NCVER

One size doesn't fit all

Pedagogy in the online environment – Volume I

Roslin Brennan

Australian *Flexible* Learning Framework
Supporting Flexible Learning Opportunities

flexiblelearning.net.au

Publisher's note

This report is published in two volumes: volume 1 contains the main report, while volume 2 contains the appendices. Volume 2 can be found on NCVER's website <www.ncver.edu.au>.

Background

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

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

Managed by the Flexible Learning Advisory Group on behalf of the Commonwealth, all states and territories in conjunction with ANTA.

ISBN 1 74096 157 9 print edition
ISBN 1 74096 158 7 web edition
TD/TNC 73.292

Published by NCVER
ABN 87 007 967 311
252 Kensington Road, Leabrook SA 5068
PO Box 115, Kensington Park SA 5068, Australia
www.ncver.edu.au

Contents

Executive summary

Introduction

Vocational education and training (VET) in Australia is increasingly being delivered online. Computer-based technology is supporting and replacing face-to-face training. As this trend continues at an extraordinary pace, questions on the effectiveness of this current practice need to be addressed. This project considers the factors that contribute to sound pedagogy and draws attention to those that require more research.

'Pedagogy' may be defined as the 'art' of teaching and learning. As such, teaching and learning practices influence the design and the delivery of teaching. The small amount of literature on online pedagogy is concerned with the mechanics of design, the process of implementation and an increasing number of evaluations of student outcomes and staff participation, rather than with what makes a quality learning experience.

The teacher's role is critical in the online environment and extensive lists of the skills and attributes of the ideal teacher have been developed. These include technical, facilitation and management skills that need to be combined in particular ways to suit the student, the content and the medium.

Student learning styles and preferences are important determinants in judging the effectiveness of online pedagogy. The content of the material, the structure of the curriculum and the institutional and policy constraints in VET also influence the pedagogy and its effectiveness. Assertions of the medium's capabilities are impressive. Online learning is said to encourage active engagement, facilitate easy access, speed up communication between teacher and learner, provide useful learner choices and create learning environments where learners are able to construct knowledge for themselves as they learn. These capacities undoubtedly exist, but the scope of their effectiveness, take-up rates and the ability of teachers to develop adequate practices to match the capacities is relatively untested.

Online delivery of VET is populated with teachers and learners with very different abilities and predispositions, all operating within the design limitations of course materials. Learners are clear about their expectations. They want a pedagogy predicated on contact, communication, feedback and flexibility. Teachers want the ability to communicate and interact with their students. However, current online delivery imposes assumptions on both teachers and learners that often militate against the realisation of these expectations.

Purpose of the study

The purpose of this study is to examine and make explicit the assumptions and practices which underpin the pedagogy of online delivery of VET.

The objectives of this research project were to:

- ✧ examine a range of current online pedagogical practices in VET and how these intersect with student learning styles and preferences

- ✧ generate a set of 'pedagogical effectiveness indicators' (PEIs) based on these practices and apply them to a range of current course offerings
- ✧ provide a robust body of knowledge in accessible formats which teachers/trainers can use to inform the methods of delivery that they use in VET to maximise the match between student needs and the technology available
- ✧ provide an extensive body of knowledge to be disseminated in a variety of formats which policy-makers can use when deciding on the extent and types of technology to fund, and the kinds of staff and student support necessary to ensure that the investment in technology is maximised.

Methodology

Data from interviews, workshops, focus groups and questionnaires to learners and teachers have been collected from a wide variety of sources in a number of key locations across Australia. Teachers, students, educational designers, policy makers and managers have been involved.

Findings

The key messages emerging from the study are as follows:

- ✧ There are a number of principles of pedagogical effectiveness that are clearly expressed by all stakeholders involved in the online delivery of VET. These are:
  - a learner-centred environment
  - constructivist approaches to teaching and learning (approaches enabling learners to build new knowledge and skill based on what they already have)
  - high quality materials design
  - teaching and learning strategies that develop cognitive skills
  - high levels of interactivity between all participants
  - guaranteed and reliable forms of access to the technology
  - quick and easy access to the training site and the online technology
  - engagement with the online materials
  - learning experiences that encourage synthesis and analysis
  - opportunities for 'deep learning'
  - consistent levels of feedback
  - thoughtful matches between materials, learning styles and learning contexts
  - a model of delivery that includes thorough planning, monitoring, reviewing and evaluating course materials and student progress
  - a range of available navigational choices for students
  - teachers who are imaginative, flexible, technologically gymnastic, committed, responsible and expert communicators.
- ✧ Pedagogical practice rarely conforms to these principles. The dominating influence of the technology has created assumptions about the nature of learning, the role of the teacher and the student characteristics, and these are poorly matched with teacher and learner expectations.
- ✧ Teachers are holding firmly to sound principles of pedagogy and students are reiterating the importance of these. Communication, interactivity and the development of social cohesion are regarded as laudable goals in an environment that frequently mitigates against their achievement. A large number of teachers are not only struggling with the demands of rapidly changing technologies, but also with an often unfriendly teaching context that is pre-determined by institutional structures and management practices, course content, material presentation and the nature of the platform that their institution is tied to. It is a credit to teacher/trainer professionalism and dogged persistence that online delivery works as well as it does.
- ✧ The casualisation of the VET teaching workforce may affect the effectiveness of the implementation of online and other flexible approaches. Staff also reported having little time for reflection on their

practice. The changing roles of teachers and the way of working both need to be recognised and respected at the institutional level and supported by appropriate professional development.

