of readings has been assembled to provide an overview to this body of work. This is complemented by three chapters by Kearns, Candy and Schofield respectively which were commissioned for this book.

This overview chapter, and the book itself, fall into a number of 'natural' sections. The 'big picture' section examines a range of key contextual and international issues and policy approaches. The second section provides valuable insights into online teaching and assessment practices and learners' views. The third examines the cost-effectiveness of the approach and the relationship between e-business and e-learning. The fourth looks at e-learning in companies. The final section examines online learning in regional and rural areas. This overview chapter summarises the body of work in each section as well as providing some key overarching messages and implications.

Key messages

As you will see, an important message that has emerged from this body of research is that it requires vision and leadership to successfully implement online learning. This also requires some fundamental changes to policies, as well as practices and funding approaches, so this can happen. This involves fostering vision and effective leadership across the sector—not just improved management.

This process requires the development of new outcome and productivity measures for providers as well as new ideas about measuring effective practice. To accomplish this, there may need to be a fundamental re-examination of the ways of funding providers.

Networks and partnerships need to be fostered not only across sectors of education and between providers but also between a far wider range of organisations and community groups. Relationships between providers and employers on the one hand, and with key local and regional community groups on the other, need to be developed and maintained. Enabling policy is needed—not one which is top down—but one which empowers grassroots organisations to collaborate, to transform and to innovate.

In fact, the nature of the transformation, in vocational education providers at least, may be quite significant. It will involve better market research, more effective planning and structural and operational change. It will also be more 'whole-of-organisation' and encompass the organisation's human resources and industrial relations practices. This is because of the changing nature of staff's work and the need to be flexible in the ways providers operate.

There are differences between a training institution and a company moving to adopt an e-learning approach which is 'whole of organisation'—and it is easier for the company. This is because they have a clear strategy, explicit business imperatives, a strong sense of mission and can move quickly. This suggests that training providers need to find greater strategic clarity, which is difficult when there are diverse interests to be served.

Another recurrent theme in the body of research is the need for professional development in a wide range of areas to help teachers make better use of online learning and delivery. Professional development needs are recognised in areas such as teaching, use of technologies, seeing what others are doing, keeping up to date with new developments in a fast-moving field, resource development and, importantly, the development of adequate levels of written and other communication skills for the online environment. The research also found that teachers need training in assessment, evaluation and online facilitation, especially in the management of self-paced groups.

Identifying and disseminating best-practice e-learning and e-business approaches also need to be considered as organisations move to transform. This requires underpinning by robust research. Evaluation processes are also needed to guide and to monitor progress on new initiatives.

Finally, the work examining the use of online learning in regional Australia identifies the same sets of issues to those found in other online research. Only the extent of the issue sometimes differs. For example, the relative speed and stability of internet access is a bigger issue in regional Australia than in metropolitan areas.

Turning now to each section of the book, the following are the key points I have drawn from the respective chapters.

The big picture

We live in a time of pervasive change. Globalisation, changes in technologies and their applications, the loss of traditional jobs and the creation of new ones make it important for all of us to keep learning throughout our lives. People need new skills and new ways to learn these skills and the ability to adapt and change.

Keeping up to date increasingly requires higher levels of traditional literacy skills and being able to find and marshall information; that is, be information literate. It also requires the new information and communication technology (ICT) literacies. Individuals now have to take increased responsibility for this learning.

Becoming more information- and ICT-literate

To be information-literate a person needs to be able to recognise when information is needed. He or she needs to have the ability to locate it from a

variety of sources, and to evaluate and use it effectively. Some would argue that this is one of the strengths of online learning as it can so readily involve learning tasks which help to build skills in information literacy. While information literacy might be considered to be a 'generic' skill, it has elements which are influenced by personal needs, context, the nature of the subject matter and the forms that the information takes.

As Candy points out, information literacy is coupled with information and communication technology literacy: the knowledge and research skills to find information sources, the technological skills to exploit them and the skills to communicate using them. It is about using digital technology, communications tools and/or networks to access, manage, integrate, evaluate, and create information in order to function in a knowledge society (Information Communication Technology Literacy Panel 2002).

While it is the clear responsibility of each person to develop and maintain these skills, they need help. This help can come from educational institutions, their employers and from community-based sources such as libraries. However, those whose role it is to help develop these skills in others may not have the skills developed at sufficient levels themselves. Both Candy and Kearns also point out that not everyone has equal access to opportunities for acquiring these literacies. As a result, special provision is needed to help those who may be disadvantaged—whether through geographic location, language skills, technological facility, physical disability, income and employment status and other forms of disadvantage. This will help to avoid, or at least limit the growth of, what is termed 'the digital divide'.

Many young people have skills in using the computer and other technology. However, these skills do not necessarily mean that they have the information and communication technology literacy needed for effective online learning. Likewise, older people who have not grown up with this emerging technology may need special help to meet their information needs to enable them to participate as fully as possible in society.

The policy framework

Kearns notes the wide range of policy on information and communication technologies. While some countries had restricted their policy considerations just to the schools sector, Australia's is distinctive in that it runs across all three of its major education sectors: schools, VET and universities. However, the message Kearns delivers is clear, and is that cross-sectoral perspectives are needed. What is more, connections to initiatives in sectors outside education need to be made, developed and maintained. The secret to realising the full potential of information and communication technologies as a tool for learning lies, as Kearns says, 'in finding creative and innovative ways to build partnerships and coalitions to support a shared vision and objectives'. This is 'the partnership challenge'.

Kearns notes that some countries are now examining ways of moving beyond the current mainstreaming and integrating phase of online learning to one which involves transforming the way learning takes place. This will also involve a transformation in the physical and operational set-up of learning institutions and the way they work with, and relate to, their clients and the 'communities' they service.

A general policy thrust is needed which moves away from 'top down' and 'imposed' policies, to 'grassroots strategies' which stimulate and support creativity and innovation at the local level, and the building of partnerships and networks to drive the desired objectives. This 'energising' of the grassroots is also seen as a way of bringing about the cultural change needed to support the aspirations of a learning and knowledge society. Teachers, institutions and communities need to be restructured and empowered to use information and communications technologies in creative ways as a tool for continuous learning and for building a learning and innovative culture.

Teaching practice and learner views

Kearns notes that British further education colleges had been encouraged and driven to change by a mixture of 'carrots' and 'sticks' by the funding agency. However, he reports that the British Educational Communication and Technology Agency had concluded that exemplary strategies all started from a strong teaching and curriculum focus and had a clear vision of how technology could and should serve learners, teaching and learning. Weaknesses resulted from colleges having no educational or teaching vision for their information and learning strategy. This conclusion is also relevant to VET in Australia.

As such, the thrust of much of the research sponsored as part of the Australian Flexible Learning Framework has been concerned with teaching approaches and issues of quality and student support, particularly from the learners' perspectives. Brennan's chapter outlines a set of effectiveness indicators for teaching and learning. These make good sense and accord well with some of the key features of good online learning and assessment identified by Cashion and Palmieri and by Hyde, Booth and Wilson respectively. In addition, Choy, McNickle and Clayton look at the support learners need before and during online learning, as well as the technical support they require.

Quality features in learning, assessment and student support

From the perspective of the learner, the most highly valued quality feature is flexibility. However, the indicators of teaching and learning effectiveness include such key quality features as teacher skills and responsiveness, and communication and interactivity between staff and learners, and between the learners themselves, in order to make the learning a more social experience. The

research has also identified that an important success factor for staff in online learning is developing strong rapport with the students: knowing them, their progress and their interests intimately in order to help to enrich their learning experiences. Feedback to learners is also very important. It needs to be rapid, informative and comprehensive, but expectations about how much will be provided to learners need to be made clear at the start of the program.

High-quality learning materials not only provide learners with the opportunity to interact with the information but also highlight additional pathways for them. These online materials can also open further pathways by linking to the potentially vast array of other resources available electronically and thus help to foster the development of key information literacy skills needed. The effectiveness indicators look for teaching approaches which challenge learners and develop their cognitive and other skills. The resources also need to encourage deep learning which enables learners to move from areas and tasks that are already familiar to new areas—achieving this in ways most suited to them.

Both Brennan, and Cashion and Palmieri identify a number of learner characteristics as prerequisites for effective e-learning, including high levels of independence, motivation, persistence, literacy, computer skills and experience, and time management. These ideals are not confirmed by current experiences reported by either teachers or students. Thus, as both Cashion and Palmieri and Choy, McNickle and Clayton point out, there is a need for induction programs at the beginning of the course and a measure of ongoing support to help to address any deficits learners may have. However, the biggest problem learners encounter relates to technology and access through the internet. Helpdesks and other support are needed to ensure that learning is the focus of their online experience—not wrestling with technology and access issues.

As Hyde, Booth and Wilson point out, assessment is an integral part of learning. Assessment, particularly formative assessment used to judge progress, is being used in teaching and learning online. But more extensive use could be made of the online environment for all forms of assessment—not just for formative quizzes and true/false questions. Summative or final assessment processes used to judge competence are less well-developed in the online environment and are mainly confined to using email to submit assignments and receive feedback. Their research identified promising developments in relation to the use of project-based assessment, case studies, simulations and chat and bulletin boards for both individual and group assessment.

Changes in teachers' work and their professional development needs

The chapters by Kilpatrick and Bound and Horton and Osborne as well as a number of the others note that online learning changes the nature of teachers'

work significantly, even when it is part of a mixed-mode approach. Many teachers are now working in new and often unfamiliar ways which, in turn, may not be understood by their organisation's administration. The online environment brings its own set of teaching and learning issues and teachers need to develop new ways of building relationships that rely more on emails, chat rooms and other devices. These require high-level information literacy, written and other communication skills which the teachers themselves may not possess.

The studies found that most teachers were enthusiastic about online teaching, finding it challenging, enlivening, rewarding and enriching. Their concerns centred on the fact that the changes it demands of teachers' working patterns are not recognised in budgets, working conditions or state reporting requirements. There is a need for greater staff availability throughout the day and across the week, an issue which has industrial relations ramifications—including more flexible views about the nature, hours and place of their 'work'. Recognition of these changes is necessary if the requisite transformations in organisations and practices are to be widely adopted.

The research also found that teachers need to master the range of technologies being used and know intimately the content, learning resources and the learning options available to the students. They cannot depend on their students being at the same stage at the same time, especially when the program is self-paced. Because students may be working at any time of the day or night, providing continuity of support is a challenge, especially given a teaching workforce which is becoming increasingly part time or casualised.

Operational issues

The cost-effectiveness of online approaches

Much of the VET sector's offerings is still reliant on classroom-based approaches, but the need to deliver to wider groups of people and in a variety of new locations has led to a range of options being adopted, including online approaches. Adopting new and more flexible approaches invariably raises questions about their cost-effectiveness.

Curtain's chapter presents six case studies comparing the costs and outcomes of online approaches with those based on traditional classroom delivery. He, like others before him, has found it difficult to isolate the true costs of establishing, investing in and meeting the recurrent costs of online and flexible approaches.

In general Curtain found online programs cost more to develop, and their recurrent costs could be higher, particularly when the level of learner support is significant. On the face of it however, online approaches have a lot going for them, especially when combined with other modes of delivery. They appear to have significant benefits over traditional distance education approaches.

As Cashion and Palmieri suggest, online learning is not a cheap option. In this context, Curtain examined ways of improving cost-effectiveness. Costs can be reduced through looking into new work roles for staff, by addressing issues caused by inherited organisational structures and by introducing new and better integrated work systems. Increasing volumes while maintaining costs is another strategy. Like Kearns and Mitchell, Curtain proposes a transformational approach and one which is 'whole-of-organisation' in its basis.

Improving teaching and learning or offering more options is often where the journey towards adopting online approaches begins. It may even be just as simple as wanting to try something new—whether new technologies or learning approaches. But this is really only one side of the story. The research has found that online approaches are but one of a range of ways that can be used to deliver learning. Flexibility is the key. Online learning is one means of achieving this flexibility.

E-business and whole-of-organisation approaches

Once there is improved service and flexibility at one level, it soon becomes clear that it is possible to broaden the nature of online use and integrate it with approaches in other areas. For example, an online approach which started with 'teaching and learning' subsequently moves to one concerned with a broader range of functions, such as student support. Online learning therefore becomes part of a wider approach to doing business. It becomes part of an 'e-business' solution.

Much of the research reported in this book shows that adopting online approaches has ramifications for the whole of the organisation. What is needed are better ways of integrating the back and front office components of what more successful providers do. Mitchell's chapter in this book does just this. It describes a more holistic and customer-oriented approach to providing and supporting vocational programs. This is called e-business, and e-learning is seen as one of its components. It is concerned with conducting business electronically, both within the business and outside—with clients, partners and the broader community. In the past, these two activities, e-business and e-learning, have evolved largely separately, but integrating them presents significant opportunities.

Moving this way means that business processes need to be redesigned—and the organisation needs to be transformed—in order to achieve business goals such as improving efficiency, reducing costs, increasing speed of transactions, expanding markets, enhancing business partnerships and, most importantly, providing additional value for clients. The chapter provides examples of practice both in Australia and overseas and documents the barriers and benefits of moving to a total e-business approach.

E-learning in companies

In her chapter Schofield draws on findings from four preliminary case studies of 'icon' companies and examines their opinions and use of e-learning. This provides a broader perspective than the provider-based focus which dominates the body of the research commissioned under the auspices of the Australian Flexible Learning Framework. It is also an important recognition of the role that employers play in skills formation and learning.

This research suggests that e-learning should not be considered as a stand-alone initiative but seen within broader corporate and human resource contexts. The link to corporate strategy is the key. The study suggests there are two overarching enablers of successful and sustainable e-learning. First, there needs to be a demand for high-performance/high-skills work organisation and this needs to be reflected in an explicit corporate strategy which is widely understood throughout the company. Second, there needs to be a high level of sensitivity amongst human resource development people to that strategy. When these enablers exist, they provide an overarching framework for e-learning and give focus and direction to its implementation. Size may be important also, and it has been suggested that the approach may not be suitable for organisations with under 400 staff.

E-learning enables a strategic repositioning of the training function by providing an opportunity in corporate human resource development to have new conversations with business units about training. These 'conversations' help to raise their awareness of its value. The training process can also be re-engineered because the systems that underpin e-learning can be used to make the administration of training far more efficient. In this way it is seen as adding real value. In addition, e-learning systems can provide data useful in raising corporate and business unit awareness of workforce development.

Schofield has also reported that cost savings are frequently presented as a key driver of e-learning, yet none of the four companies studied saw cost savings as the primary factor in their decisions about e-learning. Rather, she found the overarching drivers for the introduction of e-learning were speed, access for staff, consistency and customer service.

E-learning is also being used as a tool to support value chain integration by taking training upstream to suppliers, across to partners and downstream to distributors such as agents and, in some instances, company clients. As work organisation continues to change rapidly, and outsourcing continues to be a strategic choice of many firms, new concepts of networks, clusters and skill ecosystems are merging with the more established concept of the value chain. This raises the potential of using e-learning to help companies build on existing competitive strengths through collaborative relationships and training partnerships.

Online learning in regional and rural Australia

Two of the chapters in this book of readings deal with the issue of online learning in regional and rural Australia. The clear question raised in commissioning such projects is whether or not there are issues which are unique to learners, teachers and institutions in these areas, or whether their issues are similar to those encountered in metropolitan Australia. What is clear is that the teaching and learning and organisational issues identified are the same. There may be differences in degree, for example, the relative speed and stability of internet access.

Those in regional and rural Australia are particularly concerned that their young people will not have the educational options available to those in the cities. They also wish to support and maintain their communities and their infrastructure, and so having education and training options available to them which obviate the need for excessive travel is very important. Online delivery is one way in which this can be done so that the range of learning options and programs available is as broad as possible and meets local needs.

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The big picture

Does digital literacy mean more than clicking your fingers?

New literacies for the electronic age

Philip Candy

This chapter discusses the importance of information and communication technologies (ICT) literacy and information literacy for survival in today's fast-changing world. The meaning of each of these terms and their inter-relatedness is discussed in detail. In the context of these two literacies the importance of lifelong learning is stressed. The chapter urges policy-makers and those who implement policy to recognise and take action in this priority area as a matter of urgency.

Introduction

IN AN ERA characterised by more or less continuous change, there is an imperative for more or less continuous learning. Consequently, in the past couple of years, the concept of lifelong learning has become a popular and frequently discussed issue. It is almost impossible to pick up an educational report, attend a conference, or flick through a journal without seeing the virtues of learning throughout life praised, an ironic situation in fact, since, in times of rapid change such as we are currently confronting, people's time horizons tend to contract rather than expand. It is also ironic because the concept of lifelong learning, rather than being a radical novelty, is certainly not a new concept. In its present guise, it has been around for at least 30 years.

Back in 1972, the United Nations Education, Scientific and Cultural Organisation's (UNESCO) International Commission on the Development of Education, under its distinguished chairman Edgar Faure of France, published its final report. The so-called Faure Report argued that 'every citizen should have the means of learning, training and cultivating himself [or herself] freely available … under all circumstances, so that he [or she] will be in a fundamentally different position in relation to his [or her] education' (Faure et al. 1972, p.163). Later in the same report, the authors advocated lifelong education 'as the master concept for

educational policies in the years to come for both developed and developing countries' (p.182).

Since this time the notion has gained increasing currency, and has spawned a huge and burgeoning body of literature in all parts of the globe. One of the most audacious projects has been the formation of the World Initiative on Lifelong Learning, which defines the concept as follows:

> *A continuously supportive process which stimulates and empowers individuals to acquire all the knowledge, values, skills and understanding they will require throughout their lifetimes and to apply them with confidence, creativity and enjoyment in all roles, circumstances and environments.*
>
> (World Initiative on Lifelong Learning 1994, p.5)

Clearly this is an ambitious concept, which extends well beyond the boundaries of formal education, and affects a range of stakeholders, including governments, business and industry, clubs, societies, and associations, providers of adult non-formal and community-based learning and, increasingly, every individual or organisation who makes use of the internet—either as a producer or consumer of information.

While learning may be a natural human activity, in recent years it has taken on a particular significance in terms of both individual and collective advancement and wellbeing. In times of rapid and pervasive change, an existing or static body of knowledge does not equip people with the ability to cope, much less to thrive and advance. What, then, are the dominant changes impacting on our lives and bringing about a requirement for continuing learning and adaptation?

Turbulence and change

The first and most obvious is the pervasive effect of *new technologies*, which seem both inescapable and ubiquitous. The number of 'gadgets' that are encountered in day-to-day life is beyond counting—from videocassette recorders and automatic teller machines, to mobile phones, microwave ovens and programmable washing machines. Whether in the home, the community, the office, the library or even on public transport, people have to cope with new and often intimidating technologies. Thus, simply to go about one's everyday life, a myriad of new devices, applications and terminology have to be mastered.

A second major source for new learning is the phenomenon of *globalisation*. This embraces everything from the changing geo-political situation, to issues of mass migration, the displacement of large numbers of people, and the impacts of different cultures and religions on established ways of thinking and behaving. In its more benign manifestations, it includes opportunities for travel and language learning, increased availability of products and services from

abroad, and a more international outlook. However, there is also a more sinister and alarming aspect of globalisation which demands new learning—the effect of changed economic circumstances, the emergence of multinational corporations and, for many, the loss of jobs, necessitates the development of new skills in order to gain or retain employment.

Changing patterns of work, whether precipitated by globalisation, technology or simply by changes in organisational structures, also provide a significant pressure for new learning. Clearly this imperative impacts most directly on those already in the workforce, but there are few, if any people who escape the need for updating, learning about new markets, products or services, adjusting to changing organisational structures and systems, or in other ways engaging in work-related learning. As discussed below, some of this learning takes place through short courses and other off-the-job interventions; some through mentoring or on-the-job training, some through the distribution of new specifications and organisational structures via bulletin boards, email or the organisation's intranet. However, most of it occurs incidentally and continuously through informal means, including conversations with colleagues, suppliers and customers, or through casual interactions with others in, or in relation to, the workplace. It is therefore essential for this reason, if no other, that people are capable of self-directed learning.

As part of the widespread and pervasive changes that affect most people nowadays, alterations in *family and community relations* also provide both an impetus and context for new learning, an impetus because of dramatically changing social circumstances and family dynamics that necessitate constant adjustment, and a context because it cannot be taken for granted that everyone will grow up in a similar household environment or share a common set of cultural assumptions. An often quoted aphorism, especially in traditional societies, is 'it takes a village to raise a child', the clear implication being that children learn better when they are exposed to a range of different expectations and perspectives. For the past couple of hundred years, especially in advanced western societies, there has been a trend away from extended families towards relatively tightly knit nuclear family groupings. However, this trend has been challenged in recent years, with the conventional nuclear family giving way to a variety of different household arrangements which represent for the participants—children and adults alike—a rich context for learning. The demands made and opportunities presented by such circumstances may, in some ways, resemble the extended family groupings familiar to our ancestors.

Finally, as a backdrop for all of these various changes, we have witnessed an unprecedented *explosion in available information*. The total amount of information in our society is expanding at an extraordinary rate, and it is a challenge for everyone, for even the best educated, most widely travelled and most sophisticated information-users to keep up with their individual and local areas of interest, much less with global developments and findings. In October 2002, a

newspaper article reporting the escalating problem of storing the world's information, noted that an amount of information equivalent to 60% of all the words spoken since the dawn of time had been generated in the year 2000 alone (Dearne 2002). This phenomenon, commonly dubbed 'information overload', 'information glut' or 'data smog', highlights the extraordinary challenge involved in keeping up without feeling overwhelmed by the tidal wave of information, a challenge which commonly leads to a phenomenon called 'information anxiety' (Wurman, Leifer & Sume 2000).

Need for continuing learning

Considering all of the factors described above, it is small wonder that there is a continuing, perhaps even an escalating, requirement for learning across the lifespan. Although it is sometimes dismissed as alarmist, the evidence suggests that, in our culture at least, those people who fail to keep up with developments are likely to fall progressively further behind, and to become less employable and less competitive. As a result, there is a relentless pressure for increased learning, which may be met in a variety of ways. How do people manage to cope with the manifold and diverse learning challenges with which they are confronted? Clearly the answer is different for each category of person, and indeed for each individual, and likewise the skills required of the successful learner in each context are not exactly the same. Nevertheless, a useful typology distinguishes the following classes or categories of learning.

