

Literature Review: Digital Divide

(R019RL)

Assess and Equity in Online Learning

ISBN 1 920906 23 1

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*An initiative within the Australian Flexible Learning Framework for the National Vocational
Education and Training System 2000-2004*

*Managed by the Flexible Learning Advisory Group on behalf of the Commonwealth, all States
and Territories in conjunction with ANTA*



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Digital Divide

Strategy 2001 Project

Access and Equity in Online Learning (Stage 2)

Literature Review

‘Investigate the concept of the “digital divide” to determine the extent to which it is a significant factor impeding or facilitating VET provision around Australia and to make recommendations on how *Strategy 2002* should respond’.

This section will outline the findings of the review of literature about the significant factors impeding or facilitating the provision of VET around Australia. The literature will be divided into four distinct sections:

- I Definitions and Framework*
 - II Review of the Literature*
 - III Issues Raised by the Literature*
 - IV Conclusions from the Literature*
- I Definitions and Framework describes the background to the Digital Divide project and outlines the definition, scope and framework being used for the project.*
- II Review of the Literature outlines the literature accessed in research, reports, journals and any other forms of published material, online and hardcopy nationally and internationally, that was relevant to the project framework.*
- III Issues Raised by the Literature describes an analysis of the literature in relation to the Digital Divide as per the definition for this project.*
- IV Conclusions from the Literature draws together the issues of the Digital Divide that have been identified.*

Note

In developing the scope of the ‘digital divide’ part of the project it has been assumed that issues relating to technology access are being identified and addressed in other Strategy 2001 projects.

I Definitions and Framework

The project will build an overview of the project's nominated target groups, with respect to the barriers, needs for IT literacy, functional literacy and information literacy to enable participation in flexible delivery of vocational education. The scope of the project is detailed in the following definitions.

1.1 Definitions

Digital Divide - the disparity in skill readiness and ability to access computers and the Internet together with the ability to effectively use this technology to enable full participation in vocational education and training.

Functional Literacy Skills - the minimal level of literacy necessary to understand and use information from material printed in English to fulfil the demands of everyday life and work.

IT Literacy Skills - the basic skill requirement enabling the ability to use email, internet and some word processing packages.

Online Information Literacy - requires a skill level enabling the student to recognise the need for information, to locate, organise, evaluate it and use the skills independently for effective decision-making or problem solving (using online technologies).

1.2 Framework

The Digital Divide Framework outlines the areas that online students should have access to, if they are given the same opportunities and services afforded to traditional students. Therefore, providing online learners with an equitable learning experience. The framework has been divided into categories and questions have been allocated within these. Some questions appear to overlap and any of these issues will be addressed by the interviewer during the interviews, as the framework is for case studies and interviews face-to-face.

Digital Divide Framework

Pre-enrolment/ Enrolment	Comments - access, skills, learning opportunities and services for online learners
	Course information available
	Online enrolment
	Induction/Orientation program

Communication	Comments - access, skills, learning opportunities and services for online learners
	Technology used to communicate with teachers
	Access to support resources and other services
	Technology used for communication between peers, ie chatroom, discussion forums
	Use of the web to access results, change of course etc
	Use of the web to access and download resources for your course

Teaching and Learning	Comments - access, skills, learning opportunities and services for online learners
	Skill requirements for online learning (IT literacy, literacy, time management skills etc)
	Access and adequacy of teacher/tutor support for academic issues
	Access to study guides and associated resources for online learning

Technology	Comments - access, skills, learning opportunities and services for online learners
	IT requirements of the course prior to enrolment
	Access and usage of hardware and software
	Access to the internet
	IT skill level
	Access to IT support and a helpdesk
	Access and completion of an Introductory course in computing prior to commencement of the course
	Specific up-skilling prior to starting the course as an enabling device
	Socialising with other students online
	Reliability and cost of technology

Resources	Comments - access, skills, learning opportunities and services for online learners.
	Access, cost and downloading of resources
	Usability of course guides, content and resource materials
	Adequacy of access to library resources, databases, websites, bookshops etc.

Student Support	Comments - access, skills, learning opportunities and services for online learners
	Assignment of a tutor or contact person
	Effectiveness and efficiency of feedback from teachers/tutors
	Follow-up from teacher/tutor regarding assistance, pastoral care
	Mode of provision of support (email or phone)
	Learning style suitability

II Review of the Literature

This section will outline the literature accessed in research, reports, journals and any other forms of published material, online and hardcopy nationally and internationally, which was relevant to the project framework. The framework has been used throughout the report to maintain continuity of structure and content.

It should be highlighted at this stage that whilst this review is looking at the digital divide from the perspective of skill deficits, namely: IT literacy, literacy and information literacy, it is also including general barriers to access that affect all students and not limiting the study to the target groups. Initial research has indicated that the many of the identified needs of support are across all learner groups and not confined to target groups. This approach has been taken deliberately in order to prevent further inequities and reduce the need for redress at a later stage.

Initially online learning had a major focus on the technological components of the mode often to the detriment of the content and the learner. This particularly has the potential to create issues for those learners who have skill deficits in areas of IT literacy, functional literacy and information literacy, disadvantaging these learners from accessing the opportunities that online delivery has to offer.

The review at this stage has focussed on the barriers experienced by learners, especially from the aspect of IT literacy, functional literacy and information literacy.

Learners at all levels of education require access to support to make the transition to online learning. However, the literature provides strong evidence that students in the marginalised groups require a range of support mechanisms similar to the traditional support services to assist them in making the transition to online learning. As a result, it is necessary that providers focus on a more holistic approach to learner support.

2.1 Some Background Issues Influencing the Divide

Since the inception of Australia's National Strategy for Vocational Education and Training 1998-2003, *A Bridge to the Future*, and other national strategies to maximise the opportunities for the Australian population to access flexible learning, there has been much written and discussed about the access and equity of online learning from a range of dimensions, including the socio-economic, socio-demographic, geographical and dispositional skill perspectives.

This project aims to identify the barriers and needs of learners to enable them to participate in online delivery of vocational education, focussing on IT literacy, functional literacy and information literacy. If Australia is serious about becoming a knowledge nation and being globally competitive, there is a need for policy to ensure lifelong learning is equitably available to all. The issues of IT literacy, functional literacy and numeracy and information literacy have to be addressed as a nation, or the gap between the information rich and poor will become a *chasm*, not just a divide.

Whilst the Commonwealth and State and Territory governments are promoting participation in the information economy, there are certain sectors of the community that are emerging as being disadvantaged for a number of reasons. These disparities are evident in the following groups identified as marginalised and /or disadvantaged:

- people on low incomes
- people without tertiary education
- those living in rural and remote areas
- isolated learners
- Indigenous Australians
- people with disabilities
- people from a non-English speaking background
- those aged over 55
- women

2.1.1. International data

In many communities within the world, accessing technology is the least of their problems, with access to food, shelter and clean water taking precedence.

From a global perspective more than 80% of the world population have never heard a dial tone, let alone accessed the internet. What is more, less than 2% are connected, but this is not a priority for many third world nations. (Black 1 November 1999) People being cut off from basic telecommunications is a hardship comparable to the deprivations of shelter, health care and associated basic requirements, the UN Secretary General, Kofi Anan said as he spoke of the dangers of excluding the world's poor from the information revolution [BBC Online Network, 1999 #101].

2.1.2 Cultural perspectives

Of all the different cultures and languages who have access, the majority of websites are in English as Rollason, comments, over 80% of websites are in the English language despite the fact that less than one in ten people in the world speak the language, which, Rollason sees as a form of cultural imperialism. [Association, 2001 #128]

Achieving Equitable Outcomes, a Supporting Paper to Australia's National Strategy for Vocational Education and Training 1998-2003 sums up the key issues for indigenous learners:

Lack of culturally appropriate learning is considered to be a major cause of unsuccessful completions. Inadequate teacher and provider sensitivity to cultural differences, lack of teacher relations with students and their communities as well as language difficulties all contribute. Distance from providers is also critical in some rural and remote parts of Australia.

2.1.3. Access

For Australians to be globally competitive, it is essential that the education and training sector produces skilled people and provides them with the skills to enable them to access lifelong learning. For people to access education and training equitably they have to have the skills that enable them to take these opportunities.

The National Office for the Information Economy quotes Australian Bureau of Statistics data of August 2000 showing that 67% of Australian households are not connected to the internet, with Australian adult users tending to be younger, males earning in excess of \$75,000, employed and living in a metropolitan area.

Other reasons for people not being connected, include:

- set-up and access costs
- lack of physical access
- a perceived lack of relevant content
- security issues
- lack of skills and training, and illiteracy. (NOIE 6 June, 2001)

A study carried out by the National Centre for Social and Economic Modelling, University of Canberra (NATSEM), found home access varied across community groups:

- Income groups - 70 percent of the top income group (\$84,000+) having access in March 2000, compared with 22 percent of the bottom income group (<\$19,000). The take-up rate for high-income households is 3.2 times greater than in low income households. The Australian Bureau of Statistics, *Household Use of Information Technology* (2000, Cat. No. 8146, Table 1.2) gives the following proportion of internet access by household income- less than \$24,999 - 10%, \$25,000 - \$49,999 - 28%, \$50,000 - \$74,999 - 40%, \$75,000 - \$99,999 - 55%, >\$100,000 or more 69%.
- Educational qualification - adults with a tertiary qualification are 2.3 times more likely to have Internet access at home than adults with a primary/secondary school education.
- Age - people younger than 55 twice as likely to have home Internet access than those aged 55 and over.
- Presence of children - aged 10 years or older was also found to increase the likelihood of a household being connected to the Internet.
- Region - only a relatively mild discriminator of access with metropolitan areas having a connection rate which is 1.3 times the connection rate of non-metropolitan regions. 40 percent of adults in metropolitan areas are connected compared with 30 percent in non-metropolitan areas.
- Gender - relatively small discriminator, with males being about 1.3 times more likely than females to have access to the Internet at home.

2.1.4. Government Policy

As a result of the above study, an overview for government policy was outlined in Canberra on 24 August 2000 by Communications Law Centre Director, Jock Given, with:

Australia's primary social objective focussing on the infrastructure, which is not adequate bridge the digital divide, often omitting low-income earners, the unemployed and the elderly.

Given suggests that the present social policy agenda is not working and if Australia is seriously going to address the *root causes*, it ... *might include targeting more directly communities and families on the wrong side of the digital divide.* (NATSEM 2000)

It is widely recognised that education is paramount to wealth creation and global competitiveness. The detrimental effects due to inaccessibility of access to communication technologies is seen to be a barrier to opportunities to effectively participate in social and economic choices and has become one of the key political points of this time. One of the Liberal Coalition policies for the 1996 election campaign said:

"The pre-eminent role of government in the contemporary economic environment is to foster a climate of equitable opportunity, to provide for those in our community who cannot provide for themselves and to regulate where necessary the activities of the private sector in the public interest". (NATSEM 2000)

In 1999, the Australian National Training Authority endorsed the Flexible Learning for the Information Economy: *A Framework for National Collaboration in Vocational Education and Training 2000-2004*, supported by the annual implementation plan - Strategy 2000, which identifies specific initiatives and allocates funding for the five goals within the Framework. The major focus being on the uptake of flexible learning in the VET sector and the application of technologies to enhance teaching and learning. [Stewart-Rattray, 2000 #11]

The Framework for national collaboration in flexible learning in vocational education and training 2000-2004 (Collaborative Framework) is a principal strategy for achieving this. (Stewart-Rattray, Dr Moran et al. 2000)

These strategies have recognised specific areas of disadvantage, by:

- increasing participation by Aboriginal and Torres Strait Islander peoples in vocational education and training, particularly higher level award programs, improved retention and completion rates and improved employment outcomes
- increasing participation, retention and completion rates in vocational education and training for people with a disability, particularly in higher level and employment based training
- expansion of structured, nationally recognised training opportunities to areas where high numbers of women are employed and increased participation by women in training for emerging areas of employment
- expansion of the range of programs undertaken by people in rural and remote communities, including programs that take advantage of computer technology
- promotion of programs which link vocational outcomes with language and literacy training to clients from non-English speaking backgrounds, particularly to those in communities with high unemployment.