- ✧ There was general consensus that 'suitability' for online delivery is a relative judgement. Online delivery certainly offers learners flexibility and access to engage with course content. However there is nothing intrinsic to the medium that encourages the broad range of students to take advantage of these features.
- ✧ In areas of VET where the mode of delivery and the content are similar, such as information technology, online delivery provides a form of workplace training that is suitable both to the content and the students. In contrast, teaching and learning areas that require practical tasks or where the processes of communication, critical thinking and values clarification are central to the subject area, such as welfare or travel and tourism, are more difficult.
- ✧ Courses frequently make unequivocal assumptions about learner characteristics. (Students are motivated, literate, well organised and have high order cognitive skills). Often online students do not have these characteristics. In the present environment, suitability is more likely to be achieved in a situation where online learning, content and face-to-face contact are 'blended'.
- ✧ The teaching styles that facilitate effective online delivery of VET are strongly linked to teachers' attitudes and their use of the medium. However, some still assume that the acquisition of technical proficiency will guarantee sound practice.
- ✧ Interactivity is unequivocally regarded as the most effective teacher/student relationship to develop in an online environment. However, the use of the medium to encourage more critical thinking through debate and discussion is a relatively untapped strategy.
- ✧ Problem solving, investigation and research, and the pursuit of a theoretical understanding of content, are regarded as contributing to effective online learning at the individual learner level.
- ✧ The roles and skills of teachers and learners adapt or change, depending on whether the online delivery of VET supplements classroom time or replaces it. In both cases new approaches to time management and work patterns are required.
- ✧ The literacy demands and cultural homogeneity of many online courses and modules raises questions about the adequacy of the skills of students from non-English-speaking backgrounds and Aboriginal and Torres Strait Islander groups, as well as others with low levels of functional literacy.
- ✧ Fundamental issues such as the cultural appropriateness of questioning, conversational conventions, language acuity, and student attitudes towards interaction with authority take on a heightened importance in an online environment. In face-to-face classrooms, diversity is an asset. In an online environment it may be a distinct disadvantage.

Online pedagogy is frequently characterised as 'constructivist'. However the reality of delivery matches very poorly against the assumptions that underpin this particular view of teaching and learning, which are that individuals 'construct' new knowledge as they integrate new experiences and modify existing patterns. The teaching and learning process needs to acknowledge that students develop their own styles and preferences for learning using a variety of different resources.

Conclusions

The research findings show that, in terms of what we know about the factors that contribute to effective student learning, online pedagogy needs to address all the dimensions of practice.

In particular, online pedagogy in VET needs to be able to create teaching and learning environments where students have the opportunity to:

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

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

Introduction

Background

The focus on the online delivery of vocational education and training (VET) in Australia is clearly supported by both policy and funding. The Framework for National Collaboration in Flexible Learning in Vocational Education 2000–2004 identifies strategies that will lead to an improvement in student outcomes. The issue of the emerging pedagogy of online delivery of VET is at the heart of the Australian National Training Authority's (ANTA's) strategy for the VET sector for 1998 to 2003—*A bridge to the future* (ANTA 1998). How online materials are delivered, how teachers regard their roles and how students learn are crucial research questions that will inform the effective distribution of funds. By comparison with other aspects of online delivery of VET, these questions have received little research attention both in Australia and overseas.

The lack of research and disseminated results has led to a situation where technology is driving pedagogy (Brennan, McFadden & Law 2001). The new technologies certainly have the potential to generate new processes for teaching and learning but few of the possibilities have yet to be recognised.

The online delivery of VET in Australia is a complex and rapidly changing topic of both discussion and research. Given the levels of expenditure and policy interest in this area, it is critical that the learning outcomes for students and the impacts on teachers are evaluated. This research project focusses on the interactions between teachers, students, content and context, and creates a snapshot of online pedagogy.

Online delivery is unlike other education and training innovations. It is pervasive in ways that other pieces of technology such as the video could never have been. Information technology (IT) influences the operation of workplaces, facilitates the interactions of the commercial world and provides the superstructure for extending globalisation. Its application to the delivery of VET is a relatively small part of the growing dominance of information technology in our lives.

The major part of online delivery of VET is taking place in a range of combinations blended with other forms of student contact and support from staff.

Teachers, trainers, curriculum managers and instructional/educational designers are working on a range of initiatives in the online delivery of VET. Since there are large differences between the levels of technological expertise in both the teacher and learner groups, professional development is running in tandem with the development of materials and platforms which extend the use of information technology in the teaching and learning contexts. This is predicated on the assumption that growing familiarity with the technology will liberate teachers to focus on the effectiveness of the pedagogy.

This project has assessed the effectiveness of current pedagogy from the viewpoints of students, teacher practice, course content and delivery styles. The information gathered from these sources and others constitutes the composite picture of online practice. This profile has subsequently been overlaid by what we know about the constituent elements of 'productive pedagogies'. The results of this process provide insight into where work has to be done, future directions for research and the

generation of a challenging set of questions that need to be addressed if the technology is to deliver effective teaching and learning for all students in the VET sector.

This project builds on the results of the 2001 National Research and Evaluation Committee study, *All that glitters is not gold: An evaluation of the effectiveness of online delivery of education and training in Australia* (Brennan, McFadden & Law 2001).

Rationale for the study

The purpose of this study is to examine and make explicit the assumptions and practices which underpin the pedagogy of online delivery of VET where a variety of methodologies are used. It approaches the issue of online pedagogy from different perspectives: the practices and views of teachers, the learning styles and preferences of students, the implicit pedagogies of various modes of delivery, the identification of indicators of online pedagogical effectiveness based on the literature and an examination of a number of online courses in VET. The objectives of this research project were to:

- examine a range of current online pedagogical practices in VET and how these intersect with student learning styles and preferences
- generate a set of 'pedagogical effectiveness indicators' (PEIs) based on these practices and apply them to a range of current course offerings
- provide a robust body of knowledge in accessible formats which teachers/trainers can use to inform the methods of delivery that they use in VET to maximise the match between student needs and the technology available
- provide a robust body of knowledge that will be disseminated in a variety of formats which policy-makers can use when deciding on the extent and types of technology to fund and the kinds of staff and student support necessary to ensure that the investment in technology is maximised.

Research questions

The research questions were derived from the broad objectives listed above and parallel those generated by the earlier study (Brennan, McFadden & Law 2001). These questions reflect gaps in current knowledge about the online delivery of VET in Australia. The answers to these questions will assist in achieving improved student outcomes and higher levels of teacher professionalism and satisfaction.

The questions addressed by the current research are:

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

Online pedagogy

'Pedagogy' covers the function, work, or art of a teacher or trainer. It includes the process of teaching and instruction. It is useful to think of pedagogy as being reflected in the arrangements made to enable someone to learn something for a specific purpose. These arrangements are influenced by:

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

This study explores each of these aspects of online pedagogy. It builds on the work currently being done by other researchers for the National Centre for Vocational Education Research (NCVER). The projects which examine learner experiences and expectations (Choy, McNickle & Clayton 2002); quality online learning (Cashion & Palmieri 2002); Australian online education and training practices (Harper et al. 2000) and the evaluation of web-based flexible learning (McKavanagh et al. 2002) are particularly relevant as a body of knowledge relating to online pedagogy in Australia.