Formal learning

For most people, the learning that springs readily to mind is that which occurs in formal educational settings such as schools, colleges, institutes and universities. It is distinguished by the presence of formal curricula, a teacher, trainer, tutor or other facilitator, and is usually structured by such devices as timetables, lectures or classes, reading lists and assessment. There are distinct rules that guide the learner in such circumstances, especially those that indicate how he or she should behave and what constitutes valued learning.

However, even in formal educational settings, and at all levels from preschool right through to university education, a good deal of valued learning actually occurs informally and incidentally, outside the classroom, studio or laboratory. For instance, students get together to help each other, or to chat informally about issues such as the personalities of the staff or faculty, or the best location to find appropriate texts or learning materials. It is apparent, therefore, that not all important learning occurs within the context of the curriculum, and that at least some of the skills required to participate in this vital but submerged aspect of institutional life may be 'caught rather than taught'.

Non-formal learning

This kind of learning is organised and planned by someone, but does not lead to any qualification or recognition. It includes most short courses, whether undertaken for personal enrichment or professional/vocational advancement. A large component of such learning is planned and undertaken by the learner him- or herself. Since the advent of the internet, and more recently the world wide web, a great deal of such learning is occurring in technologically mediated forms. Accordingly, it is increasingly necessary for people to have access to the necessary technology and to be technologically 'literate' so that they are able to use the technology fluently.

Informal and incidental learning

As important as formal and non-formal learning are, they represent only a minute fraction of the learning that occurs within any one person's lifetime. In fact, in terms both of duration and impact, informal learning far outstrips the other two types. It occurs more or less continuously throughout life. Informal learning, by its nature, is beyond the reach of formal education and training providers; however, the capacity for and predisposition towards learning are largely determined during the early years of a person's life. Accordingly, attention must be paid to creating and encouraging those circumstances which orient young people towards learning. With the provision of appropriate support and encouragement, this is likely to create a vital precondition to full and active participation in many aspects of the twenty-first century knowledge economy—work, leisure, health and government.

Much of this learning is electronically mediated

As mentioned above, one of the factors contributing to the need for lifelong learning is the relentless development of information and communication technologies. There is little doubt that we are in the midst of a digital revolution and as a result, governments throughout the world have been committed, along with a wide range of stakeholders, including education providers, telecommunications carriers and the broader business community, to ensuring that all of their citizens will be able to engage fully in the globally networked knowledge economy. One of the principal initiatives is the rollout of broadband connectivity, along with more widespread access to the requisite technology, especially through educational institutions, libraries and government offices.

However, while the ability to enable large numbers of users to access the internet simultaneously is manifestly a necessary precondition, it is increasingly recognised that more is required for participation in this new digital environment. Many applications and everyday tasks at work, in the home and in the community, including formal, non-formal and informal learning, now

require at least a minimal level of understanding of and familiarity with basic terminology, and with how computers and computer networks function. Therefore, in parallel with the rollout of broadband networks and ensuring the widespread availability of required technology, governments, education and training institutions and, to some extent, employers, have also been working to ensure that all members of the community—from the youngest to the oldest—have the necessary competence to understand and use both existing and developing digital technologies, and to make sense of the information to which they provide access.

There are many different terms used to refer to this, including 'computer skills', 'computer literacy', 'technological literacy', 'technology fluency' and so on. As so often happens, the use of alternative terms has given rise to a spirited debate about subtle shades of meaning and whether or not one particular term is preferable to the others (see, for example, Mackay 1992). In this paper, I have chosen to use the term 'information and communication technologies literacy,' but it is likewise a complex notion, and I acknowledge at the outset that it is both a contested and multifaceted term.

Adequate levels of 'information and communication technologies literacy' to engage with the digital domain

What, then, are the elements of information and communication technologies literacy? As long ago as 1984, Scher stated that it was important for people to have 'appropriate familiarity with technology' to allow them 'to live and cope in the modern world' (Scher 1984, p.25). In the same year, Hunter advocated the acquisition of 'the skills and knowledge needed by a citizen to survive and thrive in a society that is dependent on technology for handling information and solving complex problems' (Hunter 1984, p.45). In the years since then, there has been considerable debate about the skills and knowledge required in order to be considered as ICT-literate, about the level of competence needed to operate in different settings or functions, and, finally, about who is or should be responsible for ensuring that all citizens develop these attributes. Not unexpectedly, ideas about exactly which skills and knowledge are required have evolved over the years more or less in step with the evolution of the technologies themselves.

In the early days of computing, and in particular when the internet was in its infancy, there were essentially two divergent schools of thought: on the one hand, those who felt that people needed only a general 'sense' of the technologies because it was a technical field that would not directly affect them and, on the other hand, those who argued that everyone ought to know how computers worked and how to write and run programs. Perhaps unexpectedly, with the rapid advances in networks, hardware, software and operating systems, there has been something of a convergence between the two opposing

views about information and communication technologies literacy. While it is now recognised that there is a near-universal requirement for some level of understanding and competence, most systems are so relatively straightforward and 'user friendly' that the majority of people do not require the high level of technical skill and understanding advocated earlier.

A number of alternative formulations of information and communication technologies literacy for the general populace have been proposed. One of the most widely cited is the International Computer Driving Licence, which comprises seven modules relating to basic information technology concepts—using the computer and file management, wordprocessing, spreadsheets, databases, presentation, and information and communication (internet and email) (Australian Computer Society n.d.).

The International Computer Driving Licence and its counterpart the European Computer Driving Licence have become a broadly accepted minimum standard, with many organisations, including businesses, governments and educational institutions providing instruction and endorsing testing for their employees, members or students. Nevertheless, a large proportion of the population, especially those who are not in the workforce or not studying, have never heard of this standard, and in practice would have little opportunity to attain such a qualification.

While the International Computer Driving Licence has been recommended for general functioning in the workplace and the community, it is widely recognised that those participating in programs of post-secondary education need additional skills. In 2000, a report prepared for the Australian Government on information and communication technologies access and literacy of university and further education students proposed a framework of the ICT skills thought to be generally required, irrespective of their particular discipline or field of study.

Both the International Computer Driving Licence and the skills framework heavily emphasise the technological understandings and competencies required to operate in the digital domain. A broader and perhaps less technologically oriented formulation is provided by the Information and Communication Technologies Literacy Panel. Convened by the Educational Testing Service in the United States in 2001, 'reflecting the growing importance and ubiquity of new technologies in work, education and everyday life', the international panel was convened with the intention of developing a robust definition of the concept and an associated array of tests to measure competence.

Table 1: Information and communication technologies skills framework

ICT literacy	Skills and attributes
Resource/ socio-structural literacy	❖ knowledge of a range of available electronic sources and ability to choose the most appropriate ❖ understanding of the nature and location of information on a global and local basis
Research literacy	❖ able to formulate electronic searches using the most appropriate search engine or CD-ROM ❖ able to analyse, extract and use information
Communications literacy	❖ able to format, communicate or publish ideas electronically using word processing, email or web design tools which may include embedded sound and video
Problem-solving literacy	❖ able to use spread sheets and charts to present ideas ❖ able to organise and classify information ❖ able to use statistical and analytical software where appropriate
Technological literacy	❖ able to learn to use new software tools introduced in courses or through research ❖ able to determine the efficacy of new methods over traditional methods ❖ be conversant with computer terminology, operation of computer hardware and software, basic maintenance, basic programming concepts and the impact of computers on society and themselves

Source: Adapted from Oliver and Towers (2000, p.4)

The panel report offers the following definition: 'ICT literacy is using digital technology, communications tools, and/or networks to access, manage, integrate, evaluate, and create information in order to function in a knowledge society' (Information and Communication Technologies Literacy Panel 2002, p.2). This definition embodies five distinct elements, which are defined as follows:

> Access: *knowing about and knowing how to collect and/or retrieve information*
>
> Manage: *applying an existing organisational or classification scheme*
>
> Integrate: *interpreting and representing information. It involves summarising, comparing and contrasting*
>
> Evaluate: *making judgements about the quality, relevance, usefulness or efficiency of information*
>
> Create: *generating information by adapting, applying, designing, inventing, or authoring information.* (Information and Communication Technologies Information Literacy Panel 2002, p.3)

Three points stand out about this definition. The first is that it recognises both the developmental nature of the concept and, being presented 'in a sequence that suggests increasing cognitive complexity' (Information and Communication Technologies Information Literacy Panel 2002, p.3), the fact that the various aspects of information and communication technologies literacy are cumulative. Second, the skills are germane to a number of activities required to effectively function in the twenty-first century—at work, in the community and as a citizen—and are not restricted to the role of the learner. Third, they bear a

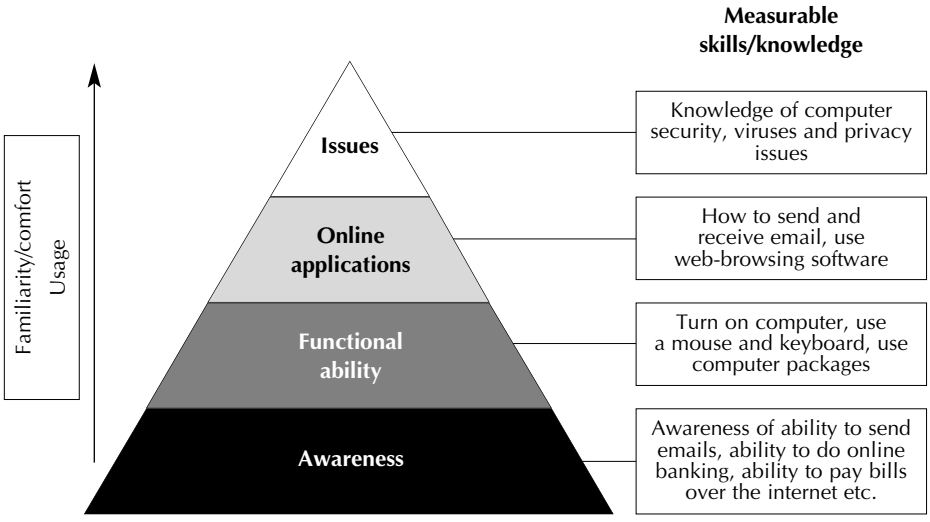
close resemblance to many of the tasks and activities encompassed by being an effective self-directed learner which, as mentioned above, is a vital accomplishment even for those engaged in formal education and training.

This last point raises the issue of the extent to which information and communication technologies literacy, like any literacy, might exist at varying levels of achievement. While it is acknowledged that some level of generic digital literacy is necessary to the performance of many everyday tasks, and that those who lack this minimal level are rapidly becoming disenfranchised from mainstream society, a study undertaken for the West Australian Department of Training and Employment (Market Equity 2001), identified four different levels of what was described as 'computer literacy', 'as opposed to the concept that someone is either computer literate or not'. The four components were:

- awareness of day-to-day computer applications
- functional ability to use a computer to carry out basic tasks
- ability to use online computer applications to good effect without supervision
- awareness and understanding of the broader social and ethical issues surrounding computer and internet usage.

These form a cumulative hierarchy, which is shown in the following diagram, where each of the four elements 'represents increased familiarity with using a computer and a higher degree of computer literacy' (Market Equity 2001, p.2).

Figure 1: Four levels of computer literacy



Source: Market Equity (2001, p.2)

Although this hierarchy is a useful conceptual tool, ICT literacy is not a unitary concept, but rather a number of separable skills which are context-dependent. For instance, it is evident that a person making frequent and advanced use of information and communication technologies to perform specialised tasks will require different literacies from someone simply wishing to send and receive emails. A person with a particular interest in using the internet for online banking or investing in the stockmarket, for instance, will probably know more about the relevant software and internet sites than will someone using it to check the weather at various holiday destinations and someone wanting to download or to participate in online discussions about popular music, will develop different literacies from those using it to perform statistical analyses as part of his or her job. Therefore, when the concept of different levels of information and communication technologies literacy is combined with the notion of different aspects, it is clear that a complex matrix is possible and that any educational intervention designed to enhance people's ICT literacy needs to be multidimensional as well as being cumulative and developmental.

In discussing the issue of information and communication technologies literacy, it is worth commenting briefly on the widely held view about intergenerational differences between younger and older people in the context of their general levels of comfort and competence. Authors such as Tapscott (1998) and Rushkoff (1997) have stressed, sometimes in stark and exaggerated terms, the current differences between young people who have grown up 'bathed in bits', to use Tapscott's evocative phrase, in a world dominated by digital technology, and their elders—commonly including their parents and teachers—who have not. Clearly this is a phenomenon whose impact will diminish over time, as those with an almost-intuitive feeling for digital technologies become the majority. However, at the current time, many young people, including those enrolling in further and higher education and those entering the workforce, are more adept with digital technologies than those in positions of authority. Thus, while young people have probably, since time immemorial, had their own argot and their own youth culture, there is currently an unusual, perhaps unprecedented, lack of symmetry between age and expertise which is changing the power relationships in arenas such as the classroom, the workplace and the community. As Brodsky observes:

> *Colleges and universities are about to admit to their halls a new generation of learners. They have grown up in a period of collapse for societal structures and of recombinant, interlacing growth in electronic diversion. Theirs is a world of videogames; multitasking and attention spans geared to what speaks to them effectively. Many of our most inquisitive learners have been at least supplementing their pre-college studies, utilising Internet communications technology. Their 'learning diet' has included—in addition to content forays—a hefty dose of 'Internet community-based interaction'. Some of this has been recreational in nature (e.g. 'chat rooms' and MUDS [multi-user domains]). But*

> *programs such as the ThinkQuest contest have been demonstrating a methodology that integrates academic subject matter in areas ranging from liberal arts to science and mathematics with a collaborative quest to teach and learn via the internet.* (Brodsky 1998)

Appropriate levels of information literacy to evaluate sources

While there can be little disagreement about the vital necessity of having the technical competencies required to participate fully in the digital environment (which are simultaneously becoming more numerous but easier to master), there is a separate set of attributes which relate to the ability to solve information and learning problems, more or less independently of the form in which that information is provided. This is commonly referred to as 'information literacy', a concept which, like information and communication technologies literacy, has generated a large and growing body of literature.

Regrettably, the two concepts are commonly confused, so that some authors assume that information literacy automatically implies information and communication technologies literacy, while others make the reverse assumption; namely, that information and communication technologies literacy inevitably implies an ability to be discerning with information as well. The indiscriminate use of these two terms more or less interchangeably is regrettable, since it blurs some important distinctions between the attitudes and skills involved in each. In this context, I will discuss the two constructs separately, but at the same time it must be acknowledged that the distinction is, in some senses, arbitrary and artificial. Because of the provisional and volatile nature of knowledge in cyberspace there are, in fact, some significant senses in which the information-literate person of today is ICT-literate and vice versa.

In relation to the concept of 'information literacy', arguably the first mainstream use of the term was in 1974, at almost exactly the same time as the term 'lifelong learning' entered common parlance although, like lifelong learning, the concept—if not the term itself—can be traced back even further. In that year, Paul Zurkowski, then President of the United States Information Industry Association, presented a report entitled *The information service environment—relationships and priorities*, in which he advocated the establishment of a national program aimed at achieving information literacy within a ten-year timeframe. In the report he wrote:

> *People trained in the application of information resources to their work can be called information literates. They have learned techniques and skills for using the wide range of information tools as well as primary sources in molding information solutions to their problems.* (Zurkowski 1974, p.6)

In the late 1980s, recognising the increasing impact of information on people's lives, the American Library Association established a Presidential Commission on Information Literacy. According to the report of that commission: 'To be information literate, a person must be able to recognize when information is needed and have the ability to locate, evaluate and use effectively the needed information' (1989, p.1). This definition is not limited to any one form of information; indeed the report goes on to add: '… whether the information they select comes from a computer, a book, a government agency, a film, or any number of other possible resources'.

Starting basically with this 1989 report, the concept of information literacy has spawned a huge literature with many slightly different definitions. However, as Webber and Johnston (2000) state in their review of developments in the field, most such definitions have the following elements:

- effective information seeking
- informed choice of information sources
- information evaluation and selection
- comfort in using a range of media to best advantage
- awareness of issues to do with bias and reliability of information
- effectiveness in transmitting information to others.

(Webber & Johnston 2000)

Many of these definitions, and the above composite list of elements are not exceptions, tend to portray information literacy largely as a generic accomplishment, a matter of applying certain skills such as information retrieval or critical thinking, irrespective of the subject matter or of the medium in which it is contained or conveyed. Put simply, the implication is that there is a generic aspect to information literacy—a capability of distinguishing useful from useless resources, reliable from unreliable sources, and sensible from silly knowledge. A further implication, rarely made explicit, is that this generic kind of information literacy can be taught and learned in a context-free way. At one level this may be true; however, there is a strongly context-dependent element as well, and information literacy is influenced both by the domain or subject area, and by the form of the information, notably whether it is digital or hard copy.

In the context of subject-specific information literacy, simply because someone is competent and knowledgeable in one domain does not mean that this expertise inevitably carries over to an entirely unrelated field. While there may be some aspects of information literacy that can be applied irrespective of the particular field of study, it is also the case that a person who is more expert than another in any given field or study or practice is likely to have a more well-developed sense both of where relevant information is to be located, and how it may be retrieved and evaluated. Each field needs, therefore, to ensure that practitioners and information users in that field have the necessary attributes to be able to learn without being confused or misled when they

encounter spurious knowledge. In the same vein, there are clearly limits to the extent to which this accomplishment can be developed by, say, library or information staff in isolation. In the final analysis it is vital for subject-matter experts to help learners to realise the specific dimensions of information literacy in their particular subject area—whether this be architecture, accounting, social work, languages, nursing or any other field.

In addition to this subject- or domain-specific aspect of information literacy, there are also aspects that depend on or vary with the actual form in which the information is presented. In the offline world, although beginners may be unable to make a fully informed appraisal of the contents of what they read, there are nevertheless some well-established indicators that might be used to assess the trustworthiness of sources. Even in an unfamiliar field, an information-literate person is likely to be able to make an informed guess about the likely dependability of a resource. Particularly in the case of documents—books, journal articles, research reports and the like—there are well-accepted and time-honoured techniques for distinguishing the quality of the material with which readers, learners and scholars have to deal. These include indicators such as the name of the author, the extent to which he or she seems to be cited or quoted by other authorities in the field, the reputation of the publishers, the look and feel of the book, journal or report, and whether it appears to have been through some robust process of peer review. In the online world, however, many of these techniques are not applicable, and the familiar benchmarks are absent, or at least less evident.

The issue of evaluating information encountered in the web environment is not simple. Certainly the quality of writing itself, including the presence or absence of spelling or typographical errors, and the range and currency of references, are indicators of the likely authority of an article that appears on the screen, as is the reputation of the author (although not all online sources are attributed and even when they are, the problems of anonymity and forgery in the digital world are legion). The currency, truthfulness or trustworthiness of various knowledge claims can be tested by triangulation against other sources, providing such other sources are to be found. In their chapter entitled 'Teaching advanced literacy skills for the World Wide Web', Britt and Gabrys (2001) discuss 'sourcing' and the differences between sourcing in the print and non-print environments. They also discuss 'corroboration', which comprises looking for supporting information in other sources. They write:

> *Corroboration is an important skill for [learners] to have for several reasons. First, corroboration enables students to verify the accuracy of information before relying on it too heavily. [Learners] can check new information against other independent documents or find the most direct source. Second, corroboration enables [learners] to identify agreed upon facts, events and interpretations and to weigh them appropriately. Third, because no single document can offer a complete picture of the situation or argument supplied, the act of corroboration enables students to locate unique information not mentioned in the original*

> *source. Finally, through corroboration, [learners] can identify information sources that omit important generally agreed upon facts, interpretations or alternatives and this may serve as a red flag to identify whether an author may be intentionally deceptive or misleading.* (Britt & Gabrys 2001, pp.80–1)

Even more challenging is assessing the usefulness of the information for a particular purpose, a complex process of judgement that entails an evolving understanding of the field of inquiry. In most cases, the more experienced learner will be in a better position than the novice to make such an evaluation.

Anyone accessing and utilising resources in the online world must be aware of the possible threats to validity and reliability of the sources they encounter. Since not all information users will be experts in the field, at least not at the outset, it will be important to make use of the wide range and large number of web evaluation guides in existence, most of which include some discussions of topics, such as coverage, currency, objectivity, accuracy, authority and audience. For instance, on a website entitled 'Caveat Lector', Auburn University in Alabama has an evaluation checklist with the following sections:

Accuracy

- Does the author cite reliable sources for his or her facts?
- How does the information compare with that in other works written about this topic?

Audience

- Who do you think the author/s of the website are trying to reach?
- Is there a particular group or segment of society that the author/s are targetting?

Authority

- What are the author's qualifications for writing on this subject?
- Is he or she connected with an organisation that has an established reputation?

Currency

- Does the website include a publication date or 'last updated' date?

Objectivity

- Is the author affiliated with a particular organisation that might have a bias?

Purpose

- Is the author's purpose to inform, for example, provide new information, current events etc?
- Is the author's purpose to explain, for example, describe a process, teach etc?

- ❖ Is the author's purpose to persuade, for example, change your mind, convince you to buy etc.?

(Auburn University Libraries n.d.)

As useful as such checklists are, they do not deal with the specifics of particular fields of study or practice. Therefore, as with information and communication technologies literacy, there is a need for some domain-specific guides to quality. These must also be contextualised through direct interventions in the form of literacy education.

Whose responsibility?

If the foregoing argument about the vital importance of both information and communication technologies literacy and information literacy is accepted, then the question must be raised about where and by whom such attributes are to be developed. For many people, young and old, both information and communication technologies literacy and information literacy have been acquired piecemeal, through trial and error. While it would be untenable to expect members of our society to acquire conventional literacy in the form of reading and writing skills entirely through their own self-directed efforts, similarly it is becoming increasingly inappropriate to expect people to develop these other vital literacies in this adventitious way. Some sort of deliberate program of instruction and development is evidently called for, and an obvious starting point is the formal education system, partly because most countries are striving for near-universal penetration of compulsory schooling, and partly because it is particularly vital for young people to develop both informational and technological 'fluency' early in life. As a result, most jurisdictions have developed and are implementing policies on information and communication technologies and information literacy in the school curriculum. As mentioned above, some aspects of information literacy are clearly amenable to direct instruction, and may therefore be incorporated into the regular curriculum of various teaching and training authorities. Moreover, some of these programs can be relatively free-standing and generic, and may therefore be taught and assessed in the abstract. Others, however, are domain-specific and inevitably entail collaboration between information specialists and subject-matter experts.