In 2000, Australian National Training Authority and Commonwealth Government initiatives further acknowledged these areas of disadvantage by launching the following strategies:

- The National Strategy for increasing opportunities for people with a disability in vocational education and training (2000-2005)
- Australia's National Aboriginal and Torres Strait Islander Strategy for vocational education and training (2000-2005)
- National Indigenous English Literacy and Numeracy Strategy (2000-2004)

The ACT Digital Divide Task Force - Report to Chief Minister (April 2001) defines the Digital Divide as follows:

Disparities in the access, use and required training of the internet and new telecommunication services across different social groups.

There is an inequality of distribution in IT knowledge, skills and resources necessary to access online services and information among different groups in modern society.

These groups include: those with less education, those on lower incomes and seniors, Aboriginal and Torres Strait Islanders, people with disabilities, persons from different cultural and linguistic backgrounds, single parent families, people with low literacy, people with low computer skills and experience, people without permanent housing, women and young people.

2.1.5. Human Rights Obligations

Australia's obligation from a Human Rights perspective is to honour the commitments established under the following Human Rights Treaties: *UNESCO Convention against Discrimination in Education* (1962), the *International Covenant on Economic, Social and Cultural Rights* (1966) and the *Convention on the Rights of the Child* (1989).

These treaties see technical and further education as an essential component of the range of educational opportunities to which children and young people are entitled. Both the *International Covenant on Economic, Social and Cultural Rights* and the *Convention on the Rights of the Child* provide that State Parties should:

Encourage the development of different forms of secondary education, including general and vocational education, make them available and accessible to every child, and take appropriate measures such as the introduction of free education and offering financial assistance in case of need (CROC art 28.1 and ICESCR art 13.2 in similar terms)] (Sidoti 2001)

Australia's obligation in the context of education is to provide access by reference to the following five criteria:

- Education must be available for all without discrimination
- It must be accessible, either within safe physical distance or by correspondence or some other form of distance education
- It must be affordable; in fact primary education must be free and once a country has succeeded in providing a free secondary education, fees can only be reimposed for very compelling reasons
- Education must be acceptable, culturally and in other ways, to both students and their parents
- And it must be adaptable so that it meets the different circumstances and changing needs of each individual student (Sidoti 2001)

Sidoti explains:

- There is strong evidence that rural and remote children are generally disadvantaged in comparison with their urban counterparts.... Rural communities expect TAFE to be an appropriate framework within which to supplement and to provide alternatives to school education, to teach literacy and numeracy for some students, including some indigenous students, and to enhance the post-school employment prospects for rural and remote student.... Lower functional literacy and numeracy rates...disabilities and cultural differences affect learning patterns of rural children and young people and can present barriers to conventional school-based learning. Rural people look to TAFE, with its emphasis on vocational training and employment preparation, to offer opportunities for those students of ability who have been unable to achieve satisfactorily at school.... (Sidoti 2001)

This perspective is further confirmed by, The Federal Council of Isolated Children's Parents' Association, who identified the close relationship between education and other rights in the context of rural development, as follows:

ICPA Australia believes that the prospects for rural development, and thus, the prospects for a better future for Australia's rural and remote places, are dependent upon access to a broad range of appropriate educational options and activities. (*Submission to the National Inquiry into Rural and Remote Education*) (Sidoti 2001)

Other barriers faced by rural and isolated learners include unreliable transport because TAFE colleges are in larger regional towns servicing a broad area and the state and territory policies hinder TAFE students accessing school buses. There are also additional costs including petrol costs, there is high youth unemployment, limited opportunities for trainee and apprenticeships and a declining rural population.

2.1.6. Digital Deficits

Many assumptions have been made about the skill levels and uptake of technology within Australian society, with many of these assumptions not being accurate.

(Graham 2000) sees the greatest division in Australia and other countries, being between those who participate in the new economy and those who are entrenched in the old economy. The new economy being defined as *digital networks, cyber economics and creative solutions, operating without boundaries*, whereas the old economy is defined as *industry sector networks, specialisation, career paths, learning without access to digital information, local economics and benchmarked solutions, separate university, college and school systems, all within boundaries*.

He sees the social divisions such as elitist and egalitarian, professional and trade, and management and worker as anachronisms in the digital economy. Rather, dot.com and not.com now define a new social order of individual economic power and individual economic alienation. (p21). He writes of the education system and economy as being locked into this paradigm, whereas the new economy is redefining the nature of work and the qualities required to drive it, something he sees the education system is not addressing.

Graham continues by quoting Schmidt, who sees the 15-24 year age group as being the losers in this transformation in the nature and shape of work over the past two decades. He sees that training these young people for work will not exist by 2010.

Graham includes comments of Regis McKenna who argues that the value set of the 21st century is *instant satisfaction*, the real time between desire and satisfaction being zero, with the empowered customer determining the responsiveness of self-service delivery. Self-empowerment to enable self satisfaction is necessary in this new economy and requires a

student-centred curriculum without boundaries to enhance information sharing and collaboration.

Currently, ... 28% of Australian homes are linked to the internet and 70% of higher income earners are internet connected as opposed to 40% of lower income earners. Another problem facing Australia is the inadequacy of the internet connection. Traditional telephone cables deliver a mind-numbing rate of web draw-down. Cable TV lines that overcome this delay are limited to the most populous area.

Even though Australia sees internet access and skills as essential, Graham questions whether this is adequate when the US has projects to raise revenue to support community technology centres, grants for the poor to access IT and programs for native Americans; in India internet cafes have been installed across the continent for children up to the age of 12 to access online learning; globally it is recognised that markets will be predicated on the real time of the internet, for this reason Australians need to use the internet, or we will not be trading competitively or participating effectively in the knowledge-based economy.

Graham concludes with:

Our education systems must ...enter the new economy. It is essential this (sic) we engineer an open system of online learning ... that fosters a life rather than a living for our young people who will integrate work with life in the future". (p.24)

Graham sees *information* and *ideas* as the main attributes in the digital economy, arguing that *traditional education, both school and vocational, is constrained by industrial mind-traps that deny learners the tools to operate effectively in the digital economy and alienate many young people from wanting to participate in the workforce. With a re-engineering of the way in which on-line education is applied to career and enterprise education, individual learner aspirations can be realised and national enterprise can be enhanced. The consequences for educational professionals, however, are radical and the anticipated alteration to their power-base could have significant political consequences. Nonetheless, the "Field of Dreams" that the worldwide web has become will ultimately re-define education delivery, as we know it.*

2.2 The Digital Divide Framework - Associated Issues

The focus on the Digital Divide is around the technological issues and access to technology whereas this research is focussing on the skill-based barriers experienced by those learners who do not have the IT literacy, functional literacy and information literacy skills. As a result many learners making the transition to online learning find the experience frustrating and threatening, especially if they have not had some experience with technology or if they have skill deficits in these areas. This point is reflected in the quote below taken from the Strategy 2000 Access and Equity report:

Increasing emphasis on the use of information technology and telecommunications in vocational education and training, now culminating in the application of online learning media and methodologies, inevitably exacerbates the sense of displacement and alienation for many learners, and which has the potential to generate or intensify feelings of low self-esteem.

Issues highlighted in the literature have been categorised under the framework headings below.

2.2.1. Pre-enrolment and Enrolment

Course information: Most organisations are providing online learners with an induction course, information on studying online and hardware and software requirements. The depth of this information varies from institution to institution. One organisation provides a compulsory one day workshop which provided learners with strategies for dealing with some of the issues they will be confronted by and also provided them with contact personnel and associated support services.

Cooper (Macon State Community College) has found that many learners are not aware of the requirements to succeed and drop out when they realise that they need a more structured environment. She stresses the importance of ensuring that learners are well informed of the course requirements and encourages learners to attend face-to-face classes to get more assistance as this also helps them make decisions about their learning needs.

Induction and Orientation: Most organisations provide a range of induction methodologies and orientation to online learning strategies, some of which are online and some face-to-face. The very nature of the provision of online learning promotes debate about whether students should be expected to attend compulsory sessions however, the benefits to students of attending induction/orientation session in-house are numerous, including:

- establishing a sense of belonging within the organisation
- meeting tutors/facilitators and knowing the process for contact and assistance
- knowing and having an understanding of the functions of the organisation and the services available to the student
- meeting other students and setting up a peer relationship
- having an understanding of the expectations of the role of the student in an online environment
- an understanding and outline of the assessment requirements
- assistance with and set up of passwords and general introduction to the technical requirements for learning online
- techniques and strategies for learning online

Steeple et al supports face-to-face induction seeing it as being appropriate for small groups because of the bonding and problem solving opportunities (Steeple, Vincent & Chapman 1997). This is often not possible for those students in isolated environments, however induction is made available online at the start of the course. The induction conference is also being made available to students in a non-interactive form during the year.

Harper et al reiterates the view, that preparing students to learn in an online environment is one of the major issues of provision as society moves to online learning. Even though providers are aware of the importance of student preparation, the comprehensive strategy that this requires needs to be addressed more thoroughly.

Linda Cooper, Macon State College (US) holds a class meeting for students starting online, which covers all the information usually covered in the first day of a traditional class. She found that the main issues were hardware related. She uses a CD Rom for the tutorial, and finds that students who miss this orientation are more likely to drop out.

(Salmon 2000) reaffirms the importance of induction, but sees it being effectively undertaken online. It must also be noted that these students are at university level, which implies a specific level of literacy and information literacy. This point then poses one of the most important questions to be considered by the provider of the induction and orientation course:

“What level of learning is the provider providing, what learning experience does the learner have already, what is the level of learning that they are entering at and what learning experiences might the learner have had?”

It is particularly appropriate at this time to contemplate the most appropriate mode to present *induction*. Considering that this project is focussing on the provision of an enabling program for pre-vocational, Certificate I and II, it has to be asked what will the students benefit most from? Will the skills and knowledge imparted to these students in an induction course empower them sufficiently to get them through the *shock of the technical*, (Dr John Gundry) when learners are thrown into the online environment. This Dr Gundry sees as learners travelling along for a few weeks and then all of a sudden they go into a high anxiety state and experience a feeling of confusion and then this levels out again (this takes place with the initial four to six week period approximately and is when most learners leave. (Interview with Aspin)

Aspin (2000) sees Induction as consisting of learners having training in First Class (student management system software) because this is their online community and some consultation in online behaviours to get the learner beyond the technology before they start their course. This is consistent with Salmon (2000) who sees that learners should be comfortable with IT before commencing their course or they spend a lot of time trying to master the IT instead of concentrating on the learning component.

Salmon made the following comments: ‘my own experience leads me to think that this induction requires a staged but extensive process, to be undertaken online rather than through more traditional teaching and learning’. It is easy to make the wrong assumptions about learners’ previous computer literacy levels of online competence and early computer mediated communication (CMC) behaviours and needs. The benefits of an effective online induction are immense because when the course proper starts participants can concentrate on the content, interaction and outcomes.