Methodology

In order to construct a comprehensive picture of online pedagogical practice in the VET sector in Australia, this project utilised a number of methodologies. These are:

- ✧ literature review
- ✧ development of an initial framework—the pedagogical effectiveness indicators (PEIs)
- ✧ interviews
- ✧ workshops
- ✧ development and analysis of student and teacher questionnaires
- ✧ at-desk activities analysing online course materials (online course filter).

Figure 1 demonstrates how data collected from the various stages of this project inform the findings.

The report has been divided into two volumes. Volume 1 contains a description of the project and its findings; volume 2 contains the appendices and is found on the National Centre for Vocational Education Research's (NCVER's) website, <www.ncver.edu.au>.

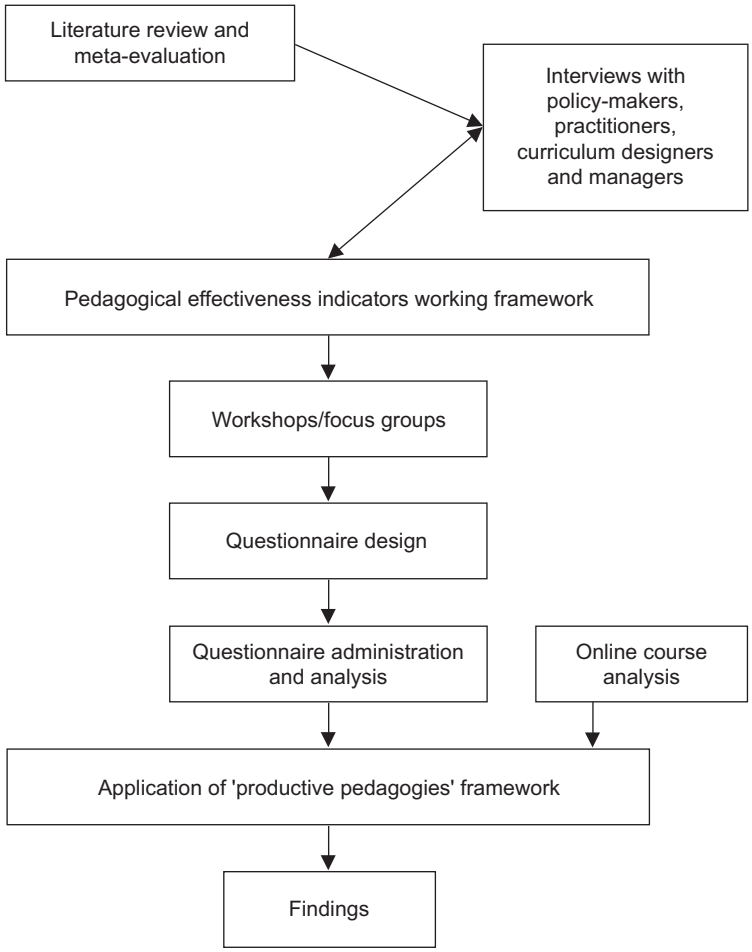
Literature review

The literature review built on Brennan, McFadden and Law (2001), with a specific focus on the compatibility between online delivery, the epistemologies of teachers and trainers and student learning styles.

The literature review incorporated material from both Australia and overseas and all were subject to a summative meta-evaluation (Straw & Cook 1990). This meta-evaluation weighed up the appropriateness of, and consistency between the various responses to the research questions and the reported outcomes of the studies.

The information was used to inform the subsequent stages of the research and was cross-referenced with the results obtained. This added to the credibility of this report by validating the findings of the other sections of the project through a process of systematic cross-referencing. One of the aims of the meta-evaluation of the literature was to identify a possible set of performance effectiveness indicators in the online environment that relate to a number of core questions posed by Bernstein (1996).

Figure 1: Project methodology



The interviews

Interviews were conducted by telephone and email with policy-makers, practitioners, curriculum designers and managers (table 1). The interviews were organised around the research questions. The interviewees represent the sectors of technical and further education (TAFE), adult community education (ACE), Education Network Australia (EdNA), ANTA, the Curriculum Corporation and private provision, and were selected because of their current crucial involvement in the development and promotion of online delivery of VET.

The interviews were transcribed and structured according to the research questions. The interview responses were also used to develop the indicators of pedagogical effectiveness, the working framework and the questionnaire content and design.

The results of these interviews appear in appendix 1.

Table 1: Project interviewees

Nick Pearl	National Toolbox Manager ANTA, Qld
Leslie Johnson	Director of Flexible Delivery ANTA, Qld
Garry Putland	Project Director EdNA online, SA
Ian Gaunt	Workforce Development Manager Hewlett Packard Consulting, Vic
Bruce Wilson	The Curriculum Corporation, Vic
Ian Hamilton	OTEN NSW TAFE, NSW
Alan Tonkin	Adult and Community Education Learning at Work, Vic
Guy Kemshal-Bell	Teacher/Researcher in Information Technology Riverina Institute of TAFE, Albury Campus, NSW
Eunice Askov	Lecturer/Course Coordinator Master in Adult Education Pennsylvania State University Online Campus United States

Site workshops

Workshops were carried out at the three participating sites, Holmesglen TAFE, Western Institute of TAFE and Canberra Institute of Technology. The research partners in each of these sites chose the participants on the basis of their experience and expertise in online delivery and support for education and training. All of the participants were experts in their own fields and represented the leading edge of technological implementation. The workshops lasted approximately five hours, with discussions organised around the research questions. The results of the workshops are described in full in appendix 2.

The aims of the workshops were to:

- ✧ explain the focus of the project and role of the three sites in achieving the outcomes
- ✧ collaboratively design the questionnaire/inventory (based on the potential pedagogical effectiveness indicators identified in the literature review) to be administered to teachers and students
- ✧ tap into state and national intelligence about the sites for the administration of the questionnaire (3–5 staff and 12–15 students per site, a crucial condition as the McKavanagh et al. 2002 study indicated).

Teacher and student questionnaires

The questionnaires were developed over a period of months. The focus areas for the questionnaires came from the literature review and meta-evaluation, the detailed interviews and the workshops. The findings from the surveys for both teachers and students are given in appendices 3 and 4 of this report respectively. The project information sheet and consent form are found in appendix 7.

The questionnaire was administered via post and in person. The sites were selected by the research team and represent:

- ✧ a rural/urban mix
- ✧ a range of content at Australian Qualifications Framework (AQF) levels
- ✧ a range of combinations of online delivery of VET from complete course delivery to the use of online facilities to supplement face-to-face delivery.

Like a number of other online studies, some difficulties were noted in the administration of the questionnaires which affected the response rates achieved.