However, young people are not the only ones who need to become both ICT- and information literate. Since they are both evolving and developmental phenomena, in effect a lifelong pursuit, it is equally important—perhaps even more so—for those of more mature years to have the chance to develop these attributes. Since such people occupy the entire range of positions in society, live in every conceivable geographic location, and have available to them widely divergent means for accessing learning opportunities, some sort of partnership is required between government, business and industry, professional associations, library and information specialists, education and training providers and community groups to ensure that the development of these literacies is enacted as a national priority.

Finally, there is a corollary to this line of argument. If indeed it is desirable to build such literacies into the courses and programs undertaken by students of all ages, there is evidence to suggest that, in many cases, the educators and trainers working in such settings do not always themselves feel comfortable with the skills required. Accordingly, educational institutions and authorities have bestowed considerable effort into identifying and specifying the attributes or competencies required to function as educators in the new information-rich workplace, and also into the provision of adequate and timely professional development.

This is particularly vital in the case of information and communication technologies literacy where many younger learners in fact already have greater levels of confidence and fluency than many of their teachers, indicating therefore a requirement for continuing professional development for educators, trainers, librarians and information specialists at all levels and in all sectors to ensure that programs are articulated and that the skills being developed are aligned with the emerging trends in the world of information.

A national priority

Despite Zurkowski's call as long ago as 1974 for national strategic approaches to the development of information-literate students and citizens, most governments have until recently been less than wholehearted in their commitment to this goal. In recent years, there has been a flurry of policies and national agendas addressing the needs of information economies and learning societies, and even some tentative advocacy for information literacy. However, few if any national governments have made a commitment to major educational or social initiatives that would see widespread adoption of information literacy training or assessment for their populations. Most initiatives tend to be piecemeal, in general aimed at limited sections of the population, such as school children, university students, library and information specialists, or those already within or wishing to enter the workforce.

Research and writing about the need for information literacy has, at the conceptual level at least, united diverse players—governments, educational providers, business and industry, librarians and information specialists among them. However, each group has tended to adopt a relatively narrow, and frequently quite instrumental perspective on the issue. Thus, educational providers commonly concern themselves with the skills and attributes required of students in the formal education system; employers and industry groups embrace information literacy but only to the extent that it contributes to their 'bottom line' results; governments release general statements about international competitiveness or active citizenship but rarely back this up with any concrete policy objectives; and librarians and information specialists advocate information literacy so that people can meet their information needs independently.

One exception to this generalisation is the Australian Library and Information Association's 'Statement on information literacy for all Australians' (Australian Library and Information Association 2001), which is as follows:

Principle

A thriving national and global culture, economy and democracy will be best advanced by people able to recognise their need for information, and identify, locate, access, evaluate and apply the needed information.

Statement

Information literacy is a prerequisite for:

a. participative citizenship

b. social inclusion

c. the creation of new knowledge

d. personal, vocational, corporate and organisational empowerment

e. learning for life.

Library and information services professionals therefore embrace a responsibility to develop the information literacy of their clients.

They will support governments at all levels, and the corporate, community, professional, educational and trade union sectors, in promoting and facilitating the development of information literacy for all Australians as a high priority during the 21st century.

(Australian Library and Information Association 2001)

It is, of course, notoriously difficult to unite such a diverse range of different stakeholders, even in support of an evidently beneficial proposal, especially when it entails the expenditure of resources to see it realised for all Australians. It is therefore vital to have explicit leadership and endorsement of the concept from the highest levels of government. In his paper prepared for the United States National Commission on Libraries and Information Science, UNESCO and the United States National Forum on Information Literacy, Horton argues unambiguously that the provision of information literacy must be a national priority and, moreover, that it must be construed as a basic human right. He writes:

- *Educating and training its citizens, even in a limited way, with the basic knowledge and skills needed to find, retrieve, organise, evaluate and use information … is not seen around the world as a public policy obligation of government, with the possible exception of a very few … countries; the special public information needs of disadvantaged and disabled citizens are even more rarely addressed*

- *[however], information literacy must be singled out and elevated to the status of a major national policy and programmatic goal; adequate funds must be appropriated to support public sector information literacy initiatives at the federal, state and local levels; schools and libraries must play a key role in these initiatives; public and private sector information literacy initiatives must be complementary.* (Horton 2002)

Clearly such a vision goes well beyond the present patchwork of provision in most jurisdictions. It rests on the recognition that, not only 'public information is a strategic resource needed at all levels of society, by all people in all walks of life', but that 'information literacy skills are necessary to exploit that strategic resource, and … the acquisition of those skills by all citizens should be treated as a basic human right' (Horton 2002).

One of the problems about discussing both the need for and existence of national policy positions in relation to these domains is the issue already highlighted, that of the conceptual and terminological confusion between them. Thus some governments have endorsed national policies in relation to information literacy when they manifestly mean information and communication technologies literacy, and vice versa. There tends to be considerable slippage between these two concepts, but whenever governments refer, as many of them do, to the 'digital divide', the 'knowledge economy' or the 'information society', it is a reasonably safe bet that their primary concern is with the attainment of information and communication technologies literacy and the capacity of citizens to engage in the digital domain.

In any dynamic and fast-changing field such as this, it is difficult to be exhaustive at the national level, and even more impossible to identify useful projects and publications generated at the level of states, or regional areas. However, it may reasonably be said that, while no one country or region has a comprehensive policy environment, there are many valuable examples in different parts of the world, and any government wishing to create an integrated approach to information literacy and information and communication technologies literacy has a wealth of resources on which to draw for inspiration.

Conclusion

In recent years, the concept of lifelong learning has moved from being largely a rhetorical flourish at the margins of educational theory and practice, to a central construct, as a major organising principle for educational policy-makers and practitioners around the world. Of the many reasons for this, one principal factor has been the 'information explosion', which has led to an irresistible requirement for more or less continuous learning by all members of society. What is more, the changes are so pervasive and unremitting that no individual

or group is exempt, and lifelong learning looks like being a central feature of our society for the foreseeable future.

There are two inevitable corollaries of this increased emphasis on learning throughout life. The first is the requirement that people must have access to needed information; the second is that they must be able to judge the quality of the information to which they are exposed. As a result, discourses about lifelong learning have become inextricably interwoven with concerns about equitable access to information (much of which is in digital form) and policies and practices designed to enhance the capacity to deal with large—often overwhelming—amounts of information.

These imperatives represent more than an incremental shift; they constitute a significant refocussing of effort, for government, for business and industry, and for education and information providers. In addition, with the rapid globalisation of information, such initiatives must be seen in a global perspective. In concluding this brief review of lifelong learning and information literacy I would echo and endorse the sentiments of the G8 Digital Opportunities Taskforce. We urgently require:

> *… an enhanced and coordinated global effort to build digital opportunity for all, to extend the power and promise of the digital revolution to all parts of the globe and all segments of society; to help the poorest help themselves to create richer and fuller lives that express and affirm their own distinctiveness in an increasingly interconnected global village.*
>
> (Digital Opportunity Task Force 2001, p.12)

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The partnership challenge

Some international perspectives on policy for information and communication technology in education

Peter Kearns

The high promise and pervasive influence of information and communication technologies in education, and in society generally, is a dominant message from an international study of policy relating to information and communication technologies in education undertaken by Global Learning Services for the Commonwealth Department of Education, Science and Training.* At the same time the study identified considerable disappointment across the countries studied in relation to the slow pace of change to realise this promise, and a fairly general recognition that ways needed to be found to accelerate the pace of change if society was to benefit in full measure from the potential of information and communication technologies as a tool for learning in an information and learning society. This has led to a focus on innovation strategies that will bring about the desired changes.

Introduction

AN INTERNATIONAL STUDY on policy relating to the use of information and communication technologies (ICT) in education was commissioned by the Department of Education, Science and Training. The study involved three components:

- the development of a database of policy summaries which can be accessed through EdNA Online (http://ictpolicy.edna.edu.au)
- an overview report on Australian developments (Kearns & Grant 2002)
- an international report which provides an overview of developments across 13 countries and international agencies (Kearns 2002).

We found that policy in most countries had a focus on the role of information and communication technologies in schools as the level where the

* A summary of the report, *Towards the connected learning society: An international overview of trends in policy for information and communication technologies in education* (Kearns 2000).

foundations for effective use of technology as a tool of learning in a learning society must be laid. In some cases, national strategies for information and communication technologies in education were restricted to schools. Australia was distinctive in having co-ordinated sectoral action plans for schools, vocational education and training (VET), and higher education linked in the *Learning for the knowledge society* action plan (Department of Education, Training and Youth Affairs 2000).

Nevertheless, the key findings from the study are as relevant to the VET sector as they are to schools, and a persistent message from the study highlights the need for systemic and cross-sectoral perspectives which link action across the sectors of education and training, and which connect to initiatives in sectors outside education. The role of information and communication technologies in education and in society has been rightly termed by the Organisation for Economic Co-operation and Development (OECD) as 'the partnership challenge' (OECD 2001a) and a core issue in the challenge of realising the full potential of information and communication technologies as a tool for learning in many contexts resides in finding creative and innovative ways to build partnerships and coalitions to support a shared vision and objectives.

The question of partnership action across society is intimately linked in a knowledge and learning society to the concept of information and communication technologies as a tool for lifelong learning. We found that the countries studied varied in the extent to which these linkages were explicitly made in national policies and strategies, with European Union countries having the most developed connections in line with European Union policies for lifelong learning and e-learning (European Commission 2001a, 2001b).

Overall, the major themes in the report which have implications for the VET sector were:

- the progression of stages in policy development
- disappointment at the slow pace of change
- fostering innovation strategies to accelerate the pace of change
- building partnership and cross-sectoral collaboration
- the digital divide and the equity challenge
- information and communication technologies and lifelong learning.

The progression of policy development

We found in both the Australian and international studies that policy had progressed through two stages of development, while some countries were poised on the threshold of a third stage which would transform the way we learn in a learning and knowledge society.

These stages were:

Stage 1: rolling out computers into schools and colleges with some professional development of teachers and development of online content

Stage 2: mainstreaming and integrating the role of information and communication technologies into education in a more strategic way with more concern for objectives, and with linkages forged to overall education strategies.

All Australian systems and all of the countries we studied are currently in this second stage of policy development. However, some countries are now examining ways of progressing to a third phase of policy which would realise the full potential of information and communication technologies in transforming the way we learn (Kearns 2002, p.29).

The concept of this transformative third phase was enunciated by the Swedish Minister for Education in a speech last year in a European Union forum in the following terms.

> *Here the role of ICT in schools is not only changing but the whole view of learning and of school as an institution is also changing. Learning is increasingly regarded as something for each and everyone throughout the course of their lives. Traditional school boundaries are being removed, classrooms are being opened up and at the same time new groups are starting to use school resources; for example, through learning at the workplace, while the school itself is increasingly using resources in society for educational purposes.*
>
> (Swedish Ministry of Education and Science 2001)

While this statement is made with reference to the role of information and communication technologies in schools, it could equally apply to the implementation of flexible learning strategies in the VET sector. The combined impact of these technologies and pressures for lifelong learning is starting to lead to shifts in roles and relationships as, for example, in some current innovations in relation to public libraries, where a number of libraries are being planned to combine library, learning centre, and community technology centre roles.

A number of countries are sharing ideas on how to progress to this third phase of policy for information and communication technologies through an informal ICT League. These countries are Sweden, Denmark, Iceland, Canada, and The Netherlands. Britain shares this interest, and late last year released a discussion paper entitled *Transforming the way we learn: A vision for the future of ICT in schools* (Department for Education and Skills 2001).

The outcomes

Our research demonstrated that, while there have been some creative innovations harnessing the potential of information and communication

technologies to advance learning in education institutions in Australia and overseas, there was generally considerable disappointment at the slow pace of change overall.

Research studies in the United States and Britain have shown that information and communication technologies, when well applied, can lead to gains in student achievement and attitudes; for example, the United States Department of Education (2000, p.21) summarised the findings of 13 research studies. They stated that students have demonstrated that there is an increase in achievement using technology: students can learn more in less time and undertake more ambitious school projects; they also demonstrate a more positive attitude towards classes using technology.

A major British longitudinal study identified more mixed outcomes and confirmed the continuing strong relationship between access to computers and socio-economic status. Examination pressures, and other organisational pressures act as barriers to innovative use of information and communication technologies in learning and teaching, so that overall, these technologies are not being used to their full potential to transform learning (Department for Education and Skills 2001).

This theme of disappointment at the slow pace of change was common across the countries studied, although less frequently articulated in Australia. An adviser to the British Educational Communications and Technology Agency (Becta), reviewing British progress in a research conference in 2000, argued that the United Kingdom was trapped in a cycle of classic innovation failure 'involving a low quality implementation of not very powerful technology'.

The Netherlands Ministry of Education, Culture and Science in a recent review of policies for information and communication technologies in education in ICT League countries reported that: 'internationally there is concern about the relatively slow pace of change' (Netherlands Ministry of Education, Culture and Science 2002, p.26).

The ministry further concluded:

> *There seems consensus internationally that it is much harder to integrate ICT in education and to realise e-learning than was generally thought a couple of years ago. And there is a broad awareness that the developments need to be speeded up.*
> (Netherlands Ministry of Education, Culture and Science 2002, p.16)

There are echoes of this line of comment in countries as different as Sweden and the United States, in some cases linked to an argument that education systems should be re-engineered to enable the great potential of information and communication technologies as a tool of learning to be realised (Swedish IT Commission 1997; National Association of State Boards of Education 2001).

The American National Association of State Boards of Education, in the 2001 report of its study group on e-learning, offers a typical response to this position in arguing that the need existed to re-engineer the education system.

However, the uncomfortable reality is that the education leaders are not currently driving the policy agenda. Rapidly moving trends are outpacing the ability of policymakers to keep up.

(National Association of State Boards of Education 2001, pp.i–ii)

This strident call for a new flexibility and responsiveness in learning strategies was summed up by the National Association of State Boards of Education (2001) in the phrase: 'Any time, any place, any path, any pace'.

Innovation strategies to accelerate the pace of change

This fairly general disappointment at the slow pace of change, which should not surprise us, has led to a keen interest in innovation strategies that will accelerate the pace of change and transform the way we learn with technology.

Table 1 provides an overview of the most common innovation strategies we found across the countries we studied.

Table 1: Strategies to foster innovation in extending the role of information and communication technologies in education and society

1	Fostering vision and leadership
2	Strengthening and focussing the research and development role and linking this more closely to policy and practice
3	Building networks to stimulate the flow of new ideas
4	Developing and promoting models of good practice
5	Implementing whole-of-community strategies
6	Innovation in forms of partnership

Source: Kearns 2002, p.105

Each of these strategies links to a general policy thrust to move away from 'top down' 'imposed policies', to 'grassroots strategies' that stimulate and support creativity and innovation at the local level and the building of partnerships and networks to drive the desired objectives.

This 'energising the grassroots' strategy is also perceived as one designed to promote cultural change to support the aspirations of a learning and knowledge society, so that teachers, institutions and communities become motivated and empowered to use information and communication technologies in creative ways as a tool for continuous learning and for building a learning and innovation culture.

This general approach may be observed in the policies and programs of the European Union through its publication, *E-learning action plan*, and the companion volume, *Making a European area of lifelong learning a reality* (European Commission 2001a, 2001b).

These policies include:

- strategies to enhance the role of information and communication technologies as a tool of lifelong learning
- the role of European Schoolnet as a network of networks in building partnerships and collaboration across Europe as well as the flow of new ideas
- planning to build a network of 5000 European innovative schools to serve as a test-bed for the latest technologies and new learning strategies—a bank of case studies will be available online to serve as models and exemplars
- a strong research effort under the e-learning action plan with close attention given to dissemination of findings and to fostering interaction between research, policy, and practice.

(European Commission 2001b)

The need to strengthen research and development, and to develop a better interaction between research, policy, and practice is widely reflected across the countries we studied. The aim of strengthening research was built into the United States' national education technology plan of 2000, the European Union's *The e-learning action plan* and into the practices of the relevant British agencies (United States Department of Education 2000; European Commission 2001a, 2001b).

The practices adopted by the British Educational Communications and Technology Agency illustrate good practice in forging these interactions. The research network established by this agency as a deliberate policy extends membership of the network to practitioners and policy-makers, as well as to researchers. In this way an ongoing dialogue is encouraged between research, policy, and practice (http://www.becta.org.uk/research).

Research priorities have been identified in the United States, the European Union, and British Educational Communications and Technology Agency research programs. An overview is given in appendix 2 of the international report (Kearns 2002, pp.143–6). There is a fair degree of commonality in the priorities identified across these systems, for example:

- how people learn in the information age and the pedagogical implications of these findings
- development of systems to support learning with technology
- virtual models at all levels (schools, higher education, VET)
- managed learning environments.

The search for effective strategies is closely linked to an interest in managing change through organisational and administrative policies.

A good example is provided by the policies adopted for British further education colleges, the British equivalent of technical and further education. These policies were developed by the former Further Education Funding Council, but are now administered by the British Educational Communications and Technology Agency on behalf of the Learning and Skill Council which is now the funding body.

The approach adopted involves three main thrusts:

- a requirement for each further education college to produce an information and learning strategy which is submitted to the British Educational Communications and Technology Agency for monitoring and evaluation
- a package of measures announced in December 1998, known as the National Learning Network, which provides 74 million pounds over three years to support information and communication technologies in further education colleges. This includes the central provision of bandwidth for further education colleges secured under a joint program with universities
- the development of a resource, Further Education Resources for Learning, which operates as a web-based information and resource system for practitioners.

(Kearns 2002, pp.150–1)

This mix of incentives, resources, and 'stick' appears to be driving change in colleges. In its 2001 assessment of college information and learning strategies, the British Educational Communications and Technology Agency reported on their strengths and weaknesses (http://ferl.becta.org.uk/ILTstrategydocuments.cfm).

The agency concluded that exemplary strategies had all started from a pedagogical and curriculum focus and had a clear vision of how technology could and should serve learners, teaching, and learning. Weaknesses resulted from colleges having no pedagogical vision for information and learning strategy. This conclusion is also relevant to VET in Australia.

The adoption of whole-of-community strategies is present in programs such as Canadian Smart Communities (http://smartcommunities.ic.gc.ca) and British Wired Communities (http://www.dfes.gov.ua/wired/index.shtml). In both cases, technology is linked to broad whole-of-community strategies where information and communication technologies become an instrument for innovation and for furthering access and equity objectives. As yet, there is no substantial research base to enable judgements to be made on the value of this approach. Australian learning communities up to now have normally not used information and communication technologies in a strategic way as a tool for providing lifelong learning opportunities for all.

Partnership and cross-sectoral collaboration

One of the key features of the international scene has been the emergence of innovative forms of partnership, including cross-sectoral collaboration involving the sectors of education.

A range of innovative partnerships has emerged including:

- *cross-sectoral collaboration* to provide infrastructure as in university and further education partnerships under the British JANET scheme, or university and school collaboration as in the Digital California Project
- *public/private partnerships* as in the British University for Industry, the National Grid for Learning, the Singapore eduQuest, Australian Information Technology Hub, and Irish Schools Integration Project
- *partnerships in local and regional development* as in Canadian Smart Communities and British Wired-up Communities
- *initiatives taken by groups of firms* as in the American CEO Forum and European E-learning Summit
- *collaboration between groups of universities and colleges* as in the development of the Swedish Internet University, and in the operation of consortia such as JANET, CANARIE, Internet 2, CENIC, and AARNet.

All of the partnerships listed above are included in the policy database developed through this project which links to the relevant website. The database may be searched for detailed information on these initiatives (http://ictpolicyedna. edu.au).

In a number of instances, cross-sectoral collaboration has proceeded further than is currently the case in Australia. Examples are in the area of the provision of bandwidth for institutions.

Both universities and further education colleges participate in the British JANET scheme to obtain bandwidth with the scheme receiving funding from both the Higher and Further Education Funding Councils (http://www.jisc.ac.uk).

Californian universities which are linked in a consortium called CENIC to obtain bandwidth collaborate with Californian schools under the Digital California Project so that schools access bandwidth through this network arrangement (http://www.cde.ca.gov/edtech/dcp.htm).

While some of these partnerships have arisen from individual initiatives, as in the Digital California Project, in other cases government policy has actively promoted cross-sectoral collaboration and partnership building. The British JANET scheme provides a good example of the government role in partnership-building. As noted earlier, the information and communication technologies role in education has been aptly termed by OECD 'the partnership challenge'.

The digital divide and the equity challenge

We found that all of the countries studied were concerned about the digital divide in society, and that some countries had initiated comprehensive strategies to address exclusion from the benefits of the 'information society'.

The term 'digital divide' has emerged in international usage to refer to 'the gap between individuals, households, business and geographic areas at different socio-economic levels with regard both to their opportunities to access information and communication technologies, and to their use of the internet for a wide variety of purposes' (OECD 2001b, p.5).

The danger of social exclusion of those citizens lacking basic digital literacy is widely recognised across the countries studied.

> *Social exclusion from various causes and social inequality pose the most serious threats to the development of an information society.*
>
> (Finland Ministry of Education 2000, p.5)

A useful analysis of the nature of the problem and possible responses is provided by the report of the Digital Opportunity Task Force of the G8 Heads of State. The task force was established by the G8 leaders following adoption of the Charter on the Global Information Society at the 2000 Kyusha–Okinawa meeting of the group.

The analysis of the task force included the following key points:

- The digital divide is threatening to exacerbate the existing social and economic inequalities between countries and communities so the potential costs of inaction are greater than ever before.
- The problem can't be addressed in isolation from the root causes of socio-economic inequality and exclusion.
- Novel forms of partnership are needed to address the problem.
- There is an urgent need for a multi-faceted and multi-layered effort by all stakeholders.