The skills developed and promoted through CMC include:

- reading and writing
- acquiring and managing information and knowledge from masses of data
- flexibility in use of resources
- the ability to function in global communities
- motivational skills for independent learning
- declarative knowledge or facts and procedural knowledge (Salmon, 2000)

2.2.2 Communication

Communication with teachers as support: Regular communication between teachers and students has been seen to be one of the most effective strategies for supporting students in online learning and essential for completion. (Choy, McNickle et al. 2001). Students expressed their disappointment with late and slow responses from teachers, commenting that this reduces momentum. Students suggested that a timeframe for feedback should be applied to help overcome this problem. Timely, helpful feedback from teachers is one of the expectations that students have of online support. Ironically, teachers see that the provision of prompt communication is available to resolve learning issues. It is the lapse between the time communication was sent and the time the receiver responds to the query that impacts on learner motivation and effectiveness of support.

Other communication strategies that students suggested as being essential were access to peers by way of email, fax, phone and online chats and also a range of communication strategies to communicate with teachers/tutors. The suggestions of a chat room for students to support each other and for teachers to organise regular chats with their students were put forward.

Technology also was highlighted as a tool to increase communication in rural and regional isolated areas. There is much written about the information *rich* and *poor*, yet little has been written about the skill barriers which are impeding access to these facilities. The skills covering a range of areas including literacy, IT literacy and information literacy are often presumed to be adequate.

However, technology will not provide access to those who do not have the literacy, information literacy or information technology skills. It is therefore imperative that these deficiencies in the learning cycle be addressed. Without these skills the learner is not really having equitable access to opportunities that they would otherwise be able to if they had the skills.

Salmon [2000 #118] sees Computer Mediated Conferencing (CMC) as being less intrusive than face-to-face or even telephone tutorials; some students being more comfortable with not being identifiable when participating in this environment, whereas some are not even able to contribute - which creates a challenge for the e-moderator. Asynchronous discussion allows students the time to reflect on their responses before they respond and time to reflect on topics between discussion times. This medium also provides the forum for '*development of discussion and innovative ideas which creates intrigue not often found in the classroom.... It is also a good medium for giving praise and constructive critiques*' (Salmon, 2000, p. 17).

Other benefits of CMC are that:

- the environment creates a freedom to express views and share experiences
- discrimination in any form is less apparent
- the control of the conference is shared and can shift from teacher-to-student and student-to-student etc
- costs of purchasing equipment can be offset by the costs of travel and attendance costs
- the medium provides any excellent environment for exploring different teaching strategies.

Strategies: The ACT Chief Minister, Ministerial Statement, *ACT Digital Divide Task Force Report - ACT Government Response* (June 2001) has recommended a number of initiatives to combat these issues, which include:

- the provision of a roving trainers program, which will assist people with basic IT and Internet training and key public access locations
- increasing the number of internet facilities in the public libraries
- libraries being equipped with a range of assistive technologies to suit the needs of the visually impaired and people with physically and cognitive disabilities
- Austouch public kiosks
- Canberra Connect - an electronic, government information system.

Salmon, suggests that to increase students' confidence in communicating online that teachers (e-moderators) start with informal discussion and a very simple dialogue, progressing from this. E-moderators need to be aware of students' fear of embarrassment, initially anyway. For this reason and others, e-moderators need to be empathetic. It is also a good idea to find out what students expectations are of communicating online.

One strategy that Cooper (Macon State College), uses to maintain some resemblance of the traditional classroom is every Friday she sends messages to online learners outlining the upcoming week's activities, explanations about assessments and any additional information. She does this to maintain the communication between teacher and learners and help keep learners 'drifting off'. She also uses a range of teaching and learning activities to fulfil the different learning requirements.

2.2.3 Teaching and Learning

Skill requirements: Literacy - Over the past 50 years concerns for literacy have been the preoccupation of developing countries fuelled by bodies such as UNESCO. (ACAL). The Australian Council for Adult Literacy (ACAL) from the Organisation for Economic Cooperation and Development (OECD) in 1993 described literacy as "how adults use written information to function well". This international survey on literacy, in which Australia participated (through the ABS) found that 6.2 million Australians between the ages of 15 and 74 have poor or very poor literacy and numeracy skills. ANTA's guidance paper, *Achieving Equitable Outcomes*, cites this raw statistic and - by way of providing a conceptual benchmark of inadequate literacy and numeracy skills - comments:

These people could be expected to experience difficulties using many of the printed materials encountered in everyday life, a factor that in turn affects their ability to learn new skills and process information. (Access & Equity report, 2000. p 21)

For this study, the ABS surveyed more than 10,000 people aged 15-74 across Australia by personal interview, but excluded those living in remote and sparsely settled areas. A remarkable 87% participated. The 'literacy and numeracy skills' covered in the survey were the information processing skills necessary to use printed material found at work, at home, and in the community. The survey focussed on "functional literacy and numeracy" - those skills necessary to understand and use information from material which is printed in English and found in everyday life.

This survey showed that the literacy skills of more than 6 million Australians were shown to fall well short of such capabilities, which software developers, Web designers and others in the information technology industry often appear to take for granted as the normal and natural possession of all users. There is a danger that the demands of online learning will exaggerate that gap, whereas commitment to access and equity policies and good practices demands that the gap be closed.

When learners with English literacy needs are faced with unfamiliar technology which requires using complex grammar, syntax, toolbars and commands it is even harder for learners with English literacy needs to comprehend these difficulties and harder still to overcome them. This may in part be caused by fear of the technology, or it may generate negative feelings about using the technology, which practitioners must be careful to recognise and respond to with sensitivity.

Adults with low levels of English literacy will often experience inhibiting emotional blocks about overcoming the barriers. If the target groups are to participate in the benefits of online learning, they must acquire literacy beyond the understanding of spoken and written language, the use of keyboard, mouse and other skills. It is also essential they have the skills to successfully access and navigate the Internet as well as be able to communicate using electronic mail.

The Strategy 2000, Access and Equity report continues with the following comments:

Online delivery embraced by vocational education and training in Australia demands that learners be facilitated and supported to exercise optimum personal choice as to the content and manner of learning they will undertake. Access and equity issues and literacy and numeracy needs are not necessarily being addressed adequately through the design and delivery of industry-based Training Packages and TAFE courses incorporating or commencing at Certificate I and II levels.

This report also noted one of the problems is that a kind of credential creep has developed. This is outlined in the following:

... which pre-supposes that basic levels of defined knowledge and skill will usually be met through recognition of prior learning or current competence rather than through formal participation in vocational education and training at Certificate I level or through a pre-vocational program. Members of the Target Groups will get left further and further behind if this trend is not arrested, at least for them.

Veenker (2001) in a paper presented at the Northern Territory University Teaching and Learning Conference, outlines research undertaken by Oliver and Towers, who found that:

... TAFE sector levels of access, usage and literacy are still well below those in universities.... 29% of TAFE students compared to only 13.2% of university students reported they did not use information and communications technologies at all at their institution and only 38.9% of TAFE students compared to 64.9% of university students reported regular use at their institution....

The existence and nature of physical and psychological barriers to access for all have long been recognised in the TAFE sector.... Australia is becoming a nation split into the rich and the poor.

Veenker, continues with the findings from the Oliver and Towers study, which found that:

Access and literacy of tertiary students were equally alarming. That access figures presented by the various surveys they reviewed in their study provided a picture of a large number of privileged students across all sectors of education with home access to computers and to a lesser degree to the internet. ... There are clearly large numbers of students with limited access to information and communications technologies and for whom the discrepancy in access has the prospect of leading to inequities in educational outcomes. ... The low levels of English literacy skills common among members these groups are already a significant barrier to their learning. Their difficulties are compounded when they are faced with the additional, different and more complex literacy skills needed to effectively use online technologies for learning. For learners with good English literacy skills, ... the various components of the technology are daunting. For learners with English literacy needs, it is almost impossible to understand.

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 for traditional classroom students.... 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 enrolls and these need to be made available for the duration of the learning cycle. (Veenker 2001)

Many learners would prefer a traditional teacher-led learning environment, especially those learners with low levels of literacy who want the support that traditional face-to-face delivery provides. This can be and is in some areas, provided in a range of venues: training organisations, libraries, the community, or even at home. The teacher can be at a distance and can deliver the training online, as long as the learner has access to support. Providers for learners with low levels of literacy need to factor in this personal contact to overcome anxiety and facilitate learning in a comfortable, supportive environment to increase the skills levels of the learner for them to become confident and self-directed. Learners have been seen to benefit

from the transition by including a combination of traditional face-to-face facilitated delivery and the emerging online approach to learning.

Other factors: A number of other factors also deserve consideration in the teaching and learning perspective in the provision of online learning. One of these is the *ageist* factor, which has been neglected in the debate on online learning strategies. A study completed by (Choy and Delahaye) *showed that most youth learners did not share adult learning characteristics such as a deep approach to learning, an andragogical orientation to study and high level of readiness for self-directed learning.* (p.2). This is an important factor that needs to be considered by the VET provider in the induction, orientation and provision of online learning as a proportion of the VET clientele is in the 17-24 age group.

Looking at the ageist factor from another perspective: of the 3 million internet users in Australia, approximately one third of these use the internet for information related to their formal studies. 80% of those people undertaking study over the age of 18 years of age have accessed the internet as part of their course study. These users were strongly concentrated in the 18 to 24 year age bracket (43%) and in the 25 to 39 year age bracket (37%). It is also appropriate at this point to consider not only the age of the VET community, but also the fact that the higher education learner in comparison to the VET learner, their previous learning experiences, their skill levels in literacy, IT literacy and information literacy. The chances of these learners having functional literacy skills is assumed, however the chances of them having adequate IT skills and information literacy skills is not assured and should not be assumed. Feedback from the higher education sector indicates that these two areas are also issues faced by the teaching and learning areas supporting online learning (Carroll and McNickle, 2000).

Self-directed learning: There are certain skills levels and requirements for learners to be able to successfully undertake the transition to self-directed learning. These include learning-to-learn skills and dispositional skills that will assist learners make the transition to self-directed learning. A study by Warner, Choy and Christie (1998) indicated, 70% of VET learners in the study were not considered as having the required self-directed readiness skills.

Watkins & Hattie (1990) listed five contextual factors that influence the adoption of a deep or surface learning approach:

- students' level of interests
- expected outcome (intrinsic, extrinsic values)
- prior knowledge relating to the task
- perceptions of the provider
- assessment tasks.

He advises that the degree of influence can be reduced through intervention programs, to direct/redirect individuals from a surface to deep and deep to surface learning approaches. Their learning is therefore said to be more teacher-directed. Learners with a pedagogical orientation expect the teacher to firmly direct their learning, motivate them and be responsible for assessing all the learning.

A range of skills and attributes analogous with self-directed learning has been listed. Gibbons (1994, p6), lists ten basic skills for self-directed learning.

1. self-assessment and self-development
2. making intelligent choices and decisions
3. goal-setting and planning
4. managing one's time, energy and resources
5. taking action and solving the problems one encounters
6. gathering feedback and evaluating progress
7. reflecting on the meaning of events and imagining possible futures
8. sharing decisions, actions and problems with others
9. demonstrating and celebrating achievement
10. clarifying one's own direction and passion.