Analysis of questionnaire data

The quantitative data gathered through the return of 200 teacher questionnaires and 110 student questionnaires was analysed using the SPSS statistical computer program. Replies to all questions were coded and entered for analysis. Frequency tables were created and 'strings' of written responses to specific questions were collated. A mixture of numerical and descriptive techniques were used to report on the data.

Online course filter

The literature, the interviewees and the workshop participants all agreed that a huge variety exists in the quality and effectiveness of the online courses available to students. It was considered that any discussion of effective online pedagogical practices must include a sampling of the online courses on offer.

The tool used to analyse the pedagogical principles on which these courses were based and the assumptions that underpin their design came from the initial framework, the pedagogical effectiveness indicators and the comments of the interviewees and workshop participants. A filter of questions was developed and members of the research team were asked to use this filter to categorise the various course sites. The courses were selected to provide a broad sweep of the estimated thousands available.

The analysis of the online course filter is given in appendix 5.

Literature review

The literature indicates that online pedagogy is a relatively new area of study and that educational issues relating to teaching and learning online have been caught up in the whirlwind of technological change and euphoria. In the VET sector, as in others, there is a growing awareness that effective online pedagogy involves issues such as interaction, changing teacher roles, student access, and matching articulated teaching skills to the needs and preferences of students. This review specifically explores the current wisdom relating to online pedagogy and the VET sector. The literature review incorporated material from both Australia and overseas and all were subject to a summative meta-evaluation (Straw & Cook 1990). This meta-evaluation weighed up the appropriateness of, and consistency between the various responses to the focus questions and the reported outcomes of the studies.

The information was used to inform the subsequent stages of the research and was cross-referenced with the results obtained. This added to the credibility of this report by validating the findings of the other sections of the project through a process of systematic cross-referencing. One of the aims of the meta-evaluation of the literature was to identify a possible set of pedagogical effectiveness indicators in the online environment. This review addresses the project research questions.

Introduction

The literature covered in this review comes from a range of different sources. There are reports from a number of major Australian, American, British and Japanese studies, smaller studies that appear in journals and online discussions and conferences. However, it is important to recognise from the outset that there is very little literature which discusses the pedagogy of online delivery specifically, or in any depth. A large number of the discussions in the literature look to the future, describing the potential of the technology but giving little about the current situation (Salmon 2000).

Defining pedagogy

Literature relating to the pedagogy of online delivery is very new (Schofield, Walsh & Melville 2000) with many participants having difficulty coming to terms with the topic (Schrum 1998). Only a few of the articles and presentations reviewed for this study provided specific definitions of the term 'pedagogy' as it applies to online delivery of VET.

The predominant themes in the literature are concerned with the mechanics of design, the process of implementation and some evaluations of student outcomes and staff participation, with the questions of access and useability dominating.

The three following definitions offer generic overviews of online pedagogy.

Schrum (1998) writes that:

> Pedagogical issues include the identification of learning goals, philosophical changes in teaching and learning, reconceptualisations of the teacher's role, evaluation of student and instructor, and the stimulation of interactivity. (Schrum 1998, p.56)

Firdyiwek (1999) defines online pedagogy as:

> … being based on effective use of the electronic learning environments for the development of cognitive skills through access to information, interactivity with tools and communication. (Firdyiwek 1999, p.29)

This definition still shies away from a closer examination of the term 'effective' and gives no precise indication of how and why these cognitive skills are to be developed through sound teaching practices.

Brennan, McFadden and Law (2001) define online pedagogy as:

> … a core of effective and traditional practices of teaching and training that have worked over time. Pedagogies are embedded in programs and practices as assumptions that influence the design and delivery of teaching and training. (Brennan, McFadden & Law 2001, p.24)

If technology is to be an effective tool for improving student learning beyond issues of accessibility, then these practices need to be explicit (Brown 1998) and discussable.

Current projects in the area

Three recent National Centre for Vocational Education Research (NCVER) publications, *The online experience: The state of Australian online education and training practices* (Harper et al. 2000), *All that glitters is not gold: An evaluation of the effectiveness of online delivery of education and training in Australia* (Brennan, McFadden & Law 2001) and *Getting to grips with online delivery* (Booker 2000) encapsulate current efforts to coherently map the territory related to online delivery.

These studies cover the broad issues involved in the discussion and deal with topics such as 'effectiveness', teacher and student reactions to online delivery, materials design, learner diversity and teacher/trainer preparation and professional development. Two major studies of online pedagogy, one from Australia and one from the Unites States, look at the multi-dimensional nature of pedagogy (Jasinski 1998; University of Illinois 1999).

The first Australian study (Jasinski 1998) involved about 80 VET practitioners, an online survey, three web forums and individual interviews. The author investigated issues relating to pedagogy online with a particular focus on identifying teaching and learning styles that facilitate online learning. The study produced the following findings:

> Technology does not cause learning. As an instructional medium online technologies will not in themselves improve or cause changes in learning. What improves learning is well-designed instruction. Online learning environments have many capabilities and the potential to widen options and opportunities available to teachers and learners. However, the key to changing conditions for improving learning is how these options and opportunities are utilised by teachers and learners. Technology is coming before pedagogy. The value of any technology for education is proportional to the need for that technology to realise educational objectives. We are constantly reminded that learning must be developed around learning needs, meeting educational objectives and producing viable graduates. However, at this stage of development, the effort put into exploring technologies to 'keep the cutting edge' is at the expense of equal investment in the underpinning educational design. (Jasinski 1998, p.1)

The second study was carried out at the University of Illinois (1999) and is an extensive examination of what constitutes good teaching and training practice. The report focusses on areas such as what constitutes good teaching either offline or online, the extent and validity of current evaluations of the effectiveness of online teaching and learning and surveys of online provision of education in the United States and beyond. The evaluation criteria were generated from the question: 'How do I determine if online teaching is successful?'

> In the short term, before history answers this question, we think that a rigorous comparison of learning competence with traditional classrooms should be done. High quality online teaching is not just a matter of transferring class notes or a videotaped lecture to the Internet; new paradigms of content delivery are needed. Particular features to look for in new courses are the strength of professor–students and student–student interactions, the depth at which students engage in the material, and the professor's and students' access to technical support. Evidence of academic maturity, such as critical thinking and synthesis of different areas of knowledge should be present in more extensive online programs. (University of Illinois 1999, p.3)

The final report of the VET teachers and online learning research project commissioned by TAFE NSW, titled *The online teacher* (Kemshal-Bell 2001), begins with an extensive review of the literature, embracing over 300 articles, papers, presentations and books. In the section titled 'Comments on research' (pp.10–15) Kemshal-Bell describes the changing role of the teacher and the effects this role change is having on teacher practice.