(Digital Opportunity Task Force 2001, pp.10–13).

The analysis of the problem has influenced a spectrum of policy responses that we observed across the countries studied, the most common being:

- reducing the cost of information and communication technologies for poor communities, families and schools
- developing a network of community access points such as the American Community Technology Centres and United Kingdom Online Centres
- implementing comprehensive regeneration programs in poor areas to include 'joined up' policies, with information and communication technologies seen as a tool for community regeneration
- information strategies and monitoring programs.

The nature of information and communication technologies policy as 'the partnership challenge' is nowhere better seen than in the imperative for 'novel forms of partnership', and for 'multi-faceted and multi-layered effort by all stakeholders' in addressing the digital divide in society and social exclusion.

Innovation and creativity will be required in bringing stakeholders together so that 'joined up policies' and multi-layered action can be achieved through partnerships, in particular at the local level. This will require the convergence of whole-of-government and whole-of-community strategies.

While developments such as Australian Learning Communities have the potential to provide a framework for such partnership development, learning communities have not yet progressed to this point in their development. Projects along the lines of Canadian Smart Communities, with information and communication technologies linked to community development, could have considerable value in testing such approaches, with community technology strategies acting as an instrument for partnership-building in addressing the digital divide in communities. The VET sector can be an active player in such strategies, along with partners such as community libraries, schools, employers, councils, and community organisations representing those excluded.

Information on policies adopted in the countries studied is included in the policy database for such responses as the American E-rate scheme, American Community Technology Centres, and British UK Online Centres and Wired-up Communities. The British approach is of particular interest in applying 'multi-faceted and multi-layered effort by all stakeholders' with a range of policy instruments connected. These include the role of UK Online Centres, Wired-up Communities, Lifelong Learning Partnerships, local Learning and Skill Councils, and University for Industry and Learndirect. Initial evaluation studies on the outcomes of UK Online Centres show promising results (Department for Education and Skills 2002).

Information and communication technologies and lifelong learning

The countries and international agencies included in our study differ in the way they view the fundamental role of information and communication technologies in education. Policy in the majority of countries and international organisations included here is driven by a vision of an 'information society' underpinned by the aspiration of lifelong learning for all.

This approach underpins policy in the European Union and in European Union countries such as Britain, Sweden, Finland, and Ireland. The European Union has achieved a convergence of policy in these two critical areas that underpin an information society. This convergence is reflected in the European Commission's *The e-learning action plan* (European Commission 2001b) and its

strategy, *Making a European area of lifelong learning* (European Commission 2001a). All European Union education programs are now underpinned by lifelong learning objectives.

OECD and countries such as Canada adopt a similar approach in viewing the role of information and communication technologies and lifelong learning as essential ingredients of an inclusive and successful information society.

The situation in Australia is, however, rather mixed, as the report on Australian information and communication technologies policy demonstrates (Kearns & Grant 2002). While most states and territories are developing policies for lifelong learning, there is no comprehensive national vision and policy for lifelong learning, or for a vision of Australia as an inclusive and cohesive information society. Whether the absence of such a national vision and policy framework is an impediment to realising the full potential of the role of information and communication technologies in education, and in Australian society, merits wide community and political discussion.

General comment

The Australian and international overview reports on policy for information and communication technologies in education reveal a dynamic situation of change as governments everywhere struggle with the challenge of responding to the pervasive influence and impact of this technology in the emerging 'information and knowledge society'. A paradigm shift of this nature from an industrial to post-industrial society inevitably brings with it tensions and conflicts of interest. The education sectors are at the frontier of this process of change.

The Australian report testifies that much has been achieved in partnership action between the Commonwealth, states and territories in addressing this challenge, with a broad spectrum of institutional arrangements and programs now in place. Nevertheless, the partnership challenge of information and communication technologies policy remains, with an imperative need to progress these arrangements in line with rapidly changing conditions and needs—and action taken in other leading countries.

While many stakeholders have a vital interest in the process of transition and change, the requirement to progress to whole-of-government strategies that link the whole-of-community responses lies at the heart of the challenge for Australian society in the information age. Imagination, creativity, and effective partnerships will be required. Herein lies a great opportunity for the education sectors, including the VET sector, to exercise a leadership role in redefining their role, relationships and contribution—in company with many partners in this journey towards a necessary vision of Australia as a just, inclusive, and successful learning society in the information age.

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Teaching practice and learner views

One size doesn't fit all

The pedagogy of online delivery of VET in Australia

Roslin Brennan

This chapter* discusses the pedagogical implications of online delivery of teaching and training particularly in the light of rapid and substantial technological change. Using a theoretical framework, the data from the project were consolidated to create a set of assertions about current online pedagogical practices. The research findings clearly demonstrate that a number of indicators of pedagogical effectiveness were relevant to the online delivery of vocational education and training (VET) but that pedagogical practice rarely conforms to these principles. Furthermore, online delivery needs to address all the dimensions of known factors which contribute to effective practice and student learning.

Introduction

As we move into the second wave of technology application in teaching and training, it is clear that teachers, trainers and students are becoming more used to the application of technology to the processes of teaching and learning. Evaluation is still surprisingly scant but a mood of critical appraisal of the effectiveness of the medium to deliver high-quality learning outcomes is gradually developing.

One significant requirement is for the development of a framework and a language which allows a wide range of individuals and groups to discuss online pedagogy in an informed way. The literature, the current debates and the research suffer from an inability to draw together the rapidly changing and disparate information about the application of technology to vocational education and training in a coherent way.

The pace of change, the new skills to be learnt, and the volatility of the medium all militate against reflection, evaluation and discussion. However, as teachers and trainers gain more specific knowledge relating to the use of

* A summary of the report, *One size doesn't fit all: Pedagogy in the online environment* (Brennan forthcoming).

technology and online approaches, it is likely that they will be more accepting of the idiosyncrasies of the medium and progress to consideration of methods of instruction and evaluation of practice. Technology may still be driving pedagogy, but the theme of 'Stop Revive Survive' is becoming increasingly accepted. Students are also developing the language and confidence to analyse their own reactions to the persistent effects of technology on their learning.

In the wake of these changes, issues of pedagogy have assumed a higher profile. The use of the technology primarily for the transmission of information has been challenged and changed by teachers and trainers. Individuals, groups and organisations are thinking about how to use the technology in ways that conform more closely with what they know about effective practice.

This project has drawn together the views of policy-makers, managers, teachers, educational designers, and students to answer some fundamental questions about online pedagogy in the VET sector.

What questions did the project try to answer?

To achieve the objectives of the project the following questions were asked:

- What pedagogical assumptions underlie online delivery?
- What are the teaching and learning areas for which online delivery is best suited pedagogically? For what areas of teaching and learning is it not suited?
- What teaching and learning styles facilitate effective online learning?
- What interactions at the individual learner level are most effective in contributing to effective online learning?
- How does online learning affect the roles and skills required of those involved in the learning process?
- What relationships exist between pedagogical features and world's best practice in online delivery and how does it incorporate these findings?

The data collected provided answers to the questions above which are reported in this chapter. But first some background.

What is this thing called online delivery?

The numbers of fully online courses are still relatively small. In some places where fully online courses have been used to deliver VET, teachers have reverted to mixed-mode delivery because of high attrition rates and student dissatisfaction. However, this has been balanced against an increasing trend to use computer technology as a teaching and training 'tool'.

Even in the very traditional trade areas the computer is becoming accepted as a teaching and learning resource, although the level of teacher scepticism is

high and the usage peripheral rather than a core component of course design and delivery. Therefore, the most common practice is the integration of computer-based technology to deliver modules or parts of modules within VET. The teachers and students in this project recognised and confirmed this delivery preference. This results in a more 'blended' form of delivery which provides flexibility and access for students who may be separated from face-to-face teaching and learning by work demands, distance or circumstance.

The variety of online learners and teachers who are working in very different contexts is exemplified by the single student studying for a business administration qualification in a shire council office 250 km from her technical and further education (TAFE) campus. She is supported by a teacher who works with this student in her own time. This situation is contrasted with the student in suburban Sydney who is doing an introductory online course in computer technology and unable to attend classes because of cultural constraints and the demands of young children. She is participating in an online class that has been set up by two enthusiastic teachers who have designed and run the course in their own time. These scenarios are then starkly contrasted with a class of 12 online learners who are completing a Certificate IV in Information Technology supported by prepackaged materials and extensive support which is factored into the working roles of the teachers involved. There is a wide range of levels of support for both teachers and learners working online and a wide range of reasons why learners choose to access online learning.

How was information collected?

Multiple methods of data collection and analysis were used in this project. These methods included a literature review and interviews with stakeholders in positions of expertise and/or policy management. This enabled the identification of a set of themes and attributes of online learning which were then tested more practically.

A series of workshops at a variety of sites were held in order to validate the indicators of pedagogical effectiveness distilled from the literature review and stakeholder interviews. A teacher and student questionnaire was then developed and administered to a range of sites including urban, rural and remote settings. The results of the 210 questionnaires were then analysed. In addition, detailed analysis was conducted of 11 online courses covering various content areas at various Australian Qualifications Framework levels.

Finally, using the theoretical framework developed by Ailwood et al. (2001), all the data were consolidated to create a set of assertions about current online pedagogical practices.

What is pedagogy?

'Pedagogy' is a term plagued by differences in definition. Furthermore, it is not always one with which people are comfortable. This discomfort results from multiple and often unclear meanings. Frequently people resort to lists of skills in an attempt to explain the meaning of the term. This is evident in the literature and in the discussions that preceded the collection of the questionnaire data from the project reported in this chapter. In its simplest terms, pedagogy is concerned with the work or 'art' of being a teacher, or teaching.

In this study a generous interpretation of pedagogy has developed and is reflected in the arrangements made to enable someone to learn something for a specific purpose. These arrangements are influenced by:

- the general orientation of the teacher or trainer
- the kind of knowledge to be developed
- the nature of the learner
- the purpose the learning is to serve.

Pedagogy is a set of processes which are influenced by the orientation of the teacher, the needs of the students and the extent to which materials and media act as determinants or otherwise of teacher behaviour. These processes are circumscribed by larger cultural, economic, political and social infrastructures which influence the style of teaching and affect the success of the learning. In discussions of online pedagogy the tendency has been to isolate skills and domains of skills required by both teachers and students to work effectively online. While these lists are helpful they represent only part of the picture. As the research has shown, online learning usually occurs in mixed-mode format. Therefore, a broader range of pedagogical issues would come into play which reflects the flexible approaches to learning that online helps to foster and promote. Such approaches enable a 'constructivist' view of learning to be adopted.

What are constructivist approaches to online learning?

More recent thinking about online pedagogy has led to the label of 'constructivism' being attached to online teaching approaches and learning experiences. This is where learning is seen as an active process, with learners constructing new ideas and concepts based on their current or past knowledge. The instructor attempts to guide them through this constructive process and point them to information and learning processes which best suit their way of learning.

The potential to use the web to extend the information base available to students and the navigational choices that come with online teaching and learning fit well within aspects of the constructivist view. However, constructivism is a much more complex activity than simply 'hunting and

gathering' information. It involves the students in the acquisition of content knowledge, the development of this knowledge into procedural knowledge through deep learning and the ability to apply this knowledge in a range of situations. The characteristics of online delivery still lean very heavily on the transmission of information, albeit from a range of different sources with some degree of learner control over new sources of information. However, the research has found that it is doubtful if the term 'constructivism' is the correct pedagogical description to apply to many of the current online teaching and learning situations.

What does the literature say?

The research questions generated a huge amount of information, some of it confirming the assumptions about online practice and some disputing the assumptions.

The literature about online pedagogy is very new (Schofield, Walsh & Melville 2000) and poses problems for teachers and researchers alike (Schrum 1998). Institutional motivation and interest are both at a high level, but good-quality research is in short supply (Graham et al. 2000). The predominant themes in the literature are concerned with the mechanics of design, the process of implementation and some evaluations of student outcomes and staff participation. The questions of access and technological issues have been major topics of practitioner and researcher discussions and reflect the relative youth of the technological innovations saturating the education and training workplaces and the relative inexperience of teachers working with the new media. (The average experience of online teachers in the project was one-and-a-half years.)

A great deal of literature refers to the skills required by both teachers and students if they are to work in an online environment (Kemshal-Bell 2001). The actual mixture of these attributes necessary to form a coherent pedagogy remains unclear as practitioners focus initially on the technology itself, its capacities and effects, and the skills required to make these attributes operational. It would seem that the role of the instructor/teacher becomes less professional when compared to the conceptualisations that apply in a face-to-face teaching or training situation. These themes recur in other areas of the literature (Holzl & Khurana 2000; Zorfass et al. 1998; Mitchell & Bluer 2000) and certainly emerged in the discussions with experts, policy-makers and teachers.

The next layer of literature investigates the assumptions that underpin different varieties of online delivery. It is asserted that the new media cater for individual learning styles and preferences, and that teaching can make use of these features. Some of the assertions about online learning (see O'Connor 2000; Booker 2000) conclude that it:

- has the capacity to create active engagement
- makes for easy access

- provides learners with a great deal of choice about computer-based information
- speeds up communication between teachers and learners
- removes unhelpful time constraints.

However, the instructional strategies used currently in Australia still predominantly deal with the delivery of content (Brown 1998; Harper et al. 2000; McKavanagh et al. 2002) and online assessment is still in its infancy. Students and teachers agree that web-based content was still the main use of the technology, with email as a means of communication holding the second ranking. Where there was a clear focus on communication, collaboration, interactivity and problem-based learning, online learning was unequivocally rated as effective (Beach 2000). However, students report extensive barriers to their learning (Harper et al. 2000; Brennan 2001). Technological difficulties, lack of motivation, high levels of potential misunderstanding (Kerka 1996) and uncertainty about their personal levels of technological competence militate against effective learning in a constructivist environment. Student responses to the project questionnaire supported this assertion.

The literature contains references to the differences between the teacher skills required online by comparison with situations of face-to-face instruction. In the former context the teacher needs to think of his/her role in terms of group planning, regular teacher and student feedback, acquainting students with the demands of the technology being used and detailed scaffolding of student learning (Oliver, Omari & Harrington cited in Harper et al. 2000). These assertions have caused many educators to reassess their current practice in both an online and a face-to-face environment. The pedagogical implications of these changes of attitude include the need for greater curriculum diversity, new assessment strategies (Schrum 1998) and a fresh look at the structure of learning to accommodate different styles and preferences (O'Connor 2000). Whether online or face to face, a re-assessment of these aspects of pedagogy is a healthy thing.

What are the indicators of pedagogical effectiveness?

Recent National Centre for Vocational Education Research (NCVER) and other publications (for example, Choy, McNickle & Clayton 2001; Cashion & Palmieri 2000), and many of the chapters in this book, have covered broad second-level issues such as 'effectiveness', teacher and student reactions to online delivery, materials design, learner diversity, teacher/trainer competencies and preparation, and professional development. However, there is a distinct lack of literature in which all of the factors influencing online delivery and learning are brought

together. For this reason a meta-evaluation of the literature (Straw & Cook 1990) was carried out to search out the 'convergence of results across studies' (Straw & Cook 1990, p.58) and identify indicators of pedagogical effectiveness. These indicators were then tested and refined through interviews and workshop activities in the course of the project.

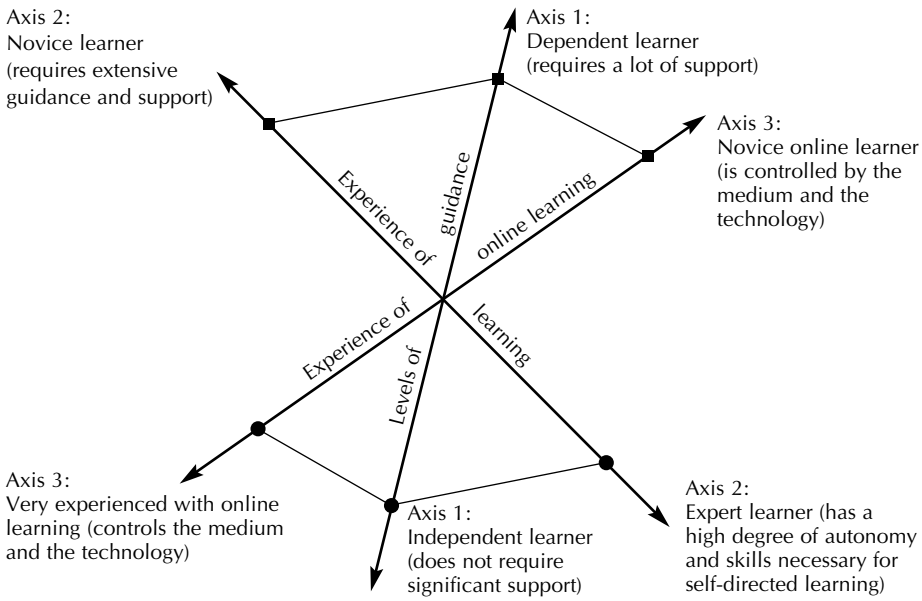
These characteristics of good online learning practice encompass the following:

- a learner-centred environment
- approaches enabling learners to build new knowledge and skills based on what they already have (constructivist approaches)
- high-quality materials design
- teaching and learning strategies that develop cognitive skills
- high levels of interactivity between all participants
- guaranteed and reliable forms of access to the technology
- quick and easy access to the technology and the particular site of online learning
- engagement with the online materials
- learning experiences that encourage synthesis and analysis
- opportunities for 'deep learning'
- consistent levels of feedback
- thoughtful matches between materials, learning styles and learning contexts
- a model of delivery that includes thorough planning, monitoring, reviewing and evaluating of course materials and student progress
- a range of available navigational choices for students
- teachers who are imaginative, flexible, technologically adroit, committed, responsive and expert.

Dimensions of current online pedagogy

Both the literature reviewed and the interviews conducted indicated that there are no absolutes in getting the 'right mix' of these indicators to guarantee effective learning. The realities of online teaching and learning acknowledge that there are a number of continua along which teachers and learners are located at any one time, and it is the complex interaction of these that define effective pedagogy. Figure 1 sets out these continua diagramatically.

Figure 1: Some dimensions of online pedagogy



Axis 1 shows how the needs of the learner influence content and the forms of delivery. This continuum extends from the new 'dependent' learner who is focussed on discrete pieces of content to the 'independent' highly self-directed learner who constructs their own learning and search for meaning. It acknowledges that factors such as learner background, learning styles and preferences, literacy levels, cultural and social background and self-efficacy will influence the types of online delivery that are likely to be effective along the continuum. It also recognises the different purposes of learning and teaching and the fact that different types of knowledge demand different forms of online delivery.

Axis 2 plots levels of self-management and the levels of guidance that students require. It extends from those 'novice' learners who require extensive guidance and support to those 'expert' learners who have high degrees of readiness, autonomy, motivation and other skills that equip them for self-directed learning. It takes into account the relative levels of critical literacy, procedural knowledge, meta-cognitive awareness and the learner's understanding of their own ways of learning.

Axis 3 plots the continuum of experience with learning in an online environment. It shows the relative 'control' over the medium that both the learner and teacher have. The greater the degree of control by teachers and learners, the more pedagogy can change and become flexible to accommodate this experience.

In an ideal world the axes intersect and there is a concurrence between teacher and student skills, knowledge, experience and control. The online world

is less than ideal, and the literature, experts, policy-makers, managers, teachers and students define pedagogies for sets of learners, teachers and circumstances at various points along the three axes through a process of explicit linking.

It is true that, in all teaching and learning situations, there are distances between teachers and learners. However, in an online environment these distances are stretched and the range of abilities, predispositions, styles and preferences displayed by both teachers and learners and overlaid by course design, mean that the matches between content, delivery style and learning effectiveness are more divergent than convergent. The diagram is a picture of the best and the worst of online pedagogy as it is currently constructed and a map for the development of more effective teaching and learning.

Teacher and student views on the characteristics of online teachers and learners

The teacher and student questionnaires reinforced the point that individuals in both groups are at different stages along the three axes described in figure 1.

The teachers and students surveyed were working at a variety of Australian Qualifications Framework levels in a range of content areas. Online delivery was predominantly part of mixed-mode delivery. Email and web-based course content delivery were the most frequently used features of the technology.

Teachers recognised that interactivity is the most critical factor in contributing to effective online learning. However, less than half the teachers maintained that the content they were delivering was suitable for an online environment. They recognised that online delivery is convenient, provides access, allows for the presentation of up-to-date materials, offers opportunities for the presentation of difficult concepts in a number of formats and facilitates student planning, reviewing and researching activities. However, they qualified these characteristics. Some commented that the age, self-direction and experience of their learners meant that even though content could be delivered online it should not be. Overwhelmingly, teachers and students commented that given the present state of the technology, a blended approach to content delivery suited all participants best.

Teachers and students recognised the levels of personal responsibility implicit in online delivery. For this reason student orientation programs where teachers help students set goals, prioritise tasks, manage their time and use the particular technology, are crucial to ensuring a good match between learner needs and the forms of delivery available. The characteristics of a successful online learner are related to motivation, independence and technological acumen.

Teachers felt that teacher confidence and support were critical features of practice which are equally important online and face to face. Some commented

that their ideas about good teaching did not translate easily to an online environment. This criticism related to the 'distance' between the designers of modules and courses and the teachers responsible for implementation of these. This militated against teacher autonomy and their ability to follow their own principles of 'good practice'. A large number of teachers recognise the characteristics they require to translate good practice from other areas of practice into the online environment. Features such as developing relationships, questioning strategies, providing feedback and creating a learner-centred environment were often mentioned. The preference was for a mixed-mode delivery which gave them the best of both worlds. The role of the teacher was seen as facilitating, motivating, mentoring and guiding.

The skills needed to support these roles were:

- *technical*: related to the use of the technology
- *curriculum-related*: program development, implementation and assessment
- *management*: the organisation of time and availability
- *teaching*: improved communication and reflection on the effectiveness of student learning.

Less than half of the teachers surveyed felt that they catered for their students' learning styles and preferences in the online environment.

Students who are independent and experienced, confident, highly motivated, literate and numerate and technologically competent are suited to online learning.

The least well catered for students are those who require constant supervision, who are auditory learners, or students who come from groups whose levels of literacy are not strong or who are from cultural backgrounds which might not support such approaches to learning.