Harper et al, (2000) in their study on, *the review of the state of online education and training practices*, found that many learners experienced difficulty in adapting to the self-directed nature of online learning. This included all modes of distance education, including paper-based forms. This study also found that:

- learners need support to become more self-regulated and maintain motivation
- online technology should support different ways of learning such as different levels of involvement and a variety of activities
- communication modes and efficiency of the use has improved the opportunity for timely feedback and support
- communication guides the way organisations support learners to develop the skills needed to make the transition from 'traditional' to technology
- technical difficulties are still a major issue for online learners
- learners have found that they are spending more time preparing for class activities than they had previously experienced
- despite the extra workload students responded positively to the new learning environment.

After reading these two lists, one might ask whether the online learner would be better off doing a self-assessment of their skill level.

George (1995) confirms further, the importance of the skills required for learners to make the transition to the more self-directed mode of learning required for online learning with, "*Flexible delivery is an approach to learning which depends on a range of enabling skills and understandings some of which are content specific but many of which are generic. Perhaps the most fundamental of these is information literacy*".

This study found that information literacy enables this kind of independent learning and has become a central issue both for those within the workplace, and those involved in educating others for the workplace.

George continues by quoting Candy (1993) who makes the point that *information literacy is the key to the realisation of the 'learning society'*. *The key to harnessing technology for educational purposes lies in matching the capacities of the technology with pedagogical purposes* (Rowntree 1994, Bates 1995). (George and Luke 1995)

Learning how to learn: Students also need to learn how to learn. Research has shown that metacognitive experiences are associated with improvements to memory, comprehension, problem solving, self-control abilities, higher academic achievement and life satisfaction. The need to become lifelong, self-directed learners in today's

society, plus the personal benefits of becoming more independent in learning make the ever-increasing acquisition of learning to learn capability a must for all. The Candy Report (1994 cited in NBEET 1996b:2) recognises that, in order to prepare students for lifelong learning, courses need to provide for “the incremental development of self-directed learning”.. (Boote 1997) However, before being able to take advantage of the opportunities of self-directed learning, students need to be equipped with the basic skills of literacy, information literacy and IT literacy skills.

Boote’s study highlights some very important factors associated with online learning, including:

- the assumption is that students will understand what the implications are for learning in each of the choices
- that they will know how they prefer to learn
- that they will have the motivation and self-discipline to undertake study in a non-traditional approach.

Boote, reminds the reader that, it is recognised that the level of learning-to-learn ability in vocational education and training students is not well understood and to be able to make decisions about their own learning, students need to have a high level of self-direction, which necessitates already acquired metacognitive skills.

“Learning how to learn - which is perforce to the self-directed or learner managed process - is not just a basic human competence but is the basic human competence”

(Bawden 1993:28). The assumption is that students have already learnt how to learn by the time they are faced with making decisions about their learning when they enrol in adult education is only an assumption and for many students this is an inaccurate assumption. Boote agrees, saying, this *does not appear to be the case, according to practitioners in vocational education and training* (Boote 1997). Research has shown that students whose disability was acquired at an earlier age tend to present as less self-directed than those who acquired a disability when they were more mature. Others will be less self-directed because of the limitations of their disability or because of their previous educational experiences. There is a need to match the student’s current level of self-direction to the learning environment. To achieve this, both student and teacher need to understand the student’s level of self-direction as well as the level required for the particular learning environment.

Veenker, (2001), highlighted the features of the knowledge era - knowledge society and knowledge-based economy. In highlighting the importance of empowering people through knowledge he made the following comments:

The determinants of personal and national success in the knowledge society most often identified in the literature include: possession of the generic skills of learning, knowing how to learn, and access to and the ability to use information and communications technology.

A higher demand for self-directed learning lies on those undertaking distance learning courses in VET. Recent research (Warner, Christie & Choy, 1999) showed that over 70% of those undertaking flexible delivery options have average and below average levels of readiness for self-directed learning compared to international norms (Guglielmino, 1991). The level of readiness of full-time, on-campus students pursuing VET courses in recent time is not known. In view of the nature of the current self-paced, competency-based learning modules used by TAFE, it is to the learner’s benefit to enhance proficiency in self-directed learning. This highlights the necessity of induction/orientation to prepare students and propagate some self-directed learning. This should be furthered contextualised by embedding these learning strategies within the course content.

The findings of this research suggests that youth aged 17 - 24 years enrolled in TAFE courses are unlike adult learners. The study indicates that they do not share adult learning characteristics such as a deep approach to learning and high level of readiness for self-directed learning. Learning programs in TAFE that are largely based on adult learning principles are therefore inappropriate for use with youth learners who do not have the skills, attributes and dispositional skills. It is therefore imperative for TAFE to examine its learner support systems and implement strategies to enhance skills in deep approaches to learning, andragogy and high level of readiness for self-directed learning.

These findings further emphasise the need for providers to ensure that students enrolling in online courses are provided with a thorough induction/orientation course and support requirements to best assist students make the learning transition. It is essential that this include skills in literacy, IT literacy and information literacy.

Individualisation of learning: This is another factor that needs to be considered as a barrier. Boote (1997) writes of the potential for flexibility to have negative social impacts, which have been recognised by several writers (for example, Young 1994: 18-19, Keddie 1980:47 and Jarvis 1993, all cited in Tair, 1994:29-30). Young, expressed concern about the "individualisation of society". If flexible delivery is taken to an extreme, that is if learning becomes a very personal and individual activity - just the learner and a self-paced package or computer - it could mean that students miss out on a lot of the benefits of current modes of delivery.

Students learn from other students, their experiences and those of their teachers. Much of which is anecdotal and spontaneous within the classroom context. This environment also promotes motivation to study, stimulated by the social interactions which occur within this environment. Motivation has been identified, as one of the most crucial elements in completions and the maintenance of this in the non-traditional learning environment is a challenge being faced by providers and practitioners and students alike.

Other learning which happens, often unplanned, is the increase in interpersonal, negotiation, communication and conflict resolution skills which become part of classroom interactions: "the kind of thing industry wants and is saying that in team work we need" (Sieminski 1993:97) However, Boote sees the need to overcome the physical, attitudinal learning and financial barriers currently limiting access to education and training.

Thomas (2001) in her monograph reflects on the conceptual issues and principles facing TAFE as it embraces the digital economy. Some of these issues include:

- general literacy and numeracy skills, as well as digital literacy are the key concerns in access and equity to online learning. The technology is really of no use to anyone who does not have the skills required to utilise it effectively.
- it would seem that the people most likely not to possess these skills are those need of further education opportunities.
- this will change over time, ABS report shows that today 59% of primary school children and 75% of secondary students in Australia can use the internet.
- the flexibility and individualised learning potentially offered by online learning can cut both ways and for students who require the motivation of physical contact with peers and teachers, the learning demands could act as barriers.
- alternative delivery modes can offer new options for disadvantaged learners who have been alienated by traditional education methods.
- self-directed learning in the form of online learning requires many pre-existing skills that disadvantaged learners are less likely to have.

Thomas further emphasises some of the issues of individualism by including Chang's concerns of the impact of online learning on psychological and physical education environments. Chang sees that *as citizens we are more isolated than ever before and that online learning potentially increases this isolation. For some, the vision of thousands of students sitting at their computers learning represents flexibility and convenience. For others it represents the undermining of a crucial social and political institution (that is, education) as well as a problematic prioritisation of convenience over community. Online learning...dehumanises the learning process and in particular, undermines the important social relationship between teachers and students.*

Learning environment: This view is shared by Davies (1999) who flags that another factor to be considered is the learning environment. That students learn best in social cooperative situations. The learning environment is an important consideration as learners undertake to learn skills that are difficult to teach in the traditional classroom environment.

It has also been identified that 72% of students with disabilities would require support (Andrews & Smith 1992). A recent study by Anderson (1996) found that about one-third of students with special needs would have dropped out of their course had it not been for the assistance of student support services. Whilst these barriers have been identified, many of the people who assist these disadvantaged groups (eg. Elder Care Groups) also lack IT access and skills to assist them.

The study also found that:

- the most accessible locations for computer use was at home or work; the least accessible being at internet cafes and laptops
- women were less likely than men to have access to work computers
- Aboriginal and Torres Strait Islander students were less likely to have computers at home
- that women with family commitments and older students also faced access barriers, including insufficient training and training at inconvenient time and limited information literacy
- access to telephones is even an issue for off campus for non-English speaking students, whereas overseas students often used email as a way to bridge their social isolation and to have extra time to study and review course content
- women also tend to use computers less than men and men are more likely to use them for leisure as well as study purposes
- in relation to other technologies, women made greater use than men of audio tapes for study
- women also tend more than men to lack information about how to get support and how to address problems that occurred in relation to computer use
- students from remote communities were also less likely to know about available support or have sufficient IT support.

The report found that if issues of access and appropriate support are not addressed, these groups will tend to be marginalised even more and the digital divide will widen. (Clark, 2001)

Postle (2000) has found that more mature students respond well to flexible delivery models and those learners who have independent learning skills acquired through previous work in higher education experiences and those who have access to the work experiences seem more comfortable in online teaching/learning environments. Preliminary information suggests that undergraduate students, particularly those entering higher education with some form of educational disadvantage (low tertiary entrance scores, content deficits and those lacking in study and learning skills) would not gain optimum benefit from exposure to contexts which are exclusively online.

Brennan (2000) found that the evaluations conducted by Bennett, Priest and McPherson (1999), Bigum and Kenway (1998), Brennan (2000), Laurillard (1993) and McKavanagh et al, (1999) have some common findings. These include:

- There was frustration at times with the limitations of the technology and its random behaviour
- Online participation can be time consuming sometimes for students and teachers
- The time to download information and activities was sometimes a drawback
- Individual learners need to be have well-developed information literacy skills.

Dispositional skills: Another important factor that needs to be considered as learners' uptake online learning is their dispositional skill levels. Not everyone has the self-direction and associated skills to pursue any form of learning beyond the traditional classroom. This is often overlooked and assumed. Many studies have indicated that this is one of the greatest flaws along with the lack of functional literacy, numeracy, IT literacy and information literacy skills areas (Warner, Christie & Choy, 1998; Cope & Kalantzis, 1998).

Pedagogy: Jasinski (1998), investigated issues relating to pedagogy online with a particular focus on identifying teaching and learning styles that facilitate online learning. She found that online pedagogy for the support and delivery of education and training is organised around the concept of 'interactivity' and that some forms of computer mediated communication (CMC) are beginning to replicate the conversations of the classroom in written forms.

She also found that learners were not ready to engage with enthusiasm in this form of delivery and that what is needed is an equivalent commitment to improving the technological, navigational and critical literacy skills of students as part of rather than separate from education and training offerings. Older people are nervous often threatened and at a loss as to where to start, whereas people from a non-English speaking background, indigenous people and people with literacy problems may well find the medium culturally and educationally disenchanting. The assumption that students come to the interface with adequate skills to even fire up the box, Janzinski, found is "*quite wrong headed thinking*".

The concept of "Multiliteracies" explained by Cope & Kalantzis (1998) is also relevant to the discussion of improved student outcomes. They maintain that, "*Not only have new communication technologies increased the language, literacy and numeracy demands of work and vocational education and training, literacy is now a critical aspect of the human-technology interface*". These demands being increased in the language, literacy and numeracy areas have make the vulnerable groups of students even more acutely vulnerable. This fact is reflected in the falling retention rates reported by Cope & Kalantzis (1998). *Self-direction is a skill which needs to be encouraged and not assumed.* The conclusions suggest that in this region of rural and remote Australia learning online has the potential to be advantageous but it will only be effective in terms of student outcomes if the barriers are removed. These include:

- low levels of computer literacy amongst the participants
- low levels of general literacy
- prohibitive costs of the technology and its unreliability
- restricted customising of the curriculum resources to fit with the communities needs
- low levels of local tutor and mentor support for the programs.