The author identifies the technical, facilitation and management skills required by online practitioners. Skills which enable effective use of email, forums, chat, website development and video and audio conferencing are discussed in detail (Kemshal-Bell 2001, pp.11–12). The facilitation skills that a teacher needs to have to ensure equivalent or improved student outcomes in an online environment include:

- ✧ engaging the learner (p.12)
- ✧ questioning (p.12)
- ✧ listening and feedback (p.13)
- ✧ providing direction and support (p.13)
- ✧ managing discussions (p.13)
- ✧ team building (p.14)
- ✧ relationship building, including virtual relationships (p.14)
- ✧ motivating (p.14)
- ✧ planning, monitoring and reviewing (p.15)
- ✧ time management (p.15).

Kemshal-Bell concludes:

> Most importantly, it is a combination of these skills that is essential. Online teachers need to know not only how to use the technology effectively, but also how to harness the power of technology through facilitation to achieve learning. On top of this, online teaching also calls for strong management skills to deal with the range of administrative and functional issues that arise. (Kemshal-Bell 2001, p.15)

The actual mixture of these attributes to form a coherent pedagogy remains unclear while the practitioners focus on the technology itself, its capacities and effects, and the skills required to make these attributes operational. The role of the instructor/teacher appears to be deprofessionalised by comparison with the perceived professional role of the face-to-face teacher or trainer. These themes

recur in other literature (Holzl & Khurana 2000; Zorfass, Remz & Gold 1998; Mitchell & Bluer 2000).

A joint project between the Research Centre for Vocational Education and Training, University of Technology Sydney (RCVET) and the Adelaide Institute of TAFE and TAFE SA, entitled *Online learning and the new VET practitioner* (Schofield, Walsh & Melville 2001) addressed this lack of research. It focussed on the knowledge and experiences with online learning and teaching of 18 self-selected VET practitioners from different backgrounds and disparate ages.

> What emerged was a picture of a group of leading edge, enthusiastic and motivated practitioners working with each other and sharing their experiences, but struggling (at least in this early stage) to integrate online work more fully within their work environments and engage immediate work colleagues in the process. It also showed a group of practitioners still operating outside the 'mainstream' of VET practice. (Schofield, Walsh & Melville 2001, p.12)

This current research indicates that VET online practitioners are primarily concerned about issues concerned with teaching and pedagogy in the online environment and include:

- ✧ constructing knowledge about online learning
- ✧ changing professional roles and practice
- ✧ the workplace learning of VET practitioners
- ✧ the organisational context of online teaching and learning.

These themes confirm other research findings in the area (Holzl & Khurana 2000; University of Illinois 1999; Bennett, Priest & McPherson 1999).

The literature and the research questions

How effective is online delivery in catering for different student needs and learning styles?

This section of the review focusses on the measures of effectiveness of online delivery, learning theory, instructional strategies and the views of students and teachers about the effective matching of materials, styles of delivery and student learning needs.

Pedagogical discussions in the literature relating to face-to-face or distance education generally focus on what the teacher is doing, the effects of these activities on the learners and how other external factors such as social class, motivation and learner background impinge on the effectiveness of the relationship between teacher, learner and content. Therefore, measures and descriptions of how student learning styles and preferences are effectively accommodated is one way in which online pedagogy can begin to be examined.

Effectiveness

This concept is difficult to tie down. One person's effectiveness is another person's failure (Brennan et al. 2001). The content of the material being delivered, the structure of the curriculum and the institutional and policy constraints in VET vary, as does the extent to which teachers feel that they have control over and confidence in both the medium and the message. Nevertheless, assertions about effectiveness are prevalent in the literature (Brennan et al. 2001; Beach 2000).

However, access does not necessarily equate with an effective match between the medium, the content and the learner styles and preferences. Student perceptions of the effectiveness of the new technologies is a relatively under-researched and under-reported area. In many studies of the relationship between technology and student outcomes, the benchmarks used to make these judgements are frequently external to the students.

Case studies, interviews and focus groups that move beyond the surface of student performance to issues of motivation, engagement and achievement are beginning to achieve credibility as measures of effectiveness (Brennan et al. 2001; Cashion & Palmieri 2002; Selwyn 1999; Slay 1997; Wallace 2000). The systematic analysis of communication and interaction in online teaching and training environments is also providing another rich source of information about how students learn online and the relative effectiveness of this learning (Choy et al. 2002; Jasinski 1998; Ross & Schulz 1999).

Learning theory, online delivery and pedagogy

By making the assumptions which underpin different types of online delivery explicit, and by placing the variety of online strategies in a theoretical framework, we are more able to get a picture of how delivery matches learning styles and preferences.

It is claimed that the new media cater for individual learning styles and preferences and that the practice of teaching makes use of these features. Assertions made about the new media include that: online learning has the capacity to create active engagement; it is readily accessible; it provides learners with many choices about information; it speeds up communication between learners and between the teacher and the learner, and it removes unhelpful time constraints (O'Connor 2000; Kerka 1996). These assertions are summarised in the literature and the counter-arguments are presented (Booker 2000).

The capacities listed above do exist, but the scope of their effectiveness, take-up rates and the ability of teachers to develop adequate pedagogical practices to match the capacities are yet untested (Dede 1996 in Kerka 1996; Rice 1997; University of Illinois 1999; Pan 1998; Bennett et al. 1999; Stein et al. 1999).

An examination of the pedagogy of three commonly used software systems for online delivery, WebCT, TopClass and Web Course in a Box, was conducted by Firdyiwek (1999). This study ascribed different theories of learning and cognition to the systems in an attempt to define the pedagogical principles underscoring their operation.

The author identified three dominant paradigm—the behaviourist/empiricist, the cognitive/rationalist, and the situative/pragmatist. These three theoretical views of learning and cognition were then applied as filters to the three online environments in an attempt to describe the pedagogies that emerged from their operation.

> These three theoretical perspectives and the pedagogical assumptions that evolve out of them map well against the components of courseware systems and the pedagogical practices implied in their integration. The types of tools provided (such as those for assessment, authoring, and communication) and the stance taken on flexibility in the definition of roles (administrator, instructor and student) reflect broadly one or other of the three theoretical perspectives mentioned above, even if this is not made explicit by the developers of the tools.
>
> (Firdyiwek 1999, p.30)

Behavioural learning theory and its accompanying pedagogy is predicated on the view that if we present information to a learner, check the learner's response, provide feedback and then either proceed or revise, the learner's behaviour will change. As Dewald (1999) notes: 'Behavioural learning theory is the basis of traditional learning environments that are geared for efficiently transmitting information and basic skills to students in a well organised manner (p.2)'.