The answers to the research questions

Question 1: What pedagogical assumptions underlie online delivery?

The individual focus implicit in a great deal of online pedagogy, while ostensibly conforming to learner-centred practices may represent a step backwards. Pedagogical principles, such as those outlined earlier, remain, but practice is quite different. It is not simply a matter of transferring skills across.

There is a high degree of disharmony in the pedagogical assumptions made by the various participants in the online delivery of VET. The dominating influence of the technology created assumptions about the nature of learning, the role of the teacher and the student characteristics which are poorly matched with teacher and learner expectations.

Teachers are holding firmly to the sound principles of pedagogy and students are reiterating the importance of these. Communication, interactivity and the development of social cohesion are regarded as laudable goals in an environment which frequently militates against their achievement. Teachers are not only struggling with the technology but also with an often unfriendly teaching context where their principles of sound pedagogy are in conflict with course design and the realities of an isolation created between teacher and learner. It is a credit to teacher professionalism and dogged persistence that online delivery works as well as it does.

Question 2: What are the teaching and learning areas for which online delivery is best suited pedagogically? For what areas of teaching and learning is it not suited?

There was general consensus that 'suitability' for online delivery was a relative judgement. Online delivery could provide access for learners in situations where previously this had not been possible. Online technology offered learners the flexibility to engage with course materials which was appealing to those who worked or who, for other reasons, found formal class contact difficult.

In content areas such as information technology, online delivery was regarded by both teachers and students as necessary and workable. In areas such as hospitality and welfare where communication, discussion and negotiation are regarded as desirable competencies to achieve, the suitability of total online delivery is doubtful.

In a competency-based training framework, where the levels of prescription of learner skill are very clear, online delivery is seemingly attractive. It can provide linear and well-sequenced activities aimed at developing skill levels which students can work through at their own pace. Assessment can be undertaken without a teacher presence, feedback can be given to students and learning experiences repeated until competency is achieved. However, a range of other factors have to be considered in making judgements about its suitability. These include considerations about learning styles and preferences, the competence and confidence of the learners and the importance of the social dimensions of learning.

Courses and learning programs can make unequivocal assumptions about the learner characteristics and traits of those they attract, and unless these are matched to the skills and attributes of the learners, any form of suitability cannot be guaranteed.

In the present environment, suitability is more likely to be achieved in a situation where online learning, content and face-to-face contact are 'blended' to suit both the circumstances and levels of resource provision.

Question 3: What teaching and learning styles facilitate effective online learning?

Teachers require time to answer the question: 'how can we use the technology well?' Online delivery is currently often seen as an additional element to an already very full workload. Teaching styles that facilitate effective online delivery are fundamentally attitudinal but the understandable mistake is still being made that the acquisition of technical proficiency will guarantee sound teaching practice.

Both teachers and students preferred a 'blended learning' approach, one which captures the best features of flexibility and integrates these with the social interactions of the classroom. If courses are fully online, then opportunities for induction, orientation and training are critical to student success and teacher satisfaction.

Question 4: What interactions at the individual learning level are most effective in contributing to effective online learning?

Interactivity between teachers and learners was unequivocally regarded as an important and effective component of online learning. This is comprised of:

- consistent and timely feedback from teaching staff
- communication between teacher and learner
- clear guidance on a well-designed and structured learning program.

Teachers regarded 'interactivity' in a quite specific way and the use of the medium to encourage more critical thinking through debate and discussion was a relatively untapped strategy. Problem-solving, investigation and research, and the pursuit of theoretical understanding were regarded as contributing to effective online learning at the individual level. These features should also be applied to the assessment process.

Question 5: How does online learning affect the roles and skills required of those involved in the learning process?

The roles and skills of teachers and learners differ to varying degrees, depending on whether the online delivery supplements classroom time or replaces it. However, in both cases, there are changes in the way both teachers and learners work and use their time. New technological and facilitation skills and experience are needed as teachers make the transition. There are new rules for interaction, security and privacy that need to be learnt and adopted. Teachers have to embed new management practices while students have to manage their time in a highly self-regulated way. The price of flexibility is work re-organisation for teachers and independence for students. The level of independence required may be beyond some learners.

The literacy demands and cultural homogeneity of many online courses and modules raises questions about the adequacy of the skills of students from a range of backgrounds and groups. Teachers and students generated lists of skills they considered essential for effective online learning and many students may not possess the requisite skills for undertaking an online course. The new roles and skills required for the online teacher relate to attitudinal predispositions. Qualities such as perception, compassion, collaboration and creativity are considered essential prerequisites to online delivery success. These attitudes are the initial building blocks from which teachers develop new facilitation, motivational, mentoring and guiding roles and skills. Communication takes on a different personality online and teachers are concentrating on clarity and regularity. Furthermore, constructivist approaches to teaching and learning entail different teacher roles and skills and the idea of the 'flexible facilitator' is encouraged by courses that are commercially or centrally designed.

Question 6: What relationships exist between pedagogical features and world's best practice in online delivery?

This was the least clear set of results from the research. There seemed to be a reluctance to make a commitment to principles of world's best practice in online learning. This situation is explained by the relative youth of this delivery medium, its technology and the shortage of rigorous evaluation in this area.

The application of a framework of good pedagogical practice to the data measured the gaps between current practice and how learning can be best facilitated—a gap which should be eliminated. Online delivery of VET is a relatively recent innovation and this research shows that, in spite of teacher effort, professional development and high levels of technical resourcing, there are some significant distances between its pedagogical features and world's best educational practice.

Key messages from the research

A number of indicators of pedagogical effectiveness were clearly expressed by all stakeholders involved in the online delivery of VET. These appear on page 61 and represent the ideal set of circumstances since pedagogical practice rarely conforms to these principles. The dominating influence of the technology has created assumptions about the nature of learning, the role of the teacher and the student characteristics, and these are poorly matched with teacher and learner expectations. The roles and skills of teachers and learners are different in degree, depending on whether the online delivery of VET supplements classroom time or replaces it. In both cases there are new definitions of time and work patterns.

There was general consensus that 'suitability' for online delivery is a relative judgement. Online delivery certainly offers learners flexibility and access to engage with course content. However, there is nothing intrinsic to the medium that encourages the broad range of students to take advantage of these features. The learner and teacher characteristics identified as prerequisites to effective online pedagogy assume high levels of independence, motivation, persistence, literacy, computer skills and experience and time management. These ideals are not confirmed by current experience for either teachers or students.

In areas of VET, where the mode of delivery and the content are similar, such as information technology, online delivery provides a form of workplace training suitable both to the content and the students. By contrast, teaching and learning areas that require practical tasks or where the processes of communication, critical thinking and values clarification are central to the subject area, such as welfare or travel and tourism, are unsuitable given the present stage of course development and the levels of technology that students can be reasonably expected to have available to them.

The literacy demands and cultural homogeneity of many online courses and modules raise questions about the adequacy of the skills of students from a range of groups to cope with this medium. Fundamental issues such as the cultural appropriateness of questioning, conversational conventions, language acuity and delay, and student attitudes towards interaction with authority take on a heightened importance in an online environment. In face-to-face classrooms, diversity is an asset. In an online environment it may be a distinct disadvantage. Courses frequently make unequivocal assumptions about learner characteristics and traits, and unless these are matched to the skills and attributes of the learners, any form of suitability cannot be guaranteed. In the present environment, suitability is more likely to be achieved in a situation where online learning, content and face-to-face contact are 'blended' to suit both the circumstances and the levels of resource provision.

Interactivity is unequivocally regarded as the most effective teacher–student relationship to develop in an online environment. Teachers regard 'interactivity' in a specific way and the use of the medium to encourage more critical thinking through debate and discussion is a relatively untapped strategy. Problem-solving, investigation and research, and the pursuit of a theoretical understanding of content are regarded as contributing to effective online learning at the individual learner level.

The research findings show that, in terms of what we know about the factors contributing to effective student learning, online pedagogy needs to address all of the dimensions of practice. In particular, online pedagogy in VET needs to be able to create teaching and learning environments where students have the opportunity to:

- reduce their reliance on text
- explore and value their intellectual, social and cultural backgrounds

- ❖ develop their knowledge beyond the transmission and assessment of content
- ❖ reflect on their own learning
- ❖ be part of an inclusive learning environment
- ❖ communicate extensively with their peers and their teachers
- ❖ become self-regulated and engaged with their own learning
- ❖ develop a group identity which connects them with their learning and with the broader social environment.

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Quality in online learning

Joan Cashion and Phoebe Palmieri

This chapter* reports on a project designed to investigate the meaning of high-quality learning for students in the vocational education and training (VET) sector. The findings indicated that students generally reacted well to online learning, with flexibility and the teacher/facilitator being the most appreciated and important aspects of the mode. While online delivery has presented many challenges to teachers, they held similar views to students vis-a-vis what constitutes a high-quality online experience. The chapter stresses the key importance of good teachers, facilitators and tutors to successful and high-quality online teaching experience, an importance which should be noted by VET organisations.

Introduction

VARIOUS FORMS OF flexible learning are being taken up in Australia and around the world, online learning prominent among them. One of the aims of flexible learning is an improvement in the quality of learning experiences and outcomes.

What does 'quality' mean in this context? Different sectors of education, and different organisations within any sector have varying views about the ways in which learning takes place, and consequently the nature of 'quality'. Many aspects of these subjects have been researched, and benchmarking studies and frameworks for quality have been prepared, including an influential American publication (Institute for Higher Education Policy 2000). Evaluations of flexible and online programs have been published. But we have been unable to find any studies that consider the perspective of online learners more broadly in the VET sector.

We therefore decided to investigate the meaning of 'quality learning' for VET online learners by asking nearly 500 enrolled students and about 50 educators for their views. We used an online questionnaire with a mixture of 'agree/disagree' style questions and more open-ended questions to elicit their definitions of quality. We also held a number of focus groups and visited a

* A summary of the report, *'The secret is the teacher': The learner's view of online learning* (Cashion & Palmieri 2002).

number of organisations to see how they approach online learning. We used this mixture of methods to seek answers to the following research questions:

- What is a quality online learning experience?
- What are the factors contributing to a 'quality online learning experience' as defined by online students?
- How do organisations define quality online learning?
- What is the congruence between the indicators of quality online learning as perceived by organisations and by students?
- Where does the 'learning experience' start and finish in online education?
- How do students rate the importance of different aspects of online learning, including administration, environment, technology access, content delivery, communication and flexibility?
- How do students rate their present online learning experience with respect to these indicators?
- What is the baseline for online education with respect to the learning experience? What are the essential elements for any online delivery?
- Is there evidence that students make use of the flexible attributes of online learning—anywhere, anytime, any amount—or that these attributes are important to students?

Definition of online learning

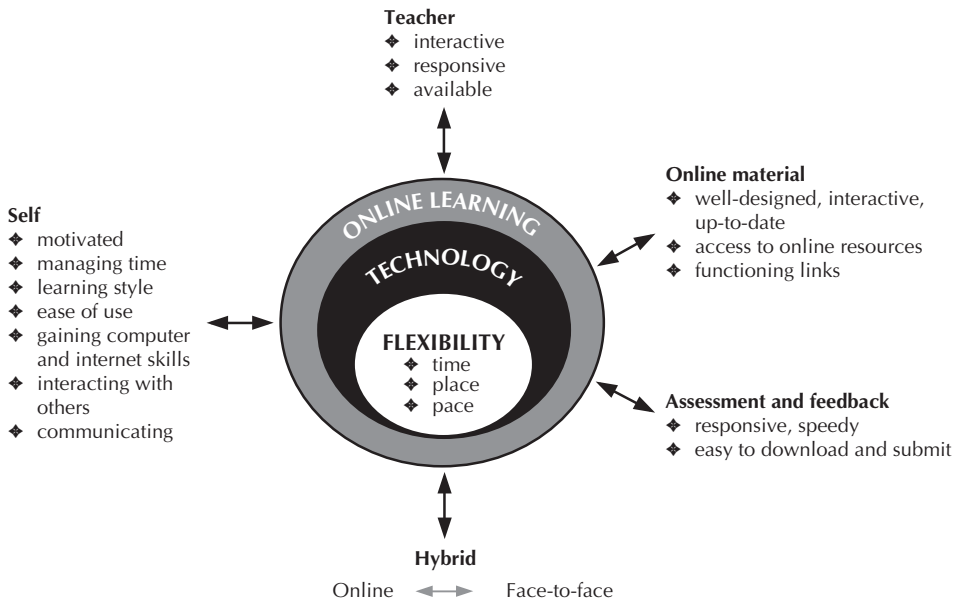
Online learning takes many forms. We debated whether to include only learning that took place purely online, or whether to include hybrid delivery; that is, a mixture of online and other delivery modes. We decided that the combination of modes might in itself be an important factor in views on quality, whether positive or negative. We therefore defined online learning, for our purposes, as learning that occurs when the delivery of education or training is carried out via an intranet or the internet. It could include whole courses, single subjects and parts of subjects. It could include mixed or hybrid modes, as long as the online component is integral to the learning. We asked students to tell us what the online experience included (where it began and ended). Other researchers such as Chizmar and Williams (1997) have noted difficulties in enrolment procedures for prospective higher education online students, and we were interested in whether students included aspects such as this.

The student view of quality online

We found that students generally reacted well to the online environment. Of those who responded to our survey, 71% said they had experienced a quality online experience while 18% said they had not. A further 11% did not respond.

There was broad agreement on a number of factors that together make up a quality learning experience and these are summarised in figure 1.

Figure 1: Quality factors reported by students



At the heart of quality for students is flexibility, while the greatest detractor from quality is unreliable technology. Content and assessment are significant contributors to a quality learning experience, while the role of the teacher is critical for VET students. VET students rely on the interaction with the teacher, and need supportive, responsive teachers who provide clear instructions and answer queries promptly and constructively.

The key factors for quality, as reported by students, are summarised in table 1. These figures are taken from the 'agree/disagree' type questions. They are supported by remarks in the open-ended questions in which students put forward their own, unprompted, comments.

Flexibility

Flexibility was the most important factor reported by students. This is similar to the findings of Kubala (1998, 2001). It not only includes the choice of time, place and pace, but options for face-to-face interaction as well. Some students were very aware of what they needed to learn, and for some, online provided an environment in which they could undertake the learning they wished.

There was no evidence that programs had been customised for different students, so that at this stage the 'just for me' element of flexibility was missing. However, what did come out clearly was the benefit students saw in being able

to decide their own pace of learning. Some students wanted to speed through the work, while others wanted to reflect and assimilate information at a much slower pace.

> *Having the freedom to choose when I have time to study and not having to keep to a timetable has been a great benefit to myself.*
>
> *Accessibility after hours, flexibility, repetition when I need it.*
>
> *I work full time on a rotating shift so I can't get to classes on specific days at specific times. Doing an online course—it's easy for me to work when I am free.*

Table 1: Quality factors

Positive attributes	#	%	Negative attributes	#	%
Flexibility	79	24	Access and technology	82	25
Responsive teachers	50	15	Self	31	9
Materials and course design	48	14	Assessment	30	9
Access to resources	29	9	Lack of teacher responses	25	8
Online assessment and feedback	22	7	Confusion	15	5
Increase in information technology skills	19	6	Resources	15	5
Learning style	19	6	Lack of support	14	4
Interaction with other students	18	5	Need for helpdesk	12	4
Communication	16	5			
Ease of use	11	3			
Hybrid mix of face-to-face and online learning	9	3			

Note: # = Number of responses % = Percentage of the sample
Some students gave more than one response, hence percentages are > 100%.

Learning online

While the students were very positive about the flexibility, freedom and convenience of the online environment, they were quite clear that they did not prefer it to face-to-face classes. They recognised that online study required a greater degree of organisation and discipline than face-to-face classes and that they needed strong personal attributes, especially motivation and skills in time management. The online mode was not adopted merely because the students could not attend classes, but rather as an interesting and viable option which provided the flexibility they wanted. The opportunity to improve computing and internet skills was another positive feature.

Good teachers, good teaching

Online education is not about replacing teachers with online content. Good teachers, facilitators and tutors are essential for quality online learning. The essence of quality is the teacher. As one student put it:

> *The secret is the teacher!*

Discussion with educators revealed that it is essential that clear standards and expectations regarding the level and nature of teacher interaction online are essential, otherwise the workload for teachers is untenable. A prominent aspect of this issue is the expectation of prompt responses from the teacher. Ng (2000) points out that the availability of email, in particular, generates the expectation of instant replies. Just what is 'prompt', and when and how often can a teacher be expected to be at the end of the line? Student expectations online are more critical than in face-to-face situations. They are disappointed if they do not receive responses when they need help, and they have no concept of waiting their turn as they would in class. They rely on the teacher to help them learn. When students received individual, speedy feedback they were delighted with the experience. When the teacher did not provide feedback or took too long to respond, then quality was seen to be lacking.

Hybrid delivery

The balance between face-to-face and online delivery, and the benefits of hybrid or blended delivery, will become more apparent in the VET sector as the use of information and communication technologies becomes further integrated into delivery. It is already recognised by writers such as Webb (1998). Many students commented on the importance of interaction with teachers. Combining this with the flexibility desired might best be done through a hybrid model of delivery.

> *A highly interactive course that has a good balance between on-line and f2f [face-to-face].*

Online resources

The internet offers access to an extensive range of information and opens up a world of resources for students. While some students found this daunting, others really appreciated the richness of the material available. The online course content was often noted as being very good, but the instructional design of materials is critical. Poor design confuses students. Online resources should be fast to download, easy to read, easy to navigate, and use online features suitable for the purpose.

Students accessed learning resources online more than they did when studying in class and they appreciated built-in interactivity. Print-based materials dumped online were not appropriate. Students generally found their materials easy to follow, easy to understand and more up to date than class

materials, although in some cases, lack of adequate instructions was an issue. The wealth of resources accessible online was a very positive factor, as were links to external sites and experts.

Assessment

Online assessment provided some exciting challenges and speedy feedback that were appreciated by students, but lack of timely feedback was a very common reason for dissatisfaction. Clearly, the medium provides an avenue for quality online learning, but standards must be developed for assessment online as well as for other aspects of online delivery. Students enjoyed computer-generated feedback, but wanted a more rapid turn-around from teachers. The greatest problems associated with assessment related to difficulties in understanding what was expected. Technical difficulties were also encountered when downloading assignments and submitting work. Validity of assessment and cheating online were not proposed as issues by either students or educators.

Support

Students did not indicate that they needed a lot of support to study online apart from the support of teachers. Induction was important, but many reported that no one had checked their skills before they started. This was one of the greatest areas of difference between students and teachers: teachers expected that students would need more support than the students considered they [the students] did. A helpdesk for technology problems was one area that everyone agreed was needed, preferably staffed with 24-hour, 7-day availability. This is consistent with the findings of Anderson (1996), who notes that:

> *… technology provided without adequate technical support is at best a disappointment, and at worst a serious waste of resources …The technical support officer needs to be a skilled communicator, able to give clear instructions over the phone.* (Anderson 1996, p.49)

Technology

The greatest deterrent to quality online learning was difficulty with technology. When technology works, it is invisible and students are happy to use it. However, when there are problems, then there is the potential to have the whole online experience destroyed. Of student respondents, 25% reported they had problems with technology. These complaints were loud and clear, but it is worth remembering that the other 75% of the sample were accepting if not enthusiastic about the technology.

The problems mainly related to the lack of computer skills to begin online study, and to networks and servers that were slow or unreliable. Access, speed

and reliability are essential for online education. Hara and Kling (1999) discuss this subject in more detail.

The respondents were more positive than negative about access to the internet and the associated technology, and did not find getting into the system so difficult that it put them off online learning. Surprisingly, they accepted the time taken for pages to download and did not find the technology confusing. Most had easy access to the hardware and software and satisfactory access to the internet. (It must be remembered, however, that students who accessed and responded to the survey must, by definition, have had sufficient access to continue with their online study. This matter will be discussed later.) Clear instructions on how to use the technology and, in particular, how to download and submit assignments and other activities are critical to successful online study.

The educator's perspective on quality

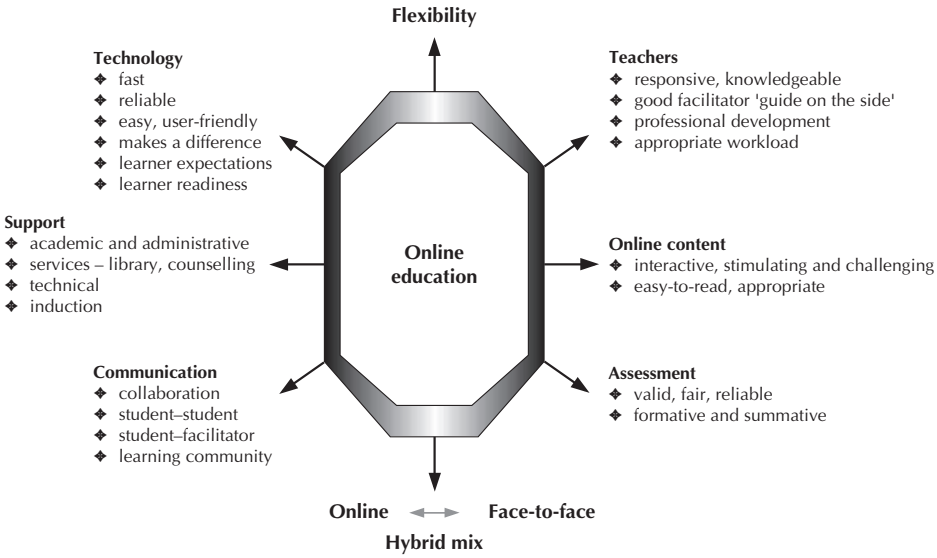
Online education has presented many new challenges for teachers. The online environment requires the mastery of the technical aspects before the teachers can focus on the various ways possible for teaching online. It also involves different ways of working, and being relatively new, the workload involved was often excessive and invariably 'as well as', not 'instead of', the rest of their work.

Many of the early initiators who have embraced online education enthusiastically have been developing online materials as well as teaching the students through the online medium. This ensures a commitment and excitement about online learning, as the teachers are learning as well as the students. The adoption of the online medium as a tool for all teachers is still in its infancy.