Veenker, included the results of a study undertaken by the University of Technology, Sydney which identified the following barriers:

- *The cost of remote connection for rural and isolated students, students of low socio-economic status and students from non-English speaking backgrounds*
- *Poor levels of information literacy leading to a lack of confidence in older students, students of low socio-economic status, Aboriginal & Torres Strait Islander students and students from non-English speaking backgrounds*
- *Students with family commitments, women and older students face access barriers that affect their use of information and communications technologies. These include access to technological training at convenient times, and limited information literacy.*
- *Learners from equity groups generally need more face-to-face support than other students and there is the potential that greater use of online learning options may lessen the opportunities for and availability of human interaction. There is a danger of placing too much trust in technology and telecommunications to serve the education and training needs of the target groups and these researchers are adamant that online technologies should never be adopted as a substitute for face-to-face learning approaches for the target groups. We need to continue to concentrate on numeracy and literacy for all so that we can then build on that foundation the new types of literacy skills in the knowledge society, particularly those needed to access and use information and communications technologies for learning. We need establish and maintain the support needed by students using information and communications technologies to learn.*

Consider these barriers and add to this the isolated, cultural and often under confident perspective of many new learners who have in many cases no choice but to study off-campus (this can be urban or rural isolated). What are we as practitioners and providers going to do to reduce some of these barriers? It is widely known that technology has the potential to enhance education in most environments if the learner is supported sufficiently to take advantage of the opportunity. *Virtual learning sites have no walls but what might appear to be liberating for some learners is a deepening divide for others.*

Traditional education is constrained by industrial mind-traps that deny learners the tools to operate effectively in the digital economy and alienate many young people from wanting to participate in the workforce. As result, Graham (2000) sees the way in which online education is applied to career and enterprise education will have to be re-engineered.

2.2.4 Technology

It must be acknowledged that the world wide web (WWW) has the potential to provide a broad range of information to low-level literacy learners who might have been unable to access information previously due to the difficulty in finding the information, however learners have to be skilled in using the technologies. Online learning also has the potential to develop active literacy that will lower anxiety and raise self-esteem as long as learners can access support.

(Schofield 1999) in her report, *Re-Imposing Our Will on the Information Economy*, writes of the assumption of the *assumed cultural homogeneity* in using the internet. She continues this perspective by reaffirming the issues highlighted by Hoffman and Novak, that providers need to consider for access to technology:

- The need to understand the differences in internet access use amongst different racial and ethnic groups
- The need to understand cultural differences in search behaviour. Some search engines not being compelling to particular cultural groups and culturally specific search engines are likely to emerge to fill the gap by mainstream searchers and browsers
- The extent to which Internet materials are sufficiently multicultural in orientation.

In studies carried out by Maguire (1999) who found that a few participants seemed to have been sold computers that were “real lemons”, which meant never really getting their computers set up to a reliable state. He also found that participants who did not have the technology in their own home generally experienced greater difficulties than those who had access at work or at some other location. It was anticipated that they would have varying levels of IT literacy, with some students commenting that there were assumptions made about their level of computer literacy. When students had difficulties it was hard to determine whether technology problems were a result of the technology or their IT literacy problems. In most instances it seemed to be a combination of both.

One university has recognised that even though there is currently enthusiasm for the WWW, and its many benefits, there is a danger that flexible delivery may be taken to mean use of high technology rather than appropriate technology which may lead to providers forgetting critical issues such as unattractiveness and often difficulty in reading from the screen in comparison to paper. The university will ensure the training in information literacy and the use of information technology is available to all. (Newcastle, 1997)

Students with little technological experience find it almost impossible to learn the technology and start the course concurrently. This perspective is reiterated by Le Cornu (2000) and Salmon (1998) who see that it is imperative that the learner is sufficiently comfortable with technology so that it becomes an enabling device rather than a barrier prior to commencing their course.

Problems students face include:

- time
- how to strike a balance between studying, working and domestic life
- not being able to keep up with messages.

The technology issues have been addressed broadly in other Strategy reports. And it is therefore not the intention of this project to focus heavily on this area. However, some valuable resources associated with the technology should be mentioned in light of their content relevance to the implementation of online learning. These include:

- *Assistive Technologies for Online Training Delivery* in the Access and Equity report (Stage 1) April 2001
- *Preferred Standards to Support National Cooperation in Applying Technology to VET* (1999) - an ANTA funded project
- A free service to check web page compatibility with HTML 4.0 with standards, is Bobby from the UK Disability organisation (Centre for Applied Special Technology) - <http://www.cast.org/bobby/>
- The WWW Consortium (W3C) recommended by The Australian Human Rights and Equal Opportunity Commission (HREOC) who argue that on the basis of available information, it appears that it is technically feasible to remove many internet barriers to provide equal access for people with a disability, and the
- AusInfo Guidelines.

Some Benefits of Technology: The speed at which information, community and educational technologies are advancing provides a range of opportunities for people with high levels of education of the emerging technological society. These are often greeted with differing levels of enthusiasm, and often some levels of resistance. However, even if it is met with resistance, technology is steering the way we communicate, participate and learn in society and those who do not participate in the new economy will become part of a social and knowledge division.

The Internet has the potential to be rich in the provision of information on culture, community, employment and entertainment through a variety of mediums that were previously inaccessible to learners, however it is imperative that this information is presented in a manner that is accessible to those with low levels of literacy, IT literacy and information literacy.

Lindell, a TAFE teacher in New South Wales has developed an Adaptive Technology Checklist to identify specific areas in which students' performance could be improved. This is used in conjunction with a list of examples *of a range of products* recommended as being suitable for use in specific training or workplace environments.

Synchronous conferencing has huge potential for distance learning because it provides the advantages of real time discussions and group interactions without the need for specialised telecommunications channels or for participants to co-locate.

In the future, phones will carry data (text, sound and video) mostly based on Internet technologies and non-orbit wireless satellite access will give wider access and networking on a global scale. In countries with poor fixed line telephone systems, mobile connectivity through cellular systems will provide access to many more people. Mobile phones will also provide wider functions and our PCs will receive and transmit video images, text messages and internet information. Audio and video conferencing through the web will be common. Presently a range of video-conferencing and video streaming are being used to try and emulate the traditional classroom environment.

Dabbagh (2000) sees the advantages of using platforms like WebCT, in that their interface mimics the organisation of a syllabus by providing a template for course information, course content, course resources and a calendar for a timeline. This method of content and structure provides students with a greater degree of flexibility when selecting and using resources. Providers are able to integrate both media, employ effective time management skills, and guard against doubling the work both for students and faculty when using a Web-based course management tool to supplement face-to-face instruction.

Issues associated with technology: The provision of access includes making technical information and products available to all, including how to use adaptive technologies to ensure these are all inclusive. It is assumed that 700 million people will be accessing the WWW by 2001, however one must be realistic about the access and equity of the internet and the quality of access. It is widely known that many people are not able to access these facilities for a number of reasons, including:

- a skill deficit in any of the following - IT literacy, functional literacy and numeracy skills and information literacy
- the demographical requirements are such that access is either not possible or not reliable
- cost
- time
- lack of confidence as an independent learner
- transport
- skill deficits in IT literacy, literacy and numeracy and information literacy.

Barriers to IT access can take many forms:

- lack of IT literacy, functional literacy or information skills
- poverty
- old age
- gender
- physical disability such as blindness
- remote locations
- technical phobia is but a few of the problems. (Clark, 2001)

The lack of infrastructure is a major problem for students in rural and remote areas and to some extent, in regional areas. Access is often slow and unreliable and charges can be very high. The most important issues include identifying techniques which enable teaching staff to support students online and for changing study behaviours for students. Another important factor being the retraining of teachers for teaching online and providing support online are critical in achieving positive outcomes for online technologies. (Harper, Hedberg et al. 2000)

The Strategy 2000, *Access and Equity in Online Learning Project* report, recommended that teachers should provide courses initially consisting of a combination of face-to-face and online delivery for learners with inadequate literacy skills (this is what these learners prefer) until the learners' confidence and independence increases. This report suggests that national training programs should incorporate this strategy.

Mehlman (2000) sees the disparities between the 'haves' and the 'have-nots' starting as early as primary school, according to Ed Smith, general manager of Virtual Communities. Young people are getting disenfranchised and starting to feel hopeless at a very young age. Those who lack skills will become increasingly unemployable, according to Don Tapscott, author of the book, *Growing Up Digital: The Rise of the Net Generation*. He believes that, *for those without computer skills, employment prospects, potential income levels, prospects for a fulfilling life are all reduced. "We have seen what happens to people who become more and more discouraged and yet caught in a downward spiral. Only this time their sense of helplessness and desperation would be even more severe."*

Many analysts believe the digital divide is a symptom of wider social inequalities, rather than a problem in itself. "People who are socially marginal and others such as Australian Aborigines, people who are homeless, people living in caravan parks - these people have no access whatsoever," said Alec Pemberton, senior lecturer in sociology and social policy at the University of Sydney. He believes patterns of technology usage are a reflection of the "systematic bases of social inequality of material and cultural resources". Tapscott, lists four key areas that he believes will go a long way to solving the problems:

1. Governments need to reinvent the education system and enact programs that encourage universal Internet access.
2. Volunteer programs such as Alliance for Youth and 2BI (both US programs) are needed to give those who have technical knowledge the opportunity to share their knowledge
3. Businesses need to develop a greater sense of social responsibility including offering free or subsidised PCs to their employees and their families.
4. Communities need to build their own computing centres, networks and non-profit ISPs.

Mehlman, sums up with the following comment, if kids in lower-income neighbourhoods don't become digitally proficient and tap into the energies of the Web, they are effectively doomed to an impoverished life.

Veenker, (2001) in a paper presented at the Northern Territory University Teaching and Learning Conference, highlighted the national importance of knowledge outlining that a study confirmed ABS surveys showing that technology take-up is lower in non-metropolitan areas than in cities but the socio-demographic characteristics indicate that a large proportion of Australians are not participating in the transition to a knowledge society because of their economic or social circumstances.

The majority of individuals will continue to depend on TAFE as the most accessible source of post-school vocationally relevant knowledge. TAFE's advantage derives from its capacity to reach large numbers of Australians through its geographical accessibility, its inclusiveness and ability to engage with local communities, its understanding of and closeness to industry and its commitment to high quality education.

Veenker, included points from Tony Bates', book: Managing Technological Change, Strategies for College and University Leaders who warns,

If an institution's mission is to provide universal access to all those who want or require a higher education in the state, its choice of technology for delivery will be limited by the forms of technology available to all its potential students. He continues with, they must identify access issues, and have an access policy. They cannot, as Bates argues, 'provide teaching and learning in a way that disenfranchises particular students. Technology undoubtedly will open up access to some but will it deny it to others, and who is most likely to be affected?'