Cognitivists present the view that the individual has an assembled body of knowledge and that new learning needs to be accommodated into this pattern. Learners learn when they are actively engaged with their materials and tasks. Constructivism, where learners construct knowledge for themselves either individually or socially as they learn, extends these principles. Online technologies offer ways of teaching and learning that are multiple, alternative and cater for different learning styles and preferences (Brown 1998).

Instructional strategies and assessment

The instructional strategies currently used in Australia give some indication of how well the online environment caters for students' needs and learning styles. In this environment delivery of content online is the most common strategy used in Australia (Brown 1998; Harper et al. 2000; McKavanagh et al. 2002). The interaction and communication capabilities of the medium are still under-utilised for a variety of reasons, although email is increasingly being used to enable teachers and students to stay in touch (Harper et al. 2000; Kerka 1996). The University of Indiana study (Graham et al. 2000) provides a detailed evaluation of the teaching strategies being used.

Assessment is also occurring online. While strategies such as electronic portfolios and diaries are being used in some online courses, assessment methods are often limited to short-answer and multiple-choice items. More extensive, in-depth assessment items which tap into the developmental aspects of learning are not yet the province of the online assessor.

What do online learners say?

This topic has been addressed extensively in the Harper et al. study (2000) and the literature has been surveyed and the results collated (Brennan et al. 2001). The two studies found that the flexibility of the new technologies is especially attractive for some learners, particularly mature adults with many other competing pressures in their lives. The studies also found that there is more communication between previously isolated learners. Where the effectiveness of the online learning was undisputed, there had been a clear focus on collaboration, communication, interactivity, and problem-based learning.

The qualification to all these statements is that we have a tendency to generically classify our learners, a position which is not adopted by the literature. In VET, the differences in styles, predispositions, preferences and levels of engagement with learning are crucial factors in assessing the effectiveness of online delivery methods from the perspective of students. We cannot assume that they are homogenous or that they possess the characteristics of adult learners that produce the kinds of results described above.

> While there are clear theories and principles for adult learners, namely described as andragogy, none are evident for youth learners, notwithstanding the recent debates surrounding the andragogy–pedagogy dichotomy claim that the teaching of youths is significantly different from the teaching of adults (Delahaye, Limerick & Hear 1994). Three attributes generally associated with adult learning are a deep approach to learning … and a high level of self directed learning. Whether youth share these attributes common in most adult learners is not apparent in the literature. A recent major study, of which this paper reports the results for TAFE students, showed that most youth learners did not share adult learning characteristics.
>
> (Choy & Delahaye 2001, *pp.1–2).*

The Choy and Delahaye (2001) study addressed the shortage of learner perspectives on the effectiveness of online learning.

> In view of the deficiency in research informing about services for online learners, a national study was conducted to explore the expectations and experiences of online learners in the VET sector. (Choy & Delahaye 2001, p.1)

The study found that student evaluations of the quality of their own learning focussed on issues of:

> … regular contact with teachers/tutors; quick responses from teachers/tutors; regular support for learning … They believed that regular communications with teachers/tutors as well as peers through emails or telephone was important to motivate and encourage them to continue with their learning. As the technologies that support online delivery are recognised for speedy communication, learners expect quick responses … According to the interviewees there were two main limitations in the current online services that related to facilitation and the technical

> system. Many believed that teachers did not provide clear guidelines or explanations of their expectations from learners. The interviewees shared a common view that many teachers/tutors are not adequately trained for online delivery. Some learners identified limitations in technical knowledge (of teachers) in the use of online delivery. (Choy & Delahaye 2001, p.11)

Other learners commented that changes in the teaching staff and the inappropriate design of the web-based materials were limiting factors in their learning, as were technical and navigational problems associated with their course materials (Choy & Delahaye 2001, p.11).

What do online teachers say?

The literature is beginning to focus on the role of the teacher and teaching activities online and there are some differences and similarities in opinions (Schofield, Walsh & Melville 2000; Kemshal-Bell 2001). The Schofield, Walsh and Melville (2000) study showed that most teachers believed that:

> … good online teaching is about building community, caring for students and being responsive … [it is about] … being imaginative and creative, a lateral thinker. This was most frequently coupled with the attribute of being a risk taker, someone who was prepared to get out of their comfort zone and try new things, to experiment.
>
> (Schofield, Walsh & Melville 2000, p.6)

A number of teachers commented on the workload issues associated with online delivery and the undervaluing of work and time (Brennan et al. 2001). Computer skills were also considered an important precondition for good online teaching, as were patience, flexibility, good planning and having a learner-centred philosophy. The most recent trends in pedagogy have been towards a constructivist view of learning where the student brings his/her prior knowledge and experience to bear on new information, and thereby constructs new knowledge. It acknowledges that students develop their own styles and preferences for learning using a variety of different resources.

Summary

'Effectiveness' and 'access' are often used interchangeably in discussions of online delivery, thereby muddying the intellectual waters. More recent studies of online delivery have focussed on in-depth analysis of student and teacher reactions to the online environment and on the applicability of learning theories in this new context. Extensive studies of teacher and student attitudes and practices have produced valuable insights into what is happening in online delivery of VET in Australia. However, a judgement on the effectiveness of online delivery to cater for different student needs and learning styles requires an integrated analysis beyond these studies. As yet there is no overarching framework of pedagogy within which these data can be placed and evaluated.

How is knowledge constructed online and how are online skills acquired?

The discussion in the literature of how knowledge is constructed online and how skills are learnt is wide-ranging.

> While there is no one 'best' teaching method some methods and combination of methods are better than others at realising the sort of constructive engagement with learning activities that lead to changes in understanding (Ramsden 1992) … For example, Stevenson (1994, 1995) argues that, in order for learners to achieve expertise, learning needs to be deep, conceptual and reflective, with strong links between concepts and practice … Ramsden (1992) argues that teachers can encourage such approaches to learning by promoting reflective activity and dialogue … Teaching is a sort of conversation. (McKavanagh et al. 2002, pp.19–20)

Good teaching involves rich conversations. Sharing ideas, a practice facilitated by the more interactive use of the new technologies, encourages discussion, critical thinking and the formation of new knowledge (Harper et al. 2000; O'Connor 2000). Problem-based learning which has been

referred to as: '… exploratory conversation and issues based analysis …' (Duffy et al. 1998, p.20) exploits these online capacities and provides another theoretical framework for explaining how learning occurs.