Educators had similar views to students about many aspects of the online experience, but they also identified additional aspects not raised in the student feedback. Their views are summarised in figure 2 and adds value to the student views on quality in figure 1.

The potential for constructivist learning and peer learning using the online medium was evident to educators, while students still saw the focus of their education to be the teacher. In a constructivist approach learning is seen as being an active process, with learners constructing new ideas and concepts based on their current or past knowledge. (For further discussion see Crouch & Montecino 1997; Smith 2000; Warner, Christie, & Choy 1998.) Educators were significantly more concerned about the support, or lack of support, provided to students. In particular they are concerned about the need for induction programs to introduce students both to the medium and the technology, but also to different and more independent ways of learning.

Figure 2: Quality factors as proposed by educators



The quality factors for educators included:

- preparation for and induction into online study, especially in relation to the use of technology
- technical and learning support
- online learning materials (including assessment materials) that are clear, accurate, accessible and suitable for the needs of the learners
- a general preference for hybrid or 'blended' modes, noting that the suitability of online delivery could vary with the subject matter as well as the needs of learners
- the importance of communication between students and teachers and between students and students, and especially suitability of the medium, skills of the teacher and the setting of behavioural norms for online interaction.
- flexibility of time and place, balanced by the requirements of some learners for structure and external discipline
- the necessity for workable and accessible technology, and for the skills to make use of it.

Induction and instructions

Educators' experiences suggested strongly that students cannot be thrown into online learning without preparation. Organisations must build into their online provision a gentle but comprehensive introduction to the technology, to the

online course structure, and to studying online. They must also be clear about what they expect of students and what students can expect of the organisation. Students need to know how and from whom they can obtain help when they need it, especially in relation to difficulties with technology.

Educators had many suggestions about induction. The most important of these are given below.

- *Prerequisite skills*: an important part of the preparation for study, either at the induction stage or (perhaps preferably) before enrolment, is the identification of the prerequisite skills which learners will need for success. These may be subject-related, but may also include computer skills in prescribed software applications or in the use of the internet. Building the online community was seen as an important part of the early stages of online learning, and activities such as ice-breakers could be used for this purpose.
- *Course orientation*: organisations should provide an orientation to the course website and associated tools. Induction materials should be available in print for easy reference when problems occur.
- *Online availability*: induction materials should be constantly available online, and the induction process revisited from time to time during the course. This approach would provide a process which could be used as a way of dealing with inappropriate behaviour, in a similar way to a grievance policy.
- *Online etiquette*: instructions should be included on appropriate behaviour online with the prevailing code of etiquette. Discipline issues were rare online but on occasions a process was needed to ensure appropriate discussion and consideration of other students during online sessions.

Communication

The potential for interactive, co-operative, student-led learning was seen as a strong advantage of online programs. Web discussion, group projects and other techniques can be used to enable students to build content, drawing on both their study and their own lives and experiences. The combination of immediacy and asynchronous activities is conducive to deeper reflection and learning.

While educators see great potential in these techniques, the students did not value this capability of online learning and showed no evidence of developing online learning communities, differing in this way from higher education students (Harasim et al. 1995; Harasim 1990).

Impact on teachers' work

Most of the teachers in the focus groups conducted during the study were enthusiastic about online teaching, finding it challenging, enlivening, rewarding

and enriching. Teachers involved in online delivery noted that this mode demands changes in their ways of working. Unfortunately these changes are not recognised in budgets, working conditions or in state reporting requirements.

While many focus group participants considered that the preparation of online learning materials is no more time-consuming than the preparation of print materials (assuming that the teacher has sufficient skills), all agreed that teaching and moderating online demand more time than teaching an equivalent group in class, especially when the program is self-paced.

Budgets, workloads and outcomes reporting are still framed in terms of student contact hours, which bear little relation to the way in which online teaching and learning take place. For many teachers their online preparation and teaching is an unrecognised add-on to their allocated workloads.

Skills and professional development

Teachers need preparation for online teaching. One group suggested that 'those who make the easiest transition to online teaching are those with experience of flexible learning or distance education: 'the qualities needed for online are the same, it is only the medium that is different'. Several groups suggested that teachers need training in online facilitation, especially in the management of self-paced groups and moderation of online discussion.

When teachers are using material prepared by others, they need to make themselves familiar not only with the subject content, but also with the activities and options available to students. One participant commented: 'I virtually had to do the module myself before I could teach it'.

When teachers are preparing their own materials, they need an understanding of instructional design and of design for the chosen medium. In many organisations, program design is a team activity, so that being able to work as part of a team is a necessary skill.

Cost

The cost of online education is often a contentious matter. One of the original aims of online education was to reduce costs. However, there are no indications that the cost of teaching is any less online than in front of a class. Preparation time has been identified as more onerous, and resource development is an expensive business.

Some of the costs have been passed on to students, although it is unknown how the average cost of printing notes from online resources compares with the amount students used to spend on books. From the student's perspective, cost did not present as an issue. It should be noted, however, that students excluded from online study by cost were, *ipso facto*, unable to take part in the survey.

Technical support and learning support

When students get into difficulties with technology, the help provided needs to be immediately available, responsive, knowledgeable and friendly. Online assistance alone is insufficient since a degree of technical proficiency is needed to make use of it. Print or, preferably, telephone help services were proposed as essential.

Need for a helpdesk

Help must be accessible just when students need it. It is not just the online resources that should be 'just in time' and 'just for me'; access to help should be available when the student needs it and in a form that he or she can use. For example, email or web help services are of no use to a student who cannot log on to the system.

> *If there is a problem, it cannot be solved immediately.*
>
> *If you need any help, don't understand or can't find the work there is no teacher to help you or any other staff.*
>
> *How to get started since this was the first time using this type of learning. When I had a problem it was hard to find the answer to my question.*

Summary: Quality learning online

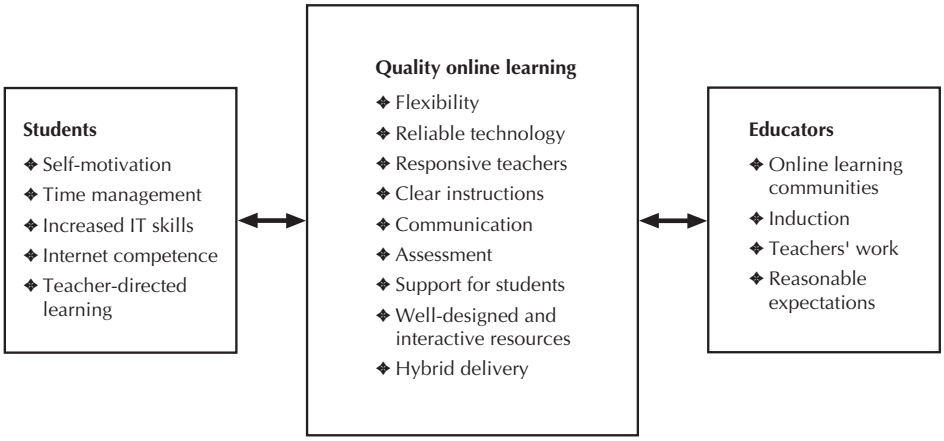
The online technologies provide a flexible, convenient and innovative medium for the delivery of quality online learning. This medium has the potential to keep Australian students in contact with the rest of the world and to facilitate access to a huge global source of information and educational resources. It enables students to improve their computing and internet skills.

It is not a cheap option. Quality online education needs fast, reliable technology and infrastructure. It needs competent, capable teachers who are recognised for the huge amounts of time involved with teaching online. It needs well-developed and well-designed course materials that are interesting and stimulating, and ideally provide elements of interactivity.

Online education offers an enormously flexible medium to provide student-centred and appropriate learning structures and supports for many students. The inclusion of a face-to-face component alongside the online medium is crucial. One student, commenting on the factors contributing to a quality learning experience noted:

> *A highly interactive course that has a good balance between online and face-to-face.*
>
> *A resourceful and responsive teacher, easily accessible online and offline.*
>
> *A clearly laid-out program and assessment.*

Figure 3: Summary of quality factors in online learning



The essential elements for online programs are encapsulated in figure 3 and can be summarised as:

- technology that is available, affordable, reliable and easy to use
- the flexibility to work at the times and places of the learner's choice, and at the learner's pace
- the availability of multiple modes of learning so that learners may opt for all online, all face-to-face or a mixture of modes
- teaching and other staff who respond promptly, thoughtfully and in an informed manner to requests for help or other contacts
- clear instructions for the study program, assessment requirements and methods and protocols for communication and submission of work
- accurate, up-to-date, comprehensive and well-designed learning resources, which include clear navigation structures, clear directions to students, and mechanisms to enable students to judge their progress
- the inclusion of links to online resources, notably useful people and contacts, and the updating of these links to maintain currency
- assessment mechanisms that are valid, reliable and easy to use
- online resources which cater for varied learning preferences, including synchronous/asynchronous interaction, text, visual and aural media, and others
- online programs and organisational procedures which avoid problems such as confusion, excessive download time, unclear learning structures and excessive cost.

Students considered it important to:

- develop their own skills, particularly time-management, independent learning and motivation
- improve and extend their information technology and internet skills.

Educators added the additional elements which they considered essential for quality online learning:

- online techniques which support and promote interaction between students as well as between student and teacher
- communicative devices which encourage co-operative and self-directed learning as well as teacher-directed learning
- induction to ensure that learners understand the program, what they can expect of the learning organisation, and the skills and equipment required.

Limitations of the study

We were keen to make use of online techniques in carrying out this study of online learning. The online questionnaires proved appealing to many respondents, and an effective instrument in terms of data analysis. It is important, however, to be aware of the limitations as well as the strengths of this technique.

We realised during the project that, in order to get a full picture of student views on quality online learning, we would need to survey learners who had discontinued their study. We were unable to find a way of contacting such students. It was, in fact, very difficult to obtain our required responses at all, largely because of the large number of surveys and research projects related to online learning which have been carried out in VET in the last few years.

We must therefore assume, since this will naturally have affected the nature of the responses received, that those who responded to the survey have been successful, at least to the extent of enrolling and making a start on their study program, and that they have sufficient access to online technology to be able to do so. Nevertheless, we consider further investigation of students who have dropped out or who were unable to enrol would be useful.

Suggestions for educators and training providers

Underlying this study has been our desire to understand what teaching organisations need to do to make online programs work well for their students.

Flexibility

Flexibility is exceedingly important to students. A quarter of the students specified that one or more aspects of flexibility were important to them. The issue of flexibility in pace is especially interesting when considered along with the comments about learning style and learners' own discussions of this. Many of the learners who responded to the survey were aware of how they learned, how they preferred to learn and what was important to enable them to learn. This is a clear indicator of the importance of providing for learners' preferences in online education.

The importance of the teacher

The importance of good teachers, facilitators and tutors is another very strong message to VET organisations. Online education is not about replacing teachers with online content. It is successful when facilitated by the work of good teachers online. It is essential that there should be clear standards and expectations regarding the level and nature of teacher interaction online. The question arises of how this matter should be managed, by teachers, students and organisations, since it is clear that teacher–student interaction requires a good deal of time and thought. A prominent aspect of this issue is the expectation of prompt responses from the teacher. Whatever response times are agreed to, the teacher has to ensure that these standards are maintained. Student expectations online are more critical than in face-to-face situations. In class, students will wait for their turn, or will try and catch a teacher after class; the teacher can take speedy corrective action if a student becomes discontented. Online, the students want responses at the moment when they need the help. They do not want to wait for the next week or even the next day.

This message is clear from the current research with students who have the competence and confidence to proceed with their studies. It would be prudent to assume, unless further research indicates the contrary, that new students and those with low levels of computer competence will require even more attention to be paid to thoughtful and timely teaching.

Technology

Technology is critical to a positive experience of online learning. Access, speed and reliability are essential and must be the baseline for online education. Teaching organisations must look to the adequacy of their information technology facilities and the technical help they provide to students and teachers.

Clear instructions on how to use the technology and, in particular, how to download and submit assignments and other activities are critical to successful online study.

Induction and instructions

Students in the study were often confused by the technology and the course materials. Induction and clear instructions are essential. Organisations must build into their online provision, a gentle but comprehensive introduction to the technology, to managing the medium, to the online course structure and to studying online. They must also be clear about what they expect of students and what students can expect of the organisation.

Assessment and feedback

Assessment and feedback are important for online learning. Students expected responses to their work 'within the week'. In classes students can estimate when they can expect work back. In the online environment, in the absence of these estimates, they expect a rapid turn-around. Online assessment caused numerous problems, and after the technology access was the next most problematic area. Students had many problems loading and downloading assessment material. Clear instructions must be given to students to enable them to cope with this aspect of the environment. Furthermore, materials and processes must always be available and in working order.

Strategies for practitioners

The benefits of hybrid or blended delivery should be explored by all organisations. Students clearly want flexibility, but most also want interaction with teachers and other students. The balance between face-to-face and online modes and the benefits of hybrid or blended delivery will become more apparent in the VET sector as the use of information communication technologies becomes further integrated into delivery. In this survey, nine students commented on this mix as being the critical factor that made for quality.

Many students commented on the importance of interaction with teachers, and combining this with the flexibility desired, can often best be achieved through a hybrid model of delivery.

Induction to online learning is needed to familiarise the students with the online environment and also to help them to learn independently. Induction to the online medium is necessary not just at the beginning of the online experience, but whenever a significant change is made to the platform or the structure of the resources.

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The development of quality online assessment in VET

Patricia Hyde, Robin Booth and Penny Wilson

This chapter* highlights some of the key issues and solutions which form part of a report for the project on development of quality online assessment in vocational education and training (VET), a project undertaken by the Vocational Education and Assessment Centre, NSW TAFE and the Centre for Undertaking Research into Vocational Education, Canberra Institute of Technology. The researchers investigated issues in quality online assessment in VET by drawing on the experience of Australian and international online designers and deliverers from across education sectors.

Why this research?

THE INCREASING USE of the online environment for learning and assessment in the vocational and other education sectors has served as a catalyst for a re-examination of educational principles. It has brought back into focus important principles relating to the design of learning and assessment, the role played by assessment in the learning process, the involvement of a range of 'stakeholders' in the assessment process and some serious exploration of the nature of learning. There may be a risk in isolating, and perhaps distorting the issues involved in the design and conduct of assessment by investigating it separately from the broader learning process. However, concerns raised about assessment in general in the VET sector and the requirements outlined in the Australian Quality Training Framework make it important for the factors and considerations which impact on quality in online assessment to be identified.

Assessment in particular is an area which is engaging increasing interest from online designers and deliverers, as the initial effort in the online field was

* A summary of the report, *The development of quality online assessment in vocational education and training* (Booth et al. in press).

directed to the development of learning resources and learning materials rather than the whole learning process.

This study took a broad approach to the term 'online assessment', given the embryonic state of online learning and assessment. The key feature of our definition of online learning and assessment is that there is some interactivity between learners and assessors.

For the VET sector the concept of quality has been precisely defined through the development of national policy and standards. Assessment in any learning mode must be developed in line with these Australian Quality Training Framework standards for registered training organisations.

There are different demands and emphases in delivery and assessment in different educational sectors. The need in the VET sector for the demonstration of competence against industry standards focusses assessment on collecting evidence of competence across skills and underpinning knowledge. The traditional emphasis in the university sector is on the assessment of the body of knowledge which underpins the discipline area. However, in some cases, the lessons learned from the experience of those in other education sectors can be very instructive in solving issues and problems and expanding the potential of the use of the online environment for assessment.

How the study was conducted

The study used a qualitative iterative approach, including a literature review and telephone and email interviews followed by requests for specific input from identified experienced online educators and designers on specific issues. The 'solutions' were then applied to a set of scenarios for online assessment in the VET sector. The project used a website for discussion and data collection (http://www.veac.org.au).

The following research questions were asked in the study:

- What are the principles of quality assessment in an online learning environment?
- What assessment purposes can be supported through the use of online technologies?
- What assessment methods and/or tools work well in an online learning and assessment environment?
- What factors influence the choice and design of online assessment methods (for example, learner characteristics)?
- What are the challenges, barriers and possible pitfalls in achieving quality online assessment?

Telephone and email interviews were conducted with 41 online educators, managers and designers from Australian and international vocational and university providers to investigate the current use of online assessment approaches and the perceived potential for further developments in online assessment. Providers in the higher education sector have a strong tradition of researching and reporting on educational change and innovation. Lessons learned about online assessment from this sector can be shared and used to support the development of quality online learning and assessment in VET.

What the literature says

The literature revealed two main perspectives in relation to the concept or term 'online assessment'.

On one hand, a significant body of literature describes and discusses online assessment in the context of web-based activity, usually involving the individual learner (Booth et al. [in press]). In this context individual learners interact in real time with assessment tools and tasks generated by an automated assessment software program. These tools generally use a question and select/response format. They have the capacity to be used for a range of assessment purposes with a current stronger emphasis on application for formative rather than summative assessment. The effectiveness and sophistication in the use of this type of online assessment activity (generally seen as an extension of earlier computer-mediated assessment tools into a web environment) is governed primarily by the assessment design skills of the 'assessor', the pedagogical considerations and the 'technical' aspects (capabilities and limitations) of both the software tool and its interface with the learning management systems and learning platforms.

On the other hand, there is another body of literature which discusses and investigates online assessment in terms of communication, collaboration and multiple perspectives. For example, Kendle and Northcote (2000) challenge online course developers to incorporate a broader, more diverse range of assessment methods to better cater for the 'differences and complexities found within any modern challenging curriculum'. They examine the scope of the online environment for task design and cite as highly useful:

> *… the ease of using collaborative tasks in an equitable manner, including mentoring, feedback to and from students and teachers, support and encouragement, ability to see examples of other students' work, and the use of peer assessment.* (Kendle & Northcote 2000, p.536)

This literature explores the ways in which online learning and communication activity can be assessed in a community of learners. This approach reflects an integrated process in which learning and assessment activity build on each other and which are in most cases, interdependent.

Concerns, fears and scepticism

Some of the concerns, fears and scepticism that have been raised about the unintended pedagogical effects of computer-automated online assessment included the potential for the trivialisation of content knowledge through the use of simple selecting, matching and multiple-choice question types delivered by assessment-generating software tools. The fear expressed by many about the use of this technology for assessment purposes was the encouragement it would give to approaches developing 'surface'-type learning over 'deep' learning (Ryan 2000). Because computer-based learning software works well for this assessment method, the concern is that most online assessment would be designed for assessment tasks only involving memorisation and recall. However, to use the technology for assessment involving higher-level cognitive skills, including applying analysis and synthesis, is seen as a greater challenge.

Most significantly for the VET context the assessment may not be valid as the candidate is not required to actually demonstrate competence.

Emerging from the recent literature and the data collected for this study is a much 'brighter' picture than originally painted—with enhanced possibilities for assessment in an online environment. Our study revealed examples of creative and thoughtful uses of the online technologies for assessment purposes, with models and examples which have both relevance and application to the VET sector.

However, there are still challenges and barriers to the further development of online assessment, ones which the VET sector may address more easily with the benefit of lessons learned in other sectors. Some of the concerns voiced about online assessment may in fact be realised unless there is a significant premium placed on the development of teacher/assessor skills in the design and maintenance of assessment tools and tasks. Interview respondents use a range of assessment methods and tools online but identified a wider range of possible methods and tools than those they are currently using.

Answering the research questions

In the next section the issues highlighted in both the literature and interviews with online educators and designers are briefly discussed. Examples of current practice drawn from the interviews are included to illustrate possible solutions to issues raised.

What are the principles of quality assessment in an online learning environment?

The principles of quality assessment are the same for online as they are in any form of delivery. These principles are set out in the Australian Quality Training Framework and not only include the need for assessment to be valid, reliable, fair

and flexible, but also that assessment is planned from the inception of the design of the learning program and includes consultation with industry bodies in its design. These principles underpin all educational testing and assessment practice.

There is a view that the technology used in online assessment does add another dimension to the assessment process. The online environment and its use of technology adds a layer of complexity and may 'exaggerate' the difficulties and issues associated with assessment in the VET sector generally. Perhaps these differences should be seen as the 'additional' complexities that using technology-enhanced learning and assessment systems brings to the design process, rather than a difference in principles.

However, it is interesting that a body of literature is growing in relation to the provision of guidelines and guides about assessment in the online environment (Kendle & Northcote 2000; Leask 1999; McAlpine & Higgison 2000; Morgan & O'Reilly 1999; O'Reilly & Newton 2002). This need to 'contextualise' the assessment principles in an online environment reflects the early stages of the introduction of 'workplace' assessment in the VET sector. Guides and tips were developed to assist practitioners with a new assessment context.

What assessment purposes can be supported through online technology?

Both the literature and the project respondents cite examples and experience of achieving assessment purposes using online technologies. Experienced online educators suggest that no single assessment purpose is necessarily more 'achievable' than another. We found examples of all assessment purposes; however, it was apparent there is a greater degree of both experience and confidence in the use of online activity for formative assessment purposes.

It was apparent in some cases that respondents did not recognise formative assessment separately but as a part of the overall learning process. For some of these respondents, the term 'assessment' appeared to be only used for the 'formal' assessment processes involving specific assessment events which would be used to report on performance or the achievement of learning outcomes.

The place of formative assessment is critical in the learning process and is an area deserving further development and investigation. Conscious decisions about the role of assessment and the design of the assessment activity in the online environment need to be made at the outset for this 'seamless' learning and assessment process to be an effective learning process (Morgan & O'Reilly 1999). For learners in a face-to-face environment, formative assessment can often be given intuitively by the teacher as part of the classroom experience, without the type of explicit planning which is required of the online learning environment.

What assessment methods and tools work well in an online environment?

A range of assessment methods and tools is being used in the online environment, and a body of literature describing these uses is developing. Over the last three years the literature, particularly that from the university sectors in Australia and internationally, has begun to identify the possibilities and potential for a range of ways in which the technologies can support and deliver assessment for a range of learning and assessment purposes (Kibby 1999; Leask 1999; Slay 2001; Herrington et al. 2000; Kendle & Northcote 2000; Oliver 2000; Rowlands 2001). The submission of assignments by email is still a dominant use of the technology, although not the focus of this study.