The immense size of the World Wide Web is both an asset and a liability - there is an enormous amount of information out there on topics we have not even heard of. However, this is an asset and a liability largely depending on the time you have, the search techniques and skills you have and your ability to scrutinise the authentic and credible from the information that does not fit the criteria. This is one of the problems learners are facing with the time searching takes and this is not sufficiently taken into account by practitioners and providers alike. The time available to learners to spend on such learning components as searching is often inaccurately calculated. Therefore, another valid point that we need to be aware of is to know when to give up. **Know when to give up** - the biggest time trap that people get into on the Web is thinking that the perfect site is out there that will answer their question in the exact words they are looking for in the detail that is needed. (Colaric and Carr-Chellman 2000)

2.2.5 Resources

Kindler found that learners working at a distance, especially those with low literacy posed the greatest challenge and concerns for program writers and teachers. Learners working at Level 2 of the Certificate in General Education for Adults in reading and writing can be expected to be able to write one or two sentences and read simple, straightforward texts on familiar and personal subjects.

The challenge is for the provision of material at this level to introduce students to and *explain through print-based materials concepts such as writing as a process and unstated meaning in texts*, when providing this in a traditional environment is often challenging for some students. How to provide this in an online context without the face-to-face support is an even greater challenge for teachers, designers and students.

Kindler sees that there are a few options:

- We could provide an audio tape which learners could follow to interpret the booklet or
- We could try to provide simple instructions, discussion and explanation
- learners working at level 2 need to be able to call on a tutor/mentor when required.

In a class situation the teacher constantly checks the understanding of the learners by looking for non-verbal cues, in online delivery the teacher does not have these cues so the learners must take control of their learning, even those students who lack confidence in their learning.

Current data illustrates gaps in computer ownership and usage. Whilst virtual space is infinite, this does not constitute universality or equity of access, nor is it appropriate for many students whose experience with technology is limited. (Gladieux, 1999)

The EdNA VET Advisory Group, (1999) have published *Preferred Standards to Support National Cooperation in Applying Technology in VET*. These outline the requirements that RTOs need to consider.

Strategies: Furner (2000) found that, teachers who use a variety of resources and who incorporate innovative ideas such as Internet Field Trips into their teaching in order to make learning more meaningful will find students more interested in their learning material. Bridging the cultural gap will profit all students as they develop more understanding and become more appreciative and tolerant of one another and each other's cultures. In this circumstance, where mathematics was being taught it was found that by emphasising the importance of relating mathematics to prior knowledge, background, real-life situations, manipulatives, and technologies was beneficial.

Furner also found that the literature on diverse learners suggest that all students may benefit from strategies that promote cultural and historical connections and the use of technologies, such as Internet Field Trips and exercises that focus on the active engagement of students through exploration and communications were beneficial.

2.2.6 Student Support

Much has been written about the support requirements of flexible learners, including the extent and benefits of support (McNickle, 1999, Carroll and McNickle, 2000, Harper et al, 2000) and these issues are being recognized and improved in many environments. The researchers indicated that all learners not just target groups, require support in the transition to flexible learning, especially in the early stages of the learning cycle.

Salmon's (2000, p. 26) *Five Stage Model of Teaching and Learning Online through CMC*, is outlined below and focuses on the support especially in the first stage, as is indicated below.

Stage 1: Access and Motivation. Student's need:

- quick and easy access
- to be welcomed and support available by telephone and email
- information and technology support to get online and this needs to be followed up possibly by access to a telephone helpline
- strong motivation and encouragement for them to put the time and effort into continuing
- providers to recognise that time online costs money. It also should not be assumed that students want to spend hours online, so there needs to be purpose for the conferencing
- sensitivity and empathy by the e-moderator as students can be embarrassed if they make mistakes
- need strong motivation and encouragement especially in the beginning when they are having troubles with the technical problems.

Stage 2: Online Socialisation. This stage shows the transition to socialising with less teacher support required. This stage offers the opportunity for online socialisation, networking and the building of a community. Durkeim's (French sociologist) basic work on, '*collective representations*' - *social power of ideas stemming from their development through the interaction of many minds*' in Salmon (2000, p. 28) could be linked to online societies similar to CMC.

This work possibly gives some understanding as to why some students find it difficult to find a sense of place/belonging in this environment. Other issues facing students include a lack of non-verbal cues and some need guidance for behaviour and judgment. E-moderators need to encourage a sense of community and any strong differences need to be dealt with by email encouraging respect for all participants.

Stage 3: Information Exchange. This stage further indicates the increased independence of the learner focussing more on information exchange. CMC provides access to information consistently. This stage provides students with:

- an appreciation of available information online
- strategies to deal with potential information overload and
- motivation and enjoyment come from personal and experiential communication (Preece, 1999 in Salmon, 2000, p. 31)

Stage 4: Knowledge Construction. Learners at this stage are quite independent although interactive with other learners:

- interacting in more participative and exposed ways
- communicating more freely and openly
- discussing concepts and theories
- learning from each other
- learning interactively
- becoming more authors than transmitters of information.

The conferencing medium can add another dimension to developing ideas and increasing the content material. It also provides the opportunity for students to stop and think and refine their ideas before responding with the best e-moderators weaving (Feenberg, 1989 in Salmon, 2000) the participants' contributions relating to the course concepts and theories. There is the potential for knowledge construction especially in distance education.

Stage 5: Development. At this stage there is a constructivist approach to learning and exploring their own learning processes. Learners are:

- articulating their thoughts and these are put on display in a way they are not in other media
- more responsible for their own learning through CMC
- needing little support beyond that already available
- developing and using critical thinking skills
- challenging the 'givens'
- demanding better access, faster responses, more software and are resistant to change or downtime on the system
- having ways of dealing with humour and emotional ways of writing etc
- willing to assist others
- sufficiently confident that they will question the e-moderator
- evaluating the technology and the impact it has on their learning
- shaping and creating the learning environment instead of having it imposed on them
- likely to realise the benefits of CMC - deferred gratification.

Participants frequently become *disillusioned and disengaged* because they have very high expectations of online learning. For this reason the support and actions of the e-moderators makes the difference between a productive and positive experience and a disappointing experience. Salmon (2000) suggests that e-moderators put themselves in the shoes of their participants to gain the understanding needed of the barriers and the needs of the individual student.

Users with a disability can use CMC at any time and in any place obviating the need for travel and physical access and this way they are valued for their contributions.

CMC can increase access to those with restricted mobility or difficulty in accessing buildings. CMC offers the opportunity to travel, meet and learn with others with comparative ease. Technology can either enhance or hinder, with various aids being available to assist:

- visually impaired students can use an audio version of First Class. Those with partial visual impairment need consideration during conference construction with font style. It is helpful to provide course texts electronically to enable students to manipulate the fonts, sizes and style to suit this needs. One provider puts courses on CD ROMs, so they can be played with a special synthesizer or displayed as larger print, with the CD ROMs carrying a voice recording.
- blind students can adapt CMC software through Braille printouts of messages or through using speech synthesis. They cannot use a mouse so must become adept at keyboard commands.

Online educational counselling for learners with long-term health problems can be provided using CMC for social and study support. CMC fosters communication between counsellors and students. Learners are perceived as being comfortable with communication technologies such as the telephone, which is one-to-one, CMC is group oriented and depends on the e-moderation of the group. (Salmon 2000)

Student support needs and expectations: A study undertaken, (Choy, McNickle et al. 2001, unpublished) on learner expectations and experiences of support requirements for online learning concluded that, 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 way. However, this experience can be minimized 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 learners; of the course requirements; of the assessment requirements; for the content to be easily understood, consistently presented, and sufficiently detailed to enable them to become self-directed learners. They need to have ready access and efficient responses to IT support and academic support to alleviate frustration and to assist with time management.

The stakeholders involved in this study have also emphatically expressed the necessity of the provision of good communication between teachers and students, timely and informative feedback from teachers in response to issues and timely responses to their IT 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 that students have, especially IT skills, literacy skills, access to resources and to IT. The literature focusing 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 whilst this support requirement usually declines over the time of the course, it needs to be available throughout the entire learning experience. (Choy, McNickle et al. 2001, unpublished)

Evans (1998) sees that the effective learner support is critical to quality provision in an electronic learning context. Supporting the learner begins with a design of the online environment and the electronic learning resources. This is complemented by tutor protocols that identify timelines and intervention points to ensure that the learner is never lost or isolated from their peers and their tutor. Providers need to develop flexible models that incorporate online communication and/or learning to meet the needs of learners. Using the internet to support traditional distance learning students.

Brown (1998) outlines examples of strategies to assist learners with basic computer literacy. This consisted of talking students through their specific problems. The “on-ramp” strategy includes a number of resources designed for students to obtain self-help. The most successful of the resources is a printed handout pointing to on-line resources, available on the course CD-ROM that provides basic computer and browser training for the novice. In addition four non-compulsory face-to-face on-campus sessions are available for local student orientation. These sessions are proving to be valuable for close-by and on-campus students. Having a need to contact the instructor appears to have solved the e-mail start-up problem encountered with moving students to the “e-way” of establishing and maintaining contact. Another “must-do” has been initiating a chat session with course registrants during the first week of the course.

(Perlgut 2000) sees the introduction of interactive television as a means of overcoming the digital divide (educational divide he sees this constitutes to). Perlgut writes that those affected by the digital divide are non-metropolitan residents, older people, and lower income people, all having less access to the internet. This solution is perceived as being a *simple, low cost, easy-to-use solution of accessing interactive educational material and email.* (p.139)

2.2.7 Other Issues

The Strategy 2000, *Access and Equity in Online Learning Project* report found that the greatest barrier to online learning for the target groups is access to technology, next greatest barrier was the costs of equipment and connection and the use of plain English for manuals. Other identified issues were cultural and linguistic issues and speedy and easy access to support.

(McIntyre 2000) argues that:

The national equity policy is flawed by its neglect of the ‘community’ dimension, and that the current discourse of ‘representation’ of ‘target equity groups’ has written out the localised and compound nature of social disadvantage.

He continues arguing that policy misrepresents the compound nature of social disadvantage, ignores the concentration of disadvantaged people in particular localities and gives little incentive for providers, including community agencies, to develop equity strategies addressing local labour market and socio-cultural disadvantage.

McIntyre argued that community-based provision is a key element in equity strategy. Research on patterns of local participation using national statistics and census data can contribute to debate on this question by examining how far equity is achieved at the provider level. The article sets out a conceptual model for local equity analysis developed in a recent study, which assumes participation patterns reflect a complex interplay of socio-economic factors, clientele influences and provider constraints, and describes three research approaches of area participation analyses, catchment analysis and provider equity analysis. Conceptual issues arising in these directions for VET participation research are discussed.

McIntyre sees that, economic and educational inequality is geographically unevenly distributed, a fact ignored by equity policy...making it difficult to raise questions about the distribution of VET resources to address disparities in localities and regions.

Many challenges are presented to those providing telecommunications to indigenous communities who are often located remotely from the information superhighway and any resource facilities. Whilst this is an issue, the provision of technology is only one facet that needs to be considered, along with the cultural and learning aspects amongst other issues that need to be considered for all learners.

May (2000) in research associated with the American Indians, sees issues being common to indigenous people, including:

- how indigenous peoples differ in the way they deal with information technology, including tribal sovereignty, languages and remoteness?
- how they are faring in the development of technology?
- who will control it and will the social disparities become wider?
- will technologies create more social issues and the like?

May stated that 50% of the American Indians don't have phones, there is a lack of technology infrastructure and their native language is disappearing. Many of these issues are synonymous to Australia's indigenous population; however, he sees solutions to these problems including:

- telecom access to indigenous communities
- use the next best forms of technology like CDs specific to the students' needs
- use of museum resources for education.