> Asynchronous discussion environments … afford us enormous pedagogical opportunities … they afford students the time for thoughtful analysis, reflection and composition as their discussion of issues evolves. (Duffy, Dueber & Hawley 1998, pp.22–3)

The Duffy, Dueber and Hawley study includes examples from United States-based programs and describes the mechanics of messages and postings in a problem-based learning context. This study was conducted in the higher education sector and is limited by the assumption that there are high levels of intrinsic student motivation that are not always present in other sectors of education and training (Choy & Delahaye 2001).

The interactive, collaborative and discursive capabilities of online teaching and learning fit well into the set of strategies now considered good teaching practice (Lau 2000; Brown 1998). Constructivist views of learning and knowledge creation help to explain how this happens.

The interactions between students and materials and colleagues and teachers and facilitators can be both 'formal-guided' and 'informal-exploratory'. This process is frequently a collaborative activity. Bull et al. (1999) describe four stages of facilitated learning in a constructivist environment:

- ✧ Students are exposed to new material that is linked to their existing knowledge.
- ✧ Coaching is provided to assist students in assimilating and accommodating new knowledge.
- ✧ Students' understandings are refined through testing the validity of the new material.
- ✧ Students are given multiple opportunities to practise and apply new material.

The potential freedom of the new technologies is well suited to constructivist strategies. However, the more interactive, navigationally focussed and communication-hungry technologies also require thoughtful implementation, scaffolded support for students, and teachers and trainers who are both confident and comfortable with this new way of working (Holzl & Khurana 2000). There is nothing magical in the medium that guarantees the creation of an effective constructivist environment. In fact, quite the reverse may be true.

The literature reports that students often confront extensive blockages to their acquisition of knowledge and skills online (Harper et al. 2000; Brennan, McFadden & Law 2001). Technological difficulties, lack of motivation, high levels of potential misunderstanding (Kerka 1996) and uncertainty about personal technical competence militate against effective learning in a constructivist environment. Students also seem to be reluctant to expose personal ideas and to develop concepts online (Lau 2000) and interchanges, when they do occur, are often brief, truncated and non-developmental (Duffy et al. 1998). Low retention rates in a number of online courses are suggested as an indicator of the lack of quality and disengagement of students from this medium and the possible failure of constructivist pedagogical practice.

Other authors maintain that online learning can be constructivist if the materials are carefully designed and presented online. The extent of learner control over the process of searching is seen as a measure of the constructivism potentially implicit in the new technologies (Brown 1998). Prerequisites for student success include engagement with the medium and a relatively high level of intrinsic motivation and persistence (Beach 2000; Kingham 2000; Kerka, 1996).

Summary

The literature focusses on the potential of the new technologies to create new pathways for the development of student knowledge and skills. Furthermore, these technologies have the capacity to facilitate constructivist learning. However, there are a number of factors militating against this

medium that need to be acknowledged, and addressed by the design of course materials and teaching strategies that encourage interaction, conversation and student confidence.

What constitutes a robust body of knowledge about online pedagogy?

This section of the review concentrates on literature which attempts:

- ✧ to develop principles of sound online pedagogy
- ✧ to define the relationship between existing theories of learning and online pedagogy
- ✧ to examine the transferability of face-to-face pedagogy to an online environment
- ✧ to identify the current barriers to the development of a robust online pedagogy.

As Harper et al. (2000) note: 'There is currently no accepted wisdom on how to implement online learning, either in Australia or internationally' (p.46).

Face-to-face instruction has a rich pedagogical literature. Currently, it focusses on contextual learning, student-centred learning, problem-based learning and individual participation in the process of constructing new knowledge (Brown 1998). The complex relationships between teacher practice, student background and experience, material content and delivery styles are the topics of discussions on face-to-face pedagogy. It would seem reasonable that a robust body of knowledge about online pedagogy should also include an integrated appreciation of how and why practice leads to student learning.

In the literature of online delivery, the pedagogical practices include long lists of teacher skills and possible student learning experiences (Dewald 1999). These lists provide some guidance about what teaching practices are possible but there is no coherent picture of how teachers mix and match the strategies and on what basis they make these professional judgements.

Kerka (1999) stresses the importance of meticulous design of online materials while Booker (2000) provides a list of questions to ask about the teacher–student relationship and identifies the essential features of instructional and interface design. The Indiana University evaluation of online delivery of courses (Graham et al. 2000) outlined the principles of good practice. Duchastel (1996 cited in Schrum 1998) proposes a continuum of practice which takes the student along the path from being a recipient of transmitted information to interaction with the materials in a way where students are more in control of their own learning.

The use of technology is expected to result in an improvement in student outcomes, as well as, on the part of learners, increased independence, engagement, motivation, research skills and improved results on standard pieces of assessment. It is doubtful and unproved that these outcomes have been achieved. The pedagogy that will lead to the achievement of these outcomes is even less clear as there is no integration of the various dimensions of pedagogy into a coherent whole, a theme that is reiterated by policy-makers and online managers and practitioners.

Learning theories and pedagogy

In order to understand and legitimise the pedagogy of online delivery, a number of authors have linked the different aspects of the technology to different learning theories. Dewald (1999) compares the relative roles of the teacher and student in two online training systems located at different ends of the learning continuum, the instructional systems design model (ISD) and the hypermedia design model (HDM), in an attempt to isolate the pedagogical differences between these two systems. The first model is based on the systematic and sometimes tedious guidance of the learner through tasks and accompanying assessments, while the latter model assumes a huge component of learner independence, confidence and motivation.

Powers (1999) focussed on the delivery of online information technology subjects and how the method of delivery is explicitly linked to sound pedagogical principles. In this study, instructional strategies are discussed as being equivalent to pedagogy and the strategies for course delivery included creating a 'class cybersociety' (p.226) and using self-guided online labs and online student portfolios (Powers 1999).

The model of teaching and learning online proposed by Salmon (2000) attempts to map the progress of student and teaching interaction as they move through stages of e-learning, being supported on both a technical and educational level. The result is a linear model of developing comfort and efficacy with the medium. There is also an attempt to relate pedagogy to the stage of technical ability and independence of the learner.