Some respondents discussed the danger that some learning platform technologies indirectly encourage inappropriate application of assessment methods and tools by novice designers and developers in online learning. 'It's there and it's easy to use'. As one respondent suggested: 'Assessment nirvana'. From the interviews for this study it was evident that, while a range of methods are being used, respondents identify a wider range of possibilities. These tend to be in the areas of self and group assessment using chat and bulletin boards, and group and collaborative approaches. Greater use of simulation and project-based assessment could also expand the potential range of methods and provide evidence from authentic environments to assess skills.

The potential of the online environment to support a stronger student or learner-centred approach has been identified by a number of writers and online course designers. The assessment methods that could be further expanded draw on the learner as central to the learning process. These include self-assessment and project-based assessment.

What factors influence the choice and design of online methods of assessment?

The factors that influence the choice and design of online assessment methods include the learners' needs, their access to technology, the available resources and to some extent, the discipline or industry area. It is important to examine what is to be learned and assessed to identify appropriate methods to demonstrate these skills. It is instructive to consider the choice of methods in the light of the classification of learning styles. It is also essential to emphasise the need to use a range of methods to collect evidence for valid assessment. A blended approach of on- and offline learning and assessment is reported to work best in most situations. The need to integrate the learning and assessment is also considered critical.

Exploring the issues and developing solutions

As part of the iterative research approach the study took up some of the key issues identified by the literature and respondents for further exploration and the identification of solutions for assessors. Key areas of concern related to the capacity of the online environment to support and enhance a learner-centred approach. Respondents raised the contradiction that the online environment is seen by some as having the potential to improve learner-centredness and by others as restricting it. This depends on how the learning process is designed. In order to enhance the online learning environment, it is important to focus on the factors that would enhance learner-centredness. These include how interactivity between assessors and learners and between learners can be better developed; how assessors can understand more about their learners; and how assessment can be meaningful to the learner.

A learner-centred approach will engage the learners with others in the assessment process and build a stronger sense of responsibility on the part of the learner for their own learning. Examples in the literature and interviews highlight the intention for a more inclusive assessment process. The benefit of such assessment approaches, requiring learners to reflect, analyse, evaluate and make judgements helps learners to develop the skills required in the workplace of today (Taylor 1998; Maor 1998; McAlpine & Higgison 2000; Boud 2002).

Issues selected for further examination were those which related specifically to the development, implementation and enhancement of current approaches to online assessment, rather than broader organisational ones. These issues were:

- using the online environment to expand the learning and assessment possibilities through self and peer assessment, and group and collaborative learning
- assessing the quality of online interactions/contributions between learners and between learners and teachers
- creating valid, authentic online assessment
- assessing learner readiness for online learning and assessment
- time and resource management for online assessors
- providing online support for online assessors
- cheating—ensuring authentic learner performance.

Self, peer and group/collaborative assessment

McAlpine and Higgison (2000) provide a useful discussion of self-assessment in the online environment and note that it can help move students 'towards becoming more reflective, autonomous and effective learners.

A benefit of peer and collaborative assessment activity is its potential to reduce the sense of isolation in online learning, particularly for distance education learners where no face-to-face component is possible.

For the most part, self-assessment is used as a self-check or validation process to provide opportunities for learners to monitor their learning achievements and progress and identify further learning needs.

Peer assessment or review is introduced in many learning situations to enrich the learning process. As both an assessment and learning strategy, it enables students to share their collective opinions and findings. Importantly, it provides for multiple perspectives and another way to build a better understanding of the issues raised. Respondents provided examples of the peer assessment process as a contributory factor in the summative assessment for specific courses.

Collaborative learning is recognised not just as a tool to help students develop knowledge and understanding of a subject, but is also recognised as a means to help learners prepare and hone specific workplace skills. Collaboration is considered an important key competency for workplace readiness. Tasks which incorporate collaborative learning and assessment allow topics to be discussed and explored more thoroughly and in a team environment.

Respondents' feedback did not note any beneficial time-saving elements to incorporating self, peer and collaborative assessment into the overall assessment strategy although the literature did provide evidence of this. In fact, respondents tended to emphasise the time which is required to set up and manage assessment strategies, particularly those involving peer assessment and group learning and assessment.

Example: Engaging learners in the assessment process—self and peer assessment in an Australian university

For the learning and assessment activity of a particular unit, students are given authentic problems for which they have to write a solution in portable document format. Students have to post their solutions, along with a self-assessment mark, by a specific date and time.

The assessment system then randomly allocates three student teams to assess each solution. Students are given a specific time within which they have to read the solutions, provide comments and assess. Following this stage, tutors then assess the solutions.

This approach provides a multi-dimensional assessment environment, in which learners can see the problem, view the solutions and all of the assessments given by self, peers and tutors. The benefits of such an assessment approach is that it allows students to see the work of others, to see how others are assessed, to look at how and what feedback is provided and to see comments from a range of different sources and perspectives.

The commitment of time by the tutor to an assessment activity of this nature is significant and may be more demanding than traditional assessment procedures.

Assessing the quality of online interactions/contributions between learners and teachers

If you don't assess it, they won't do it!

The concern expressed in this comment has generated a fair degree of discussion in the literature about the assessment of online communication (Maor 1998; McAlpine & Higgison 2000; Bunker & Vardi 2001; McKavanagh et al. 2002; Downes 2002; Edelstein & Edwards 2002).

As online educators design learning and assessment activities involving online discussions, collaborative activities, postings and learner reviews, some dilemmas emerge. To what extent should this activity be assessed, if at all? If so, how should it be assessed? What criteria should be used?

These interactions or activities need to be assessed if they are actually identified as components of the learning outcomes or competence. If participation in the interactions has no explicit link to the achievement of a stated learning outcome or the assessment criteria for competence, learners will not see the relevance.

Although this technique contributes to the learner's understanding of the subject matter, the student may not view their participation as critical to the learning process. In this case, giving credit towards the student's overall result for actively participating in the communication process will help to encourage the learner to engage in the process.

When the communication is contributing to the overall assessment of the course, the criteria for measuring the communication process must not only reflect the overall aims of the course but must also be stated clearly to learners at the outset of the course.

Some guidelines for assessment strategies involving online communication and interactions are:

- Be sure that the activity being assessed is a component of the products or processes being developed in the course.
- Make the relationship between this assessment activity, other assessment activities and the learning outcomes or competencies explicit to the learners.
- Link assessment criteria for online interactions to the completion of other assessed or non-assessed activities such as synthesis of ideas from readings.
- Be very explicit about the value of interaction to the learning process and to the student themselves.
- Provide clear guidelines and assessment criteria and involve students in setting assessment criteria if possible.

- ❖ Incorporate peer assessment such as voting on good examples.
- ❖ Design a system for categorising responses according to how closely they approximate desired or expected responses.

Attention to the role of the learning community in online learning will ultimately extend the potential of the medium to facilitate learning of new skills. Palloff and Pratt (1999) note: 'it is the relationships and interactions among people through which knowledge is primarily generated. The learning community takes on new proportions in this [online] environment and consequently must be nurtured and developed so as to be an effective vehicle for education.'

Example: Integrating online discussion with assessment in an open learning institution

The online tutor uses the online discussions for summative assessment purposes. Learners are expected to participate in the online discussions and collaborative activities planned by the tutor. These online discussions and collaborations are then used as a resource when learners complete the more traditional essay-type assignments. In this way the online learning activity is incorporated into the assessment activity, in much the same way as a student might use the literature, discussions or papers integral to a face-to-face session.

At least 25% of the marks for the assessment are given for drawing on the discussions which arise out of the online activities, so if the student doesn't participate they experience difficulties completing the assignment. The assignments are submitted, marked and returned via an electronic system.

Creating valid, authentic online assessment

Interview respondents provided a number of suggestions about the ways to develop authentic assessments. Examples of these included:

- ❖ investigation of real problems in a collaborative environment
- ❖ using student teams to assess and review different solutions
- ❖ using portfolios to build sets of resources which are easily assessed by learners and subsequently can be used for job seeking and/or promotions.

Learning to share knowledge and information and building team skills is also part of the authentic learning process, as are communication, negotiation and collaboration skills. Building these key competencies into the assessment process mirrors the skills required in the workplace and adds a measure of authenticity to any form of assessment.

Example: Creating authentic assessments in the VET sector

In an occupational health and safety module of a fashion course the 'online' assessment activity involves students viewing a simulated workplace environment (for example, a machine cutter in a workroom). Students are set tasks to identify the potential hazards they discover through viewing the video clip/picture. The assessment activity becomes more 'authentic' than the traditional essay assignment.

A major public safety agency is in the process of developing more sophisticated learning and assessment activities using highly developed graphical interfaces which will allow them to replicate emergency situations and assess responses in particular scenarios.

Example: Developing authentic and simulated assessment environments in an Australian university

An undergraduate course in soil science (Agriculture degree) successfully uses an online simulation to assess students' abilities to consider and evaluate all the factors they need to consider when replicating the complexity of a real life situation. The visual and graphical interface allows a three-dimensional depiction of the soil study site enabling learners to explore the site without being there.

The tutor sets up a range of possible scenarios to assess their predicting skills. Students select factors and then combine these to propose outcomes.

Assessing learner readiness for online learning and assessment

Research into learning online suggests that a number of considerations will impact on the learners' success in online learning (McNickle 2001; Choy, McNickle & Clayton 2002; Brennan forthcoming). Computer literacy is important, but it is not the only factor. Skills in time management, a high degree of motivation and well-developed organisational skills have been identified as key skills and attitudes for maintaining the level of focus needed to successfully complete an online learning program. Pre-course self-assessment along with other support strategies help learners and teachers to identify readiness and possible preparation activities required by the potential online learner.

For learners to succeed in online assessment, they need:

- clear instructions about what is required of them in the assessment together with the ability to question the assessor for advice and instructions
- opportunities to practise using the chosen assessment methods.

Both the literature and the interview respondents promote the use of 'blended' delivery strategies which introduce learners to independent learning in a supportive manner. A blended assessment strategy involving the collection

of evidence from a range of sources and over a period of time enhances the flexibility of both learning and assessment.

Example: Self-assessment for recognition or course enrolment purposes in VET

The online assessment activity in the information technology course offered by a large open training organisation serves a number of assessment purposes for the provider. The purpose, which they highlight as one of great benefit for the learners, is the 'recognition' of current knowledge/skills. The organisation has seen the opportunity to use the assessment activities to assist students to identify their own skill or knowledge level prior to enrolling in a particular module.

Time and resource management for online assessors

In terms of their development, online computer-generated and marked assessments can be time- and money-hungry. Along with the actual assessment design there is the added challenge of the technology tools used to deliver or support the assessment. For example, the development of well-designed select/response question types with automated marking systems requires significant time and resources if they are to be used over a period of time, meet validity and reliability standards and provide the learners with feedback loops to learning material. But once developed, the view is that they are worth the initial investment. This view is usually justified in terms of the value gained in the reduction in time spent on 'marking' for large cohorts of students, the potential for instant feedback, the flexibility of time and location, and the administrative ease of tracking, reporting and monitoring progress.

However, it is essential that, before developing a multitude of technology-driven assessment tasks, the assessment designer examines the purpose and aims of the learning to ensure that the assessment is appropriate to the skills, knowledge and attitude to be assessed. Being able to do it is one thing, needing it is another.

As the provision of rapid feedback to learners which is both instructive and constructive is critical for learning to take place, an increasing load is being placed on the online educators to respond to learners' emails at all times of the day and week. This is an 'anytime, anywhere' learning environment. Teachers do need to develop clearly stated expectations upfront to help manage their time and should consider technological solutions to assist where available. Cost factors, technical issues, feedback processes and learner expectations about turn-around time are all issues which need to be addressed.

Example: Using select-type questions for assessing higher-order skills in an Australian university

In support of the potential of assessment using multiple-choice questions and ordering/sequencing activity to assess higher-order skills, one respondent discussed an example in which problem-solving skills are assessed. Medical students had to select from 30 possible responses in a specific medical context and then determine an order in which decisions would need to be made, so that the selected outcome could be supported. Highlighted in this example is the range of skills required to arrive at a solution: recalling knowledge, reflecting and analysing information, predicting and evaluating. The design of the task involves a series of stages in which the learning and the assessment are integrated and responses in one stage have consequences for the next.

Using technology to support assessors

The online medium can and is being used to support assessors in their work. However, organisations offering online courses could provide more support to assessors through using their online facilities for professional development. Assessors need professional development and an online environment would provide the ideal medium for such learning and also reduce potential isolation for teachers and assessors. To comply with the Australian Quality Training Framework assessors also need to validate their assessment. The online environment could be used much more extensively to assist assessors to compare and evaluate their assessment approaches.

Cheating—ensuring the authenticity of student performance

Concern about the potential for cheating and plagiarism in the online learning environment is perhaps overstated. This was a view expressed by many interviewed for this study. Numerous responses highlighted the existence of cheating and plagiarism regardless of the delivery mode, and many pointed towards strategies that would minimise its occurrence.

Firstly, teachers need to adopt a risk management approach to the issue of authenticating assessment and make judgements concerning the identification of critical assessments that absolutely must be authenticated as opposed to the assessments where authentication is less critical.

Secondly, by knowing their learners, assessors can more easily determine whether learners have the capacity to produce the work which has been submitted under their name. This seems to be a better method of combating cheating than the deployment of a range of expensive, high-tech solutions.

A common response to overcoming the possibility of cheating is to gather a range of assessment material throughout the course as evidence of competence. Many teachers are using a blended approach where final summative assessment takes place in a real or simulated workplace.

The future

Experienced designers and online educators consulted for this study were asked about their predictions for the future of online assessment. Developments in the technology will change the face of delivery of learning programs (Dalziel 2000; Dalziel & Gazzard 1999; Bennett 1999, 2000; Bejar et al. 2001). Improvements in diagnostic tools are already leading to the development of customised learning programs based on assessment of the learners' needs (Drew, Thorpe & Bannister 2002). Extending the use of assessment methods such as simulations, problem-based models and the collections of portfolios of evidence will expand the potential of the online environment regardless of the technology. Developments in techniques will improve the possibility of simulations and problem-based assessment. Standardised large-scale tests are favoured by some writers as solutions to time and consistency issues. However, large-scale tests and item banks have limited use in improving efficiency, often at the expense of valid assessment of competence. There will be an increasing interest in the use of technology-assisted assessment for diagnostic assessment purposes. In an educational context, online diagnostic tools (both self- and instructor-reviewed) will be used to assist learners to identify current levels of skills and knowledge for online learning readiness and course placement. For the VET sector this will also have particular relevance for processes associated with the recognition of prior learning.

Example: Compiling portfolios for assessment in both a European and New Zealand university

Having a collaborative approach to learning is the key to the design of online learning and assessment activity for one of the tutors interviewed in the study. The tutor uses one of the major learning platforms to support his approach to assessment. This platform provides the facility for students to create teaching and learning portfolios. As the learners are engaged in a collaborative learning activity, they post their portfolio resources over a period of time and all the learners can see how their portfolios are built up over this time.

The lecturer in a teacher training course primarily sees the online technology she uses as part of her classroom. The course uses software which has been modified to meet the teaching and learning requirements. Within each class the lecturer has established a folder called 'portfolios' where she is able to review and evaluate the portfolios of all learners. She places all the module responses provided by learners, her feedback, comments and grades in the portfolios. Learners can easily access their assessment and lecturer comments. This approach to monitoring and maintaining an assessment system has benefits for the learners and the lecturer. It has eliminated the need for email or attached documents which were too time-consuming.

Key points for high-quality assessment online

From the research, a set of key points emerged that support the design and implementation of quality assessment in online learning in VET. These points can be used to help online and face-to-face practitioners develop valid, reliable, flexible and fair assessment.

The planning stage

- Plan upfront how candidates will demonstrate their competence.
- Use the skills and knowledge you have developed for face-to-face delivery and assessment to help guide your choice of assessment tools and strategies.

Developing strategies

- Consider the skills and knowledge that are to be assessed and determine the best methods to collect evidence of these, keeping in mind that the technology available should not determine the methods used.
- Make assessment part of the online learning process. The learning strategies and assessment strategies should be developed simultaneously.
- Use a range of methods to collect evidence of competence as with any competency-based assessment, whether delivered online or face to face.
- Ensure assessment is valid and authentic by using strategies such as simulation, problem-based approaches, portfolios of evidence and integrating online and face-to-face assessment.
- Consider how the assessment can be learner-centred by using strategies like self and peer assessment.
- Use the online formative assessment strategies to develop key competencies such as communication, collaboration and team work.

Implementation

- State the criteria for assessment upfront to learners. For example, if quality and quantity of online communications count towards final assessment, be clear about the criteria used for assessing.
- Make sure the expectations regarding the timeliness and extent of feedback from the assessor are clear to the learners from the outset.
- Help eliminate cheating by devising ways to know your learners' abilities and by gathering a range of evidence of competence.

- ❖ Believe that simple technology can be as effective as complex technology.
- ❖ Make sure you understand the capabilities and access to technology available to your client group. Offer other options if online is going to restrict access to your learners.
- ❖ Explore the possibilities of blended delivery and assessment methods. Online assessment strategies can be incorporated into a face-to-face class and conversely, online classes can be assessed using real or simulated workplaces.

Assessor support and review

- ❖ Share resources with people in similar fields to help enrich your own materials, build on your skills and knowledge and keep up to date with the constantly changing technology.
- ❖ Use the online environment to compare and review your assessment strategies, evidence collected and judgements with other assessors to validate assessment.

Conclusions

The literature and examples discussed from the interviews demonstrate that the most effective use of online assessment is achieved when educational objectives are clearly linked to assessment activities.

What the good examples in both the literature and our study reveal is that by identifying very early in the online learning design process exactly what it is that is going to be assessed helps to determine how learning and assessment will best be integrated. Then the selection of the tools or technology to support or deliver the assessment process will be based on an informed educational decision rather than an attraction to a particular assessment method or tool.

It is clear that select-and-supply-type computerised assessment tools have a role to play in various assessment contexts and for various assessment purposes. Instantaneous feedback to learners, enhanced by well-designed learning loops, opportunities for multiple attempts as well as a reduction in a 'marking' load, are all important benefits of computerised assessment activities and provide scope for both formative and summative assessment. However, the latter use is still an area of considerable debate.

Most significantly however, the literature and the examples in this study highlight a rethinking of assessment in light of the potential for collaborative and online learning communities in open, distance and flexible learning arrangements. Learner-centred assessment approaches which include peer and self-assessment create further opportunities for the development and assessment of higher-order skills and attributes.

The use of discussion boards for both learning and assessment purposes will continue to grow as all stakeholders become more comfortable with the medium. The objective to make assessment a much more integrated and transparent process can be supported by the new technologies, creating portfolios of evidence, developing assessment criteria available to all and generating opportunities for a greater role to be taken by the learners themselves in the assessment process.

Overall, the advice to VET in relation to online assessment is best expressed through the comment based on that made by Bates (1995) and others more recently:

> *… concentrate on designing the learning [and assessment] experience, and not on testing the technology.*

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Learner expectations and experiences

Student views of support in online learning

Sarojni Choy, Cathy McNickle and Berwyn Clayton

This chapter* recognises the importance of provision of services designed to support online students in every aspect of the online experience, including pre-enrolment, teaching and learning and technical support. The respondents in the study indicated that flexibility was their key reason for choosing online study—flexibility of time, place and pace. In terms of the support they considered necessary to accomplish online study successfully, students are looking for information to assist them enrol in the program, including information about the institution, reliable and ongoing support from teachers and co-ordinators, and quick responses from staff for their queries.

Introduction

THE INTEGRATION OF information technology into vocational education and training (VET) programs has dramatically enhanced its flexible delivery by expanding and modernising the information technology capabilities to include those related to online learning. In doing so, learning services have been extended to meet the needs of a more diverse client group, producing a rapid growth in online innovations. However, the research into the support expected by students has been limited. Due to this, our study was commissioned to explore the expectations and experiences of online students in the VET sector. The findings of this study are the subject of this chapter.

The need for supporting students has been highlighted by a number of authors including Brookfield (1984), Candy (1991), Mitchell and Bluer (1997), Warner, Christie and Choy (1998), van Stavaren, Beverley and Bloch (1999) and McNickle (1999). The need for intervention strategies and support for students

* A summary of the report, *Learner expectations and experiences: An examination of student views of support in online learning* (Choy, McNickle & Clayton 2002).

have also been emphasised in studies investigating non-completions in VET programs (for example, Baron, Thiele & Hintz 1995; James 1998; McNickle 1999; Misko 1999). Research on the quality of online learning has been undertaken in the past; however, much of this has been inconclusive. To this effect, how the use of technology enhances learning also remains unclear (Phipps & Merisotis 1999).

The aims of the study were to:

- explore the theoretical frameworks/models underpinning student support and intervention strategies in online learning
- examine the current assumptions and practices in the delivery of online VET programs
- investigate student expectations and experiences of current practices at various stages in their programs of study
- develop guidelines for online support for both practitioners and students.

This study used both quantitative and qualitative methods. Separate surveys with students and online course co-ordinators and teachers provided quantitative data. Interviews with students, course co-ordinators and teachers, and case studies provided qualitative data. The purpose of the interviews was to expand on critical services expected by online students, the most beneficial services, best examples of current services and those most in need for improvement. A review of websites and other databases of online providers was conducted and the literature was reviewed.

Profile of the students sampled

Two hundred and one responses to the survey were received from students who represented 23 private and public institutions across New South Wales, Queensland, Victoria, the Australian Capital Territory and South Australia.

The great majority of respondents were aged over 26 years, with 43% aged between 26 and 40 years while a further 40% were aged over 40 years. The remainder was aged between 21 and 25 years (12%), or below 20 years of age (5%). The sample was predominantly female (68% female, 32% male).

The majority of respondents (73%) did not belong to any of the targeted access and equity groups. Of the total sample, 2% were of Aboriginal or Torres Strait Islander origin, 6% were from a culturally and linguistically diverse background while 19% were from rural or regionally isolated areas.

A majority of online students (64%) intend to complete the whole course using the online mode. About 17% of the sample expects to complete some modules/subjects online and the rest by other modes. Nineteen per cent of students were undecided about future online learning.