2.3 Actions to Overcome the Issues - Crossing the Divide

There are an enormous number of strategies and initiatives being used nationally and internationally in order to bridge the digital divide. It should be kept in mind though, that whilst there is the provision of computers and connections in tele-centres and the like, the real needs of the community centres and the relevant content have not always been identified and are therefore not utilised or self-sustaining. Strategies being used nationally and internationally for overcoming the divide are outlined in the following paragraphs. Brenchley (2000) sees that the government is facing a crucial question - *should it subsidise access to infrastructure such as computers and the internet, or provide the "enablers", such as tele-centres and training?*

Access to VET includes, an:

- emphasis on openness & equity in access to study
- access to bridging, literacy & other programs which need to be provided to improve opportunities to enter VET & optimum opportunity to complete

Access to online technologies, includes:

- students having affordable access to a computer, internet, email account
- students have access to technical assistance throughout their study - on campus & remotely
- seamless connectivity is established between provider & employer

A report, *Spanning the Digital Divide: Understanding and Tackling the Issues*, sees the real issues for accessing technology including:

- physical access
- appropriate technology
- affordability
- capacity
- relevant content
- socio-cultural factors
- trust
- legal and regulatory framework
- local economic environment
- macro-economic environment
- political will.

2.3.1 Recommended strategies to overcome some deficits

This report (*Spanning the Digital Divide: Understanding and Tackling the Issues*) recommended the following strategies for the target groups:

- Indigenous learners living in rural and remote communities face the major problem that - even if the computers themselves and other essential equipment are to hand - the vital human resources may simply not be available to provide basic instruction and continuing encouragement, guidance, support and trouble-shooting assistance for as short or as long a time as necessary to build competence and confidence.
- Learners with low levels of English literacy will encounter major barriers in the forms of language, including the specialised grammar, syntax and vocabulary characteristic on Web pages.
- National consultations pointed out that vocational education and training practitioners may also lack confidence with computer technology and telecommunications, whether in a basic or general sense, or in terms of the use of particular types of software or proprietary items such as Blackboard or WebCT.
- Avoiding overly optimistic assumptions about the capabilities of the equipment students have access to - as well as about students' levels of technological expertise and confidence with online media - and resolving to minimise the barriers to communication through technological and telecommunications means are vital principles.
- Negotiate with students from the target groups to establish their cultural backgrounds, educational aspirations, support, needs, preferred learning styles, familiarity with information technology, the capacities of their hardware and software, and any other information that will assist in applying the principles of flexible delivery and user choice to the design and presentation of online courses and learning materials.
- Identify what preparatory learning students in the target groups may need to complete before they are ready to deal with the competency levels in the training course or package they are about to undertake, and arrange for this learning to take place.
- Online assistance provided on a 24 hour, 7 day basis.

2.3.2 Commonwealth and State policies addressing 'Divide' issues

At this stage the strategies addressing the issues in relation to the implementation of online learning include:

- Commonwealth and State initiatives are addressing access to technology in regional Australia, especially youth and indigenous Australians. Methods of intervention include the provision of Access Centres (telecentres, regional access centres etc)
- The Education Network Australia (EdNA) Schools Pilot Project Facilitating Community Access to IT through Schools (CAITS) aims to provide access to online technologies in rural areas through schools in socio-economically disadvantaged areas
- *Networking the Nation* - a group of initiatives designed to upgrade telecommunications and services to regional, rural and remote Australia including *Building Additional Rural Networks*, *Local Government Fund*, *Internet Access*, *Remote and Isolated Islands programs*, *Launceston Broadband Project*, *Connecting Tasmanian schools*, *AccessAbility*, *National Office for the Information Economy*.
- DEWRSB - *Work for the Dole* program is funding projects designed to provide technical support to computer users in telecentres and assist in the recycling of computers for provision of special needs users.
- DTRS - *Rural Transaction Centres Program* where the government has committed \$70 million over five years (1999-2004) to help small, rural communities to establish access to basic transaction services. Also the *Rural Communities Program* where small regional communities are funded to undertake projects in community planning and development.
- Centrelink - PCs in agencies, reviewing and renewing its website, producing information and communication products to raise awareness of benefits of using the internet
- DIMA - promotes use of internet access and immigration arrangements
- DHAC - established *HealthInsite* to reliable health information and *AgeInsite* to promote a one-stop-shop on a range of issues regarding age and the community.
- DFACS - *Family and Community Initiative* includes the development of a website for access to information on family and community agencies.
- DISR - funding a number of projects to improve internet access to people with disabilities. (NOIE)
- The Commonwealth Department of Education, Training and Youth Affairs (DETYA) has developed the *Education and Training Plan for the Information Economy*, in order for the Australian community to be able to take advantage of technology confidently and creatively to enhance communication, apply knowledge and to take advantage of employment opportunities (Strategy Progress Report - May 2000)
- Commonwealth Government's (January 1999) Strategic Framework for the Information Economy
- States and territories strategies for bridging the digital divide include:
 - NSW - Community Technology Centres
 - South Australia - NetWorks for You Network Centres offer internet services to the internet, awareness programs, structured training and business development assistance
 - Tasmania - \$7.7 million through Networking the Nation to create 64 Access Centres (telecentres) to address socio-economic disadvantage in rural, regional and remote areas
 - Western Australia - The WA Telecentre Support Unit was allocated \$1.8 million for the Telecentres in anticipation of extending the network from 38 to 100 to regional towns

2.3.3 International initiatives attempting to “Bridge the Divide”:

Outlined briefly is an insight into Canada’s approach to assisting the populace in the transition to online learning as Canada is highlighted acclaimed for it’s innovative attempts in doing this.

Canada’s Commonwealth Government actions to overcome divide issues, include:

Connecting Canadians is the federal government’s vision and plan to make Canada the most connected country in the world

Information Highway Strategy, which addresses the two critical elements of affordability and convenient access

Canada On-Line is a strategy to help connect Canadians to each other - and the world - by supporting public Internet access sites in 5,000 rural and remote communities, and adding up to another 5,000 in urban areas. This is also helping to connect all 16,500 public schools and 3,400 public libraries across Canada.

Other international examples are included in Appendix B.

III Summary of Issues Raised by the Literature

This section will summarise the issues identified in the literature under the categories used in the framework: Pre-enrolment/Enrolment, Communication, Teaching and Learning, Technology, Resources and Student Support.

It should be noted that the categories used in the framework and the identified issues are generic to most learners and not confined to learners specific to the target groups.

Pre-enrolment/Enrolment

The majority of VET and higher education providers have a range of information about courses and services available online. This varies from provider to provider. Whilst there is a general consensus that induction/orientation sessions are a crucial part of assisting learners makes the transition to flexible delivery, there is some debate about whether students should be expected to attend compulsory face-to-face induction sessions.

Most organisations are providing online tutors, an induction course, information on studying online and hardware and software requirements.

The benefits to students of attending induction/orientation sessions in-house are seen to be numerous, including establishing a sense of belonging within the organisation, providing an understanding of the expectations of the role of the learner in an online environment and the opportunity for learners to become familiar with techniques and strategies for learning online.

Steeple supports face-to-face induction to provide bonding and problem-solving opportunities. For students in isolated environments, induction is made available online at the start of the course and software is mailed to students. An induction conference is made available to students in a non-interactive form during the year.

Le Cornu has found that students with little technological experience find it almost impossible to learn the technology and start the course concurrently.

Salmon agrees that it is imperative that the learner is sufficiently comfortable with technology prior to commencing their course, so that it becomes an enabling device rather than barrier.

Harper et al sees that preparing students to learn in an online environment is one of the major issues of provision.

Cooper, Macon State College, holds a class meeting for students starting online, which covers all the information usually covered in the first day of a traditional class.

Communication

Communication between teacher and learner has been enhanced by the provision of technology, albeit it assumes the technology is accessible and the learner skills to use it. One of the main points that have become most apparent in the literature is that providers should avoid making assumptions about the capabilities of equipment that learners have access to, their ability to use the communication mediums available and the skill levels of the learners.

Researchers also confirmed that the more contact learners have with teachers/tutors to more chance there is of the learner completing their course, especially in the earlier stages of the learning cycle.

Choy et al, found that learners see regular communication between teachers and students as being one of the most effective strategies for supporting students in online learning and essential for completion. Technology has been highlighted as a tool to increase communication in rural and regional isolated areas, but providers must not assume this though as there are still many issues to be overcome in this area including reliability of power transmission and bandwidth. Some areas still do not have reliable telephone services.

Barriers which are impeding access to the facilities include literacy, IT literacy and information literacy which are often presumed to be adequate, however there are other issues that also deserve considerations including understanding:

- the differences in internet access and usage
- cultural differences in search behaviour and
- the extent to which internet materials are sufficiently multicultural amongst different racial and ethnic groups.

There are number of strategies being used to try and reduce these issues including the use of television and maintenance of some resemblance to the traditional classroom.

Teaching and Learning

Assumptions are often made about the level of literacy and numeracy of the learner, these are often unfounded and many learners face barriers and frustrations as they try to access online learning.

It should also be noted that some VET practitioners may also lack the skills and confidence in using WebCT and other similar platforms, this creates issues for both the practitioner and the learner.

Choy's study showed that most youth learners did not share adult learning characteristics such as a deep approach to learning, an andragogical orientation to study and high level of readiness for self-directed learning.

Watkins & Hattie listed five contextual factors that influence the adoption of a deep or surface approach: students' level of interests, expected outcome, prior knowledge, and perception of the provider and assessment tasks.

Gibbons, lists ten basic skills for self-directed learning. These include: decision-making, time management, problem solving, goal setting, self-awareness, self-direction, giving and receiving feedback.

Warner, Christie & Choy showed that over 70% of those undertaking flexible delivery options have average and below average levels of readiness for self-directed learning.

Young, expressed concern about the "individualisation of society", if flexible delivery is taken to an extreme.

Learners use the traditional classroom for a range of learning and socialising opportunities which can't always be supplemented in an online environment. Davies, reaffirms this indicating that learners learn best in social cooperation situations.

Candy, recognises that in order to prepare students for lifelong learning, courses need to provide for "the incremental development self-directed learning".

Boote, sees that before students can take advantage of self-directed learning they need to be equipped with the basic skills of literacy, information literacy and IT literacy skills. She highlights some very important factors:

- the assumption is that students will understand what the implications are for learning in each of the choices
- that they will know how they prefer to learn and how to learn
- that they will have the motivation and self-discipline in a non-traditional environment.

Anderson, found that about one third of students with special needs would have dropped out of the course had it not been for the assistance of student support services.

Kindler, found that learners working at a distance, especially those with low literacy posed the greatest challenge and concerns for program writers and teachers.

Evans, sees that the effective learner support is critical to quality provision in an electronic learning context.

Thomas, reflects on the issues facing TAFE as it embraces the digital economy, which include general literacy, numeracy and digital literacy skills as being the key concerns in access and equity in online learning.

Jasinski, when identifying teaching and learning styles that facilitate online learning, found that 'interactivity' and some forms of CMC are beginning to replicate the conversations of the classroom. He also found that learners were not ready to engage in this form of delivery and what is needed is commitment to improving the technological, navigational and critical literacy skills of students.

Cope and Kalantzis, maintain that ... *new communication technologies increased the language, literacy and numeracy demands of work and vocational education and training...*

Harper, et al found that many learners experienced difficulty in adapting to the self-directed nature of online learning.

George confirms that, flexible delivery is an approach to learning which depends on a range of enabling skills and understandings some of which are content specific but many of which are generic... the most fundamental of these is information literacy.

George, also quotes Candy, who makes the point that information literacy is the key to the realisation of the learning society.