O'Connor (2000) details the stages of effective learner engagement and teacher responsibility in an online environment. These stages, listed below, represent a continuum of development and imply a set of accompanying pedagogical practices:

- ✧ access and motivation
- ✧ online socialisation
- ✧ information exchange
- ✧ knowledge construction
- ✧ development.

In general, the literature establishes a number of prerequisites that will lead to the development of a rigorous online pedagogy. These include:

- ✧ a thorough understanding of the mechanics of the medium
- ✧ a methodology to enable transfer of teachers' and trainer knowledge to the new medium
- ✧ the skills to navigate, reflect, evaluate and then change practice
- ✧ a sense of 'pedagogical integration' (Firdyiwek 1999, p.29)
- ✧ the ability of those working in the creation and the use of the new tools to affect this integration.

A 1997 study completed on behalf of the Australian National Training Authority, *From desk to disk* (ANTA 1997), aligns teacher practice with the particular proportion of online and other forms of delivery in individual courses. These mixtures were defined under four broad categories labelled as 'options' and general pedagogical features were assigned to each.

In option 1, where training is delivered completely online, procedures and teacher practice is generic and limited. Option 2 looks at a learning centre that has a mixture of online and face-to-face delivery where teachers and information technology staff 'act as tutors in the centre and assist with both content and technical questions. Option 3 is about online as a 'supplement' to print-based forms of delivery' (p.46), where access to staff and currency of resources are the advantage. The final option, option 4, is online delivery as a supplement to full classroom activity with customised materials and quick communication. Teaching practice is flexible and pedagogical features reflect responsiveness to student needs (ANTA 1997). Each of these options imposes new relationships on teachers and students.

A number of major online studies commissioned by NCVER recognise the importance and the changing role of the teacher in these different contexts. It is no longer acceptable to assume that the skills developed in face-to-face teaching can be instantly transferred to the online environment with either ease or good results. The practice of teaching has to be reconceptualised.

Oliver, Omari and Herrington (1997) cited in Harper et al. (2000) have recommended that online pedagogical practices and the reconceptualisation of the role of the teacher should be based on strategies such as:

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

(Oliver, Omari & Hetherington 1997 cited in Harper et al. 2000, p.19)

Transferability

> There is an acceptance of the notion that traditional face-to-face instructional strategies and resources need to be reconceptualised for online learning. (Harper et al. 2000, p.46)

Although, as noted above, a number of commentators argue that traditional teaching methodologies and materials require reconceptualisation to accommodate the new technologies, some authors maintain that characteristics which constitute sound pedagogy when used face to face are applicable and transferable to the new technological media (O'Connor 2000). Curriculum planning, goals and outcomes, resources, facilitation and assessment remain the same in an online environment as they do in an offline one and, argues O'Connor, we live in a world of changing pedagogical emphases where teachers and trainers are now much more student-centred, where co-operation is fostered over competition and where learning is far more self-paced and self-selected (O'Connor 2000).

While these characteristics remain the same, it is clear that there is a need for new models of teaching, a theme reiterated in the literature surveyed by Brown (1998). Online teaching and learning has focussed our attention on current learning theories, and recognition of the need to evaluate all aspects of our practice has been the result.

> To exploit e-learning for teaching we must understand its potential, which is different from that of any other teaching medium and we must be trained to understand e-learning, and to add real value for the online participants. (Salmon 2000)

However, there is little developmental investigation or discussion of how these skills are developed or how they constitute a robust body of knowledge about online delivery.

Barriers to a robust body of pedagogical knowledge

Some authors maintain that the lack of a robust pedagogy is due to the distance created between those who construct and design and those who implement and teach (Firdyiwek 1999; Brennan, McFadden & Law 2001). In the absence of input in the creation stage, the implementers often fall into the trap of being technological operators whose job is de-skilled, the job itself focussing on decoding the technology for use by students. In such circumstances, the robustness of the pedagogy is, of course, quite questionable. Those with the experience have lost their way.

The speed of technological change and the inability of those struggling with new features to systematically evaluate and reflect on their practice in the new environments militates against the building of a concerted body of knowledge (Brennan et al. 2001).

Several authors have identified a number of constraining factors which prevent the definition of a robust online pedagogy (Firdyiwek 1999). The lack of contact between designers and educators and trainers creates camps of online workers who do not communicate openly or often.

> The tools and features (the designers) provide need to be more carefully selected and better integrated so as not to end up confusing and alienating users, or worse, implicitly encouraging pedagogically suspect practices. (Firdyiwek 1999, p.34)

Pedagogy results from exploration, evaluation, reflection and a modification of practice on the basis of these results. To date there was been little opportunity for exploration and documentation of this cycle in an any integrated or coherent manner. The lack of reported evaluations (Harper et al. 2000) exemplifies this gap.

Barriers to change are summarised by Simoff and Maher cited in Harper et al. (2000).

> Experience from implementation of online courses suggested that traditional face-to-face strategies need to be reconceptualised to take advantage of the unique opportunities offered by the emerging online technologies. (Simoff & Maher 1997 cited in Harper et al. 2000, p.18)

The studies carried out by the University of Illinois (1999) and the University of Indiana (Graham et al. 2000) are exceptions and are specifically related to the tertiary sector.

Summary

Face-to-face instruction displays no shortage of pedagogical analysis. However, the analysis of online delivery seems to have jettisoned the lessons from this research in favour of lists of skills and student attributes. In an attempt to acknowledge the uniqueness of the new learning environments and accommodate the pace of change, the tried-and-true teaching and learning precepts are relegated to an inferior status. Reconceptualisation of pedagogical roles has discredited the possibility of transferability of teaching skills to new contexts. There is a palpable lack of coherence in discussions about online pedagogy, with studies focussing on the individual elements of the learning equation rather than on attempting to bring together teachers, students and course materials as a starting point for discussions about pedagogy.

How does world's best practice inform the discussion of the pedagogy of online delivery of VET in Australia?

The elements of world's best practice in online delivery can be identified from a number of major studies. The Indiana University study (Graham et al. 2000) reports on the evaluations of four online courses and lists the features of 'best practice' emerging from this detailed study, as follows:

- ✧ prompt feedback on both contributions and new information
- ✧ time on task
- ✧ high expectations
- ✧ respect for diversity.

This study also reports on a variety of strategies for achieving these features of best practice.

From desk to disk: Staff development for VET staff in flexible delivery (ANTA 1997) is a broad survey of current practice in online delivery and defines 'best practice' as:

> … those attributes and practices that will lead to effective learning outcomes using online technology. (ANTA 1997, p.