A large proportion of students (94%) were employed while studying online. Of these, 13% were in part-time employment while 87% held full-time jobs.

What they studied online

Online students who participated in this study were studying at a range of courses at certificate and diploma levels. Most (48%) of the sample undertaking online courses were studying for a certificate III qualification. Approximately 26% were pursuing a certificate IV course while 14% were completing courses for a certificate I or II (7% each), and 5% were undertaking studies for a diploma, with 7% undertaking advanced diploma qualifications.

Among those pursuing studies through the online mode, about 65% said they were completing their first module at the time of the survey. Approximately 31% had already completed between one and five modules through the online mode and 4% had completed over five modules using this medium. While 12% of the sample had been doing online courses for less than six months (indicating they were beginners), a majority (83%) said they had been studying online courses for 6 to 12 months. Only 5% said they had been studying online courses for more than 12 months. The most experienced online student had been studying for 3.5 years through the online mode.

Where they studied online

The responses showed that 42% of students completed all of their online learning from home. About 22% said all of their online learning took place at work. About 17% completed their learning mostly at home with the remainder at work, while 16% said they completed most of their online learning at work and the rest at home. Only 2% of the sample said they completed their online learning at the computer centre of their institute and 1% indicated their learning took place at a friend's house because they did not own a computer.

Why they studied online

The students were asked to state their reasons for undertaking online courses. The statements provided by the sample were grouped under three main broad reasons: flexibility, change and lack of choice.

Of the total sample, 68% undertook online learning because of flexibility in terms of pace, time and place. Some examples of statements were:

> *Freedom—I can work at my own pace.*
>
> *No time constraints, can work whenever I have time.*
>
> *Due to geographical constraint. I live in the* [sic] *rural area.*

About 12% said they enrolled in online courses to experience a change from traditional delivery systems.

Just wanted a change.

I have an interest in the internet systems.

I enrolled in a pilot course and wanted to test out the online system.

About 20% of the sample said they did not have a choice in the course they were studying online because it was offered only through this mode. Among them, a few commented that their employer requested they complete this course online to participate in a pilot study.

Overall, the results show that the flexibility in time, place and pace are the key reasons why students enrol in online courses.

Student support: What it is and where it is needed

Students learning online require similar support to those studying by more traditional means (Carroll & McNickle 2000). These services are provided to enable students to access learning support and other assistance to maximise their chances of successful completion. Traditionally such support is seen in terms of that required prior to enrolment and during the teaching and learning process. However, in online and flexible approaches, learners also need a measure of technical support.

In the context of online learning:

- Pre-enrolment support includes career advice/counselling, course advice, course information, information on enrolment procedures and payment of fees.
- Teaching and learning support includes induction and orientation to the course and to online learning, communication strategies (including processes to keep students in touch with each other and with staff), access to study and research skills (time management, learning-to-learn skills/independent learning skills), information literacy, and using the web to access information, general learning support, and providing access to learning resources (for example, the institution's library).
- Technical support relates to the information technology support that provides students with a range of options to access assistance, including phone, fax, email, frequently asked questions and helpdesk. It includes providing hardware and software support for students as well as ensuring that the systems function well, are easy to use and are reliable.

Support prior to enrolment: What it involves

Services and support for pre-enrolment/enrolment are crucial for online learning. Students have highlighted this area as being the primary concern for providers, together with learning and teaching and technical assistance.

Enrolment requires user-friendly procedures and simple steps to enable students to enrol without problems. Therefore, pre-enrolment support needs to be accessible. One interviewee demonstrated the importance of this:

> *I am very disappointed in the lack of support I have been getting from the start. The course was supposed to start in July and I am still waiting for some learning material … please tell me where to go to get started on this course.*

The five services with the highest expectations for pre-enrolment/enrolment were:

- detailed information about what is required to complete the module/course
- detailed information about the courses
- security of personal details on the institute's database
- instructions on whom to approach for help
- information on how to enrol.

Other highly regarded services included:

- instructions on how to seek help
- the software and hardware requirements needed to do the course/module
- recommended library resources to support learning.

Findings indicated that there was no significant difference in responses by age. However, there was a significant difference in responses to four items by gender. Females had a higher mean than males for:

- detailed information about what is required to complete the module/course
- enrolment via the internet
- security of personal details on the institute's database.

There was a significant difference between the means of females and males for the option *to complete RPL* [recognition of prior learning] *via the internet*.

There was also a significant difference in responses by online students who were employed and those who were not in paid employment. In the latter case, however, the sample is quite small.

Those who were not employed were more concerned about the cost of completing modules or courses, the software and hardware requirements

needed to do the course/module, the security of their personal details on the institute's database and their access to their institute's student services. Those in part-time employment had higher expectations for the software and hardware requirements needed, detailed information about what is required to complete the module/course and an assessment of their readiness for online learning. Thus employment status (intuitively at least) and gender issues are likely to affect the nature of the online program offered, particularly in relation to information needs, security of personal information, the costs and the technologies needed.

Support during study: What it involves

Learning and teaching are the backbones of what constitutes online delivery. The major theme amongst the responses to the interview questions focussed on the importance of total support through the entire learning and teaching process. This should be provided in numerous forms and be continuously accessible, and without presenting any difficulties.

Student support is important, so that students studying online have the same support and facilities as 'on- and off-campus' students. Initially, the online student group was seen as not requiring the same support as undergraduate or VET students because they were assumed to be more mature, more independent and more self-sufficient. This is true to some degree, as the majority of online students in this study at least do seem to possess these characteristics. However, these assumptions ignore that a student is learning and therefore requires help like any other student.

In relation to teaching and learning support needs, the services that were most highly regarded were:

- clear statements of what I [the learner] was expected to learn
- helpful feedback from teachers
- requirements for assessment
- communication with teachers using a variety of ways, for example, email, online chat, face to face
- timely feedback from teachers.

Other highly regarded services included:

- course outline and learning outcomes
- due dates for the different tasks
- the return time for assignments
- strategies for approaching assessment tasks
- the way feedback is to be provided to me.

There was no significant difference in the responses to the items by the different age groups, indicating services for learning and teaching; however, some significant differences were noted, with females having a higher mean than males, particularly in relation to the ways in which communication and feedback are provided. There was a significant difference in the expectations (for this service) by online students who were employed and those not in employment. The unemployed online students had a slightly higher mean, or level of expectation, than employed students.

Technical support: What it involves

All students of online education have experienced technical difficulties. Whether it was infrequent login access, slow-moving technology, or expensive hardware, technical difficulties were experienced regularly.

Technical support expectations focussed on prompt technical service, as were the results indicated by the interview sample.

The most expected services for technical support were:

- quick response to technical problems
- easy access to technical assistance
- provision of technical (information technology) assistance throughout the course
- strategies for checking the accuracy/quality of information on the internet
- access to frequently asked questions and responses relating to technical issues.

There was no significant difference in the mean responses for the technical support services by age, gender or employed status.

Support: What learners say they want

Essentially students are looking for:

- information to help them succeed in the program
- regional support contact with teachers and tutors
- quick responses from staff to their queries.

Box 1 shows the top ten services expected by online students drawn from across the three major areas of student support studied.

On the whole, female students had higher expectations of support services than males at pre-enrolment and during the teaching and learning process.

In addition, students who were unemployed generally had greater expectations in relation to such issues as the costs, hardware and software

requirements, access to student services and security of personal details than students who were in employment.

Box 1: The top ten online student services

1. Detailed information about what is required to complete the module/course
2. Detailed information about the courses
3. Security of personal details on the institute's database
4. Clear statements of what they are expected to learn
5. Helpful feedback from teachers
6. Requirements for assessment
7. Communication with teachers using a variety of ways, for example, email, online chat, face to face
8. Timely feedback from teachers with agreed response times being met
9. Instructions on whom to approach for help
10. Information on how to enrol

Those employed part time were more concerned about hardware and software requirements, requirements to complete the module/course and assessment of their readiness for online approaches than their colleagues who were fully employed.

However, there were no differences in mean responses related to expectations of technical services on the basis of age, gender or employment status. Finally, there were no significant differences on the basis of age in relation to expectations for either pre-enrolment or teaching and learning support services.

Interviewees were asked to state the most essential services for the completion of their online learning programs. There were three key services that online students perceived as essential. These are listed in order from most discussed to least.

Detailed information on students

Students believed information was important, and the more of it the better. They needed information about courses and how to enrol prior to enrolment, and detailed information to help them to complete the course or module in which they were enrolled. This also included clear information about what they were expected to learn and the requirement for assessment. The security of their own information and personal details were also important to them. Therefore staff need to be very clear, and make it clear to learners, what information concerning them (assessment feedback etc.) will be public and what will remain confidential.

Finally, the learners needed information about who to approach for help and how and when they could be approached. This support and contact is particularly important to learners. It is also important that it is both quick and timely.

Regular contact with the teachers/tutors

Students believed that it was most essential to have regular contact with teachers and tutors as well as with other students. Many said they were able to contact teachers/tutors and peers mainly through emails. The following statements are examples of responses from the interviewees. Two students reported that they required:

> *Teachers who are present on a regular and continuing basis through email contact.*
>
> *Personal and frequent contact with course supervisor/tutor.*

Another student commented that:

> *Emails were not always answered and when they were took days to weeks to get a reply. When you are doing a course online you need to be able to have access to a tutor pretty much on the spot if you have any questions etc.*

A few students were able to make regular contact by telephone. Others said they would have liked more contact by telephone.

Online students believed that regular support for learning was also essential. Teachers were expected to provide advice, directions and feedback on a regular basis. Online students expected teachers to provide new information or resources such as web pages, references and networks to support online learning.

Other elements of services that were suggested as essential included access to peers (through email, phone and online chats), accurate record-keeping by teachers, and clear navigation for self-help. A range of communication strategies is available to students to communicate with teachers but not peers. One student suggested that teachers should initiate the establishment of chat rooms and facilitate scheduled discussions on a regular basis:

> *Design chat rooms for the students to support each other and for the teacher to organise regular chats with his/her students.*

One student suggested the establishment of noticeboards:

> *Forums/noticeboards are useful for asynchronous discussions—so that I can participate even though I'm not available at the right times.*

These elements of good practice and support reinforce the key features of a high-quality online learning experience.

Quick responses from teachers/tutors

Some interviewees expressed disappointment with late or slow responses from their teachers/tutors, particularly when they perceive technology as being able

to enhance the return rate and timeframes. The statement from one interviewee represents similar experiences by others.

> *Having access to course teacher/tutors is essential; in my experience it has taken me two or three days to get an answer for my questions and I have forgotten or lost interest by this stage.*
>
> *Quick responses from teachers are essential to maintain momentum with study. Long delays with responses and marking of assignments by teachers hinder and handicap study and course completion.*

One student suggested:

> *Feedback between students/teachers to be no longer than two days—frustration and lack of enthusiasm seeps in after that.*

It appears that online students recognise the capacity and ability of online technology to provide quick responses and are expecting teachers/tutors to operate quickly.

Student support: What needs to be improved?

When asked which areas of online services were most in need of improvement, comments from students focussed mostly on facilitation by teachers and technical systems.

Facilitation

The interviewees identified several shortcomings in teachers and their practices which required improvement. The most frequent among their comments related to the delay in response from teachers. They suggested that teachers should mark assignments quickly and provide feedback to students within a reasonable timeframe (two days was suggested by one student). Many added that teachers should inform their students if they plan to take a vacation. One interviewee suggested that teachers should not be changed during the period of the course and wrote:

> *Treat like face-to-face course and not rotate teachers and confuse students.*

It was also suggested that teachers give a clearer explanation of what is expected of online students.

One interviewee highlighted the importance of writing the content specifically for online delivery:

> *Writer—very important that writers write to the appropriate audience. They need to realise that writing to online students is different to writing for a class that will be face to face and things can be explained.*

Two comments from the interview participants indicated that students did not think their teachers/tutors were trained well for online delivery.

> *Staff induction to online learning. They don't seem very well trained.*

Tutors don't know what they are doing. Do the tutors know exactly what is expected of themselves?

Technical systems

A common problem encountered by many students related to attempts to refer to content materials when completing assessments. The following statements illustrate this problem and highlight an area which needs improvement:

> *When you are doing your assessments, it is handy to look back over the section you studied … Not to get the answers, but to make sure you have included what you intended. I found I had to hit the back button more often then not and lost track of where I was going. There was a lot of switching between areas that I found time-wasting.*

Some online students suggested improvement to the log-in access.

> *Improve log-in access—how can a student contemplate doing the courses in lunch breaks etc. if it can take an hour to log in.*

Comments from online student illustrate their extensive level of knowledge and understanding about interactive online materials. They have explored other materials on the world wide web and experienced the capacities for interactiveness, hence expect similar attributes in their learning materials.

Student support: What the teachers think

Due to the limited response from the teacher/co-ordinator group (N = 12), the results can only be deemed an 'indicator' of the group perspective.

The teachers/co-ordinators were asked to list three support services for online learning that they considered to be most useful to students. They were asked to also list their perceptions of why this was so. The responses were as follows:

- high-quality information technology helpdesk or call centre: students need prompt resolution of difficulties or they lose confidence in the validity of the online learning experience. A forum or bulletin board is also needed for frequently asked questions
- easy/convenient access to other learning resources and links (books, software and hardware) that complement the online program: not all resources can be provided online in a convenient and easy-to-use format. There is still a need for print/paper resources and hardware
- prompt (timely) communication to resolve issues arising from the online program including feedback on assignments, responding to questions, re-assessments and general and specialist concerns: this could be accomplished by email, phone or by other means. Delays in this area are especially significant online, where students should be (need to be) in

control of their rate of progress. Continuing without essential correction of misinterpretations, misinformation, incorrect assumptions and perceptions can lead to having to 'undo incorrect learning', which places a high demand on time for everyone. This includes tutorial support in relation to content and learning activities that students undertake

- face-to-face or online induction: there needs to be some kind of intensive induction program that includes a range of the staff involved in supporting learners, such as the content person, the lecturer, the resource developer and information technology support staff.

What support services do students access most?

According to the teachers/co-ordinators the five services that were accessed most frequently by students, included:

- *support*: diverse offline flexible learning mechanisms in support of the online program with facilitators being available 12 hours per day (0900–2100)
- *access to variety of communication tools*: phone/email contact to be made available as part of the support mechanism and tutors to be in frequent contact with most students
- *resources*: external access to simulators and specialist resources including links to state networks using WebCT (a learning management system) and lending services for learning resources
- *helpdesk for general assistance*
- *induction processes*: this needs to include improving students' literacy skills in general, and information technology literacy in particular, prior to beginning the online course and self-assessment on readiness for using the mode, the particular learning system and software.

What needs improving?

The teachers/co-ordinators believe that services to students are limited in the following areas:

- information technology and internet services
- pre-enrolment services, including pre-enrolment counselling
- readiness and suitability assessment
- administrative services, including the ability to make changes to personal details through access by password, the option to complete recognition of prior learning processes via the internet
- requirements for assessment and quick, easy responses to technical assistance.

Table 1: Guidelines for online support and intervention strategies

Area	Student expectations	Guidelines for support and strategies for intervention
Pre-enrolment	❖ information on what is required to complete the course ❖ information about the course ❖ security of personal details ❖ who to approach for help ❖ information on how to enrol	❖ comprehensive accessible information available on enrolment, course content, the institution, and career options ❖ information to be presented clearly and easy to navigate ❖ information to be made available in a range of modes ❖ constant and ready access to the course ❖ contact persons to be available for clarification of enrolment and course queries by email/phone/face to face ❖ an enrolling online webmaster to assist ❖ information on who to ask for help and how to seek help ❖ information on costs, what is required to complete the course, enrolment and security of personal details
	Strategies for intervention	❖ an enrolling online webmaster to assist or contacts to be available in a range of modes to provide guidance and assistance ❖ course information to be presented clearly and accurately with access to course advisor
Teaching/learning	❖ clear instructions on what they are expected to learn ❖ helpful feedback from teachers ❖ requirements for assessment ❖ communication with teachers using a variety of media ❖ timely feedback from teachers	❖ comprehensive induction/orientation programs ❖ induction/orientation skills to include study skills, self-awareness of learning styles etc. and application of the study skills for these styles ❖ induction/orientation to be available in a variety of modes ❖ clear statements of what students are to learn in the course ❖ students to be allocated a mentor/contact for the duration of the course ❖ resources built into the learning material and also available in hard copy ❖ learning materials to be presented clearly and comprehensively ❖ references to other resources and learning materials within learning materials ❖ information to be presented in manageable amounts ❖ online exams and resource/course material mode available ❖ timely and helpful feedback from teachers

Area	Student expectations	Guidelines for support and strategies for intervention
Teaching/learning cont.		❖ consistency—same tutor, same contact details, consistent access ❖ notice boards, frequently asked questions boards, chat rooms ❖ reliability—of material, teachers ❖ communication with teachers using a variety of ways e.g. email, online chat, face to face ❖ requirements for assessment to be clearly presented ❖ provision of communication with teachers and other students ❖ opportunities to practise skills ❖ provision of bulletin boards, telephone, fax and assessment strategies ❖ strategies for working in groups and independently
	Strategies for intervention	❖ comprehensive induction/orientation program ❖ comprehensive resources and learning materials and information ❖ allocation of a mentor ❖ teachers/mentors easily accessed ❖ frequent communication between students and teachers especially in the early stages
Technical support	❖ quick response to technical problems ❖ easy access to technical assistance ❖ provision of technical assistance throughout course ❖ strategies for checking accuracy/quality of information on the internet ❖ access to frequently asked questions	❖ provision of technical (information technology) assistance throughout the course to be available in a number of forms i.e. telephone, fax and email ❖ helpdesk ❖ response times to be stipulated for addressing technical problems ❖ easy access to technical assistance ❖ strategies for checking the accuracy/quality of information on the internet ❖ access to frequently asked questions ❖ tips on downloading information, participating in discussion groups and a technical glossary ❖ guide to using email ❖ provision of net etiquette and referencing
	Strategies for intervention	❖ students to participate in an induction/orientation program that has an introductory information technology and internet component ❖ provision of technical (information technology) assistance throughout the course to be available in a number of forms i.e. telephone, fax and email and 24 hours a day, seven days a week

The good practice guide

As a result of the student feedback, the teacher/co-ordinator feedback and the literature search undertaken, the guidelines in table 1 have been developed. It is with some hesitation that this information is included due to the embryonic stage of online learning and the limited feedback that has been gained from online students for the study. These guidelines could be considered as minimum requirements for online support; however, those students who are less computer-literate or categorised within a disadvantaged group would possibly require additional services, for example extra academic or technical support.

Summary and conclusions

For online delivery to attain its main purpose of creating flexibility and enhancing access to learning, it is essential that providers supply the same services to support online students that are provided to traditional classroom students.

The diversity of information technology ensures an excellent tool for enhancing flexibility and delivery forums and also has the potential to cater for the needs of diverse groups of students. Accordingly, providers are using online systems in combination with other modes to meet these client needs. However, the precise nature of services offered by each provider to online students is rarely shared for reasons which mainly relate to commercial-in-confidence considerations. No minimum requirements or standards for student support seem to exist for providers for use in online delivery. What each provider has or is able to offer to support students depends on a number of factors, including staff expertise with technology, finances, types and number of students and whether the infrastructure is student-centred as opposed to the more traditional teacher-centred.

The stakeholders involved in this study have strongly reinforced the necessity for a range of support strategies which need to start from the time the student enrols and which need to be made available for the duration of the learning cycle. What is also clear is that the support solutions need to be characterised by a more whole-of-organisation rather than a piecemeal approach.

The transition from traditional classroom to online learning has the potential to be an anxiety-inducing experience and for this reason many students fall by the wayside. However, this experience can be minimised by adequately supporting students, especially in the initial stages. Feedback from students, teachers and research indicates that students need to be well informed of the requirements of them as students, of the course requirements and of the assessment requirements. The content needs to be presented so that it is easily understood. It should be consistently presented and sufficiently detailed to

enable them to become self-directed students. Students need to have ready access to and efficient responses from information technology and academic support to alleviate frustration and to assist with time management.

Student responses indicated the need for information on course and module requirements and regular communication with teachers and tutors as the underpinning requirements for successful completion of online learning. The research found that there is a lack of opportunity for students to complete all the necessary administrative procedures online.

However, the co-ordinator/teacher feedback indicated that the participating institutions are providing online students with adequate information on the course material and administrative procedures, with the exception of enrolling online and paying online.

Respondent teachers/tutors also highlighted a deficiency in the provision of self-awareness of the students' dispositional skills and suitability, an area that is gaining greater importance and also one becoming more aligned to completion rates and success in flexible learning.

Providers have taken into account the benefits of the ongoing provision of information to support their online study and have offered students opportunities for communication, utilising a range of modes to facilitate interaction/communication between teacher and students.

Teacher/co-ordinator responses highlighted the need for self-assessment to be completed prior to enrolment along with the assessment of key competencies. One comment received by teachers confirmed this: 'We propose to recommend that our online students become computer and web literate before they undertake an online course'. These respondents also noted that students could be given tips on how to keep motivated (for example, provision of social space).

Other results of the study indicated that the key issues for registered training organisations to consider, include:

- specific professional development for teachers/tutors who are involved in online delivery
- allocation of dedicated staff to support online students so that they are able to provide rapid response to enquiries
- establishment of guidelines and directions for online students and teachers/tutors
- establishment of the roles and responsibilities of students as well as teachers/tutors.

One key issue for national governing bodies, such as the Australian National Training Authority, is the establishment of minimum standards for online delivery to ensure any specific groups of online VET students are not disadvantaged.

The stakeholders involved in this study have also emphatically expressed the necessity of provision of good communication between teachers and students, timely and informative feedback from teachers in response to issues, and timely responses to their information technology issues.

Students need to participate in a comprehensive induction/orientation program which will address many of the issues they are likely to encounter in the early stages of their course. Many assumptions have been made about the skills students possess, especially information technology skills and literacy skills, and their access to resources and to information technology. The literature focussing on online support indicates that there is a general consensus that students need to be supported with access to the same services as traditional/classroom-based students. This support needs to start from the time the student enquires about the course, and while this support requirement usually declines over the duration of the course, it needs to be available throughout the entire learning experience.

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