Technology

Many unfounded assumptions are made about the level of access learners have to technology. This extends to the assumption of IT skills of the learner, their access to the hardware and software, and associated equipment and a myriad of other access associated issues. Many of these assumptions put the learner in a vulnerable position as they attempt to embark on a new learning experience, which if inadequately supported can lead to the learner *dropping out*.

Many people are not able to access technology for a number of reasons, including:

- the lack of skills required, including IT literacy, functional literacy and numeracy skills and information literacy
- the demographical requirements are such that access is either not possible or is not reliable
- cost
- time
- confidence in their ability as an independent learner
- marginalised groups - age, disability, unemployed, rural and remote, isolated, Aboriginal and Torres Strait Islander, youth and students from a non-English speaking background, and
- transport.

Lindell, has developed an Adaptive Technology Checklist to identify specific areas in which students' performance could be improved.

Harper, et al identifies that the lack of infrastructure is a major problem for students in rural and remote areas and to some extent, in regional areas.

The Strategy 2000, *Access and Equity in Online Learning Project* report, recommended that teachers should provide courses initially with a combination of face-to-face and online for learners with inadequate literacy skills until the learners' confidence and independence increases.

Mehlman, sees the disparities between the 'haves' and the 'have-nots' starting as early as primary school, with young people becoming disenfranchised and starting to feel hopeless at a very young age. *If kids in lower-income neighbourhoods don't become digitally proficient and tap into the energies of the Web, they are effectively doomed to an impoverished life.*

Dabbagh, sees the advantages of using platforms like WebCT in that the interface mimics the organisation of a syllabus.

The immense size of the World Wide Web is both an asset and a liability, largely depending on the time you have, the search techniques and skills you have and your ability to scrutinise the authentic and credible from that, which is not. It is also imperative that learners know when to give up. The latter having the potential to be the biggest time-wasting experience learners are confronted with.

Resources

There is a lot of material available on the guidelines and development of online material and supporting learners. This is specific to the target groups and has technological requirements and guidelines. Examples of these have been included under the section on Technology, in the Access and Equity Project report (2000) which elaborates on these. However, developing resources and supporting learners from a distance who have low level literacy and IT literacy skills poses challenges beyond these realms for these teachers, designers and learners. Kindler provides options to overcome some of these issues by providing audio tape which learners could follow to interpret the booklet, or providing simple instructions, discussion and explanation for learners working at Certificate 2 level need to be able to call on a tutor/mentor when required.

Furner, found that teachers who use a variety of resources and who incorporate innovative ideas such as Internet Field Trips into their teaching find learners are more interested in their learning.

Student Support

Researchers focussing on student support strongly indicate that all learners require access to support, especially in the early stages of the learning cycle. This support should encompass the same support services as traditional learners have. However, providing support to online learners who have skill deficits poses many challenges for all stakeholders.

Choy, et al in a study on learner expectations, found the following points:

- the transition from traditional classroom to online learning has a potential to be an anxiety inducing experience and for this reason many students withdraw
- this experience can be minimized by adequately supporting students especially in the initial stages
- students need to be well informed of the requirements of the content of the course
- they need to have ready access and efficient responses to IT and academic support to alleviate frustration and to maintain motivation
- they need to be provision of good communication between teachers and students
- there needs to be provision of timely and informative feedback from teachers in response to academic and IT issues.

Veenker, who quotes Bates, stresses the importance of institutions identifying access issues and having an access policy, also warns that technology will open up access to some learners but also has potential to deny it to others.

Veenker, also quotes a study undertaken by Oliver and Towers, who found that access and literacy levels of tertiary students were alarming.... There are large numbers of students with limited access to information and communications technologies... and that there were low levels of English literacy skills common among these groups.... causing a significant barrier to their learning.

This quote indicates strongly the fact that the provision of support has to be made available to all learners not just those who have been identified in a target group.

Perlgut (2000) sees the use of television being in method of supporting learners in a range of environments and scenarios.

IV Conclusions from the Literature

If Australia as a nation is to be globally competitive it is imperative that all people are provided with equitable access to knowledge by whatever learning medium that will afford them the best opportunity to achieve their maximum professional and personal growth. Australia needs to adopt a broader, more complex social policy if the real causes of the digital divide are to be addressed.

Education is paramount to the wealth of the nation and to enhancing the provision of opportunities for the individual. What is becoming alarmingly apparent is the division between those members of the community who have the skills and opportunities including access to information and those who are disadvantaged by skills deficits, geographical and/or socio/economic circumstances. Whatever the reason these groups are less likely to be employed or to attain their optimum level of education and employment.

Many of the isolated regions in Australia are dependent on the TAFE system to provide appropriate educational options and opportunities. The rural and remote regions in particular are often disadvantaged due to inadequate access to facilities and their reliance on the TAFE system to provide some post-school opportunities. This is especially difficult when the chance of traineeship and apprenticeships are so very limited. TAFE is the only chance some of these people have to up-skill and to become part of the knowledge economy. Without this opportunity there is a very definite divide between those in the new economy and those in the old economy.

The disparities identified were evident in the following marginalised or disadvantaged groups, however there are also disparities for many and varied reasons some of which go beyond the identified marginalised/disadvantaged groups. It is therefore essential that access is afforded to every Australian whether they fall within these groups or not, to prevent further disadvantaging learners accessing the VET sector.

The literature has reinforced the following:

- the need for all learners, especially those within the identified groups to be provided with all the support requirements of the traditional classroom learner throughout the learning cycle
- that it is in the best interest of the learner to be consulted about identifying their skill needs prior to commencing their course
- the advantages of starting learners in the traditional mode
- gradually introducing learners to online learning as they gain their skill and confidence levels
- the assumption that the learner entering VET has appropriate/adequate IT, information literacy and functional literacy and numeracy skills adequate to cope with the transition to online learning
- it is assumed also that learners have access to the IT equipment and the appropriate hardware and software to make this transition, as well as the dispositional skills necessary to be self-directed learners
- learners to be supported from enrolment to completion. This includes the provision of a comprehensive induction/orientation session, the availability of student services that are equitable to the traditional learner requirements and the availability of prompt and accessible teacher/tutor support
- for online learning to be successful for these groups technology needs to assist and enhance the learning process (student support being widely acknowledged as a critical factor in assisting learners making the transition to flexible learning)

The barriers are numerous and span a vast number of groups within the Australian populace. The concept of bridging the digital divide is awe inspiring and challenging, however as a nation, the **basic human right of access to education** needs to be adhered to. This at least provides all communities with the opportunity to pursue their personal goals and opportunities for employment and engenders lifelong learning.

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Appendix B: International strategies attempting to Bridge the Divide

USA

Target Group	Action to overcome divide
Education, Training, Employment and Social Services	Education Technology: Programmes that serve to make modern computers and technology accessible to all students.
Strengthening the American Community Digital Divide	<p>Community Technology Centres (CTC's) (www.ctcnet.org): Provide access to and training for information technology in community-based setting within traditionally underserved areas.</p> <p>Broadband Communities: Grants and loans to ensure underserved rural, urban and Native American communities can build the infrastructure necessary.</p> <p>Internet Home Access Programme: Provide low-income individuals and families with connections, training and support necessary.</p> <p>Technology Opportunities Programme: Grants to community-based areas such as on-line support for micro enterprise development and distance learning.</p> <p>HUD's Regional Connections Initiative: Promote regional 'smart growth' strategies using information technology.</p> <p>Other Programmes: Initiative for Tribal Colleges to encourage Native Americans to pursue information technology.</p>
Corporate Initiatives	<p>AT&T</p> <p>The AT&T Learning Network: This program offers free online resources to help families, schools and communities use technology effectively to enhance teaching and learning.</p> <p>Academy of Information Technology: AT&T is helping to launch the Academy of Information Technology, a high-school.</p> <p>Job Corps Funding: AT&T is investing in the Edison (N.J.) Job Corps program by developing a three year initiative to address the shortage of skilled workers in the information-technology industry.</p>

Target Group	Action to overcome divide
	<p>Community Technology Centres: AT&T is collaborating with the NAACP, the National Urban League and the Community Technology Centres' Network to give under-resourced communities access to technology.</p> <p>Los Angeles Neighbourhood Technology Centres: an effort to establish 25 neighbourhood-based technology centres.</p> <p>Computer Learning: free computer-based education programs to children, youth and adults.</p> <p>New York City Housing Resources: AT&T is helping settlement houses in New York City serve as centres where technology resources can be accessed, shared and used by settlement staff.</p>

Canada

Target Group	Action to overcome divide
<p>Commonwealth Government</p> <p>www.fin.gc.ca</p>	<p>Information Highway Strategy: Addresses two critical elements- affordable and convenient access.</p> <p>Connecting Canadians is the federal government's vision and plan to make Canada the most connected country in the world.</p> <p>Canada On-Line helping to connect Canadians to each other - and the world - by supporting public Internet access sites in 5,000 rural and remote communities, and adding up to another 5,000 in urban areas. Also helping to connect all 16,500 public schools and 3,400 public libraries across Canada.</p> <p>Smart Communities</p> <p>Canadian Content On-Line helping Canada become a world leader in supplying online content as well as exciting new software and applications.</p> <p>Government On-Line: Provides better access to information, through new interactive services.</p>

UK

Target Group	Action to overcome divide
	<p>ICT Learning Centres: Government plans to establish 700 new ICT centres.</p> <p>Community Access Lifelong Learning: the development of a nationwide network of learning centres with ICT access to information and learning.</p> <p>People's Network: The Network will connect all public libraries to the Internet and offer access to specially created content designed.</p> <p>Digitise Programme: Funding will be given to projects which make information available in digital format.</p> <p>ICT training for public library staff: This initiative realises that libraries and library staff are a valuable resource in combating the Digital Divide.</p>

European Union

Target Group	Action to overcome divide
	<p>Fifth Framework Programme 1998-2002: Community activities in the field of research, technological development and demonstration. Aim is to help solve problems and to respond to major socio-economic challenges facing the European Union.</p>
Italy	600,000 year 9 students in Italy will be offered computers at 40% less than the retail price, to encourage school children to use the internet. Parents unable to afford computers will be able to take advantage of an interest free loan from ABI.
Ireland	Schools IT 2000 initiative: Designed to speed up the incorporation of ICT in schools. Partnered with Telecom Eireann.
Denmark	Sektor Net: Project (1994-2000) to wire the education sector.
Estonia	Tiger Leap: Government programme to provide all high schools with computers, software and net access in the next three years.
Korea	Edutopia Plan. To establish an information infrastructure by 2005 multimedia database, training in use of advanced technologies.
Kabissa	Space for change in Africa. Universal Service Agency (USA) Telecenter Project: Telecenters will be built or established in existing churches, schools, clinics and community centres to ensure access for under-served and under-privileged areas and communities.

South America

Target Group	Action to overcome divide
South America	APC Networks: establish telecommunication centres to promote social participation in the development process through the use of electronic communications by and for the people at the community level.

South-East Asia

Target Group	Action to overcome divide
Government of Singapore	<p>Singapore Government Network Information Centre (SGNIC): Supplying every person over the age of five years with a free email address and website. They are also developing relevant content in Chinese, Malay, Tamil and English.</p> <p>Infocomm Development Authority: 30,000 low income households will be given used computers, along with free internet access and some basic training.</p>

Title: **Literature Review: Digital Divide (R019RL)**
Code: **R019RL**
Document Status: **Final**
Author: **Rhonda Daniell**
Document Intent: **Practitioners and Researchers**
Document Type: **Literature Review of R019R Digital Divide Report**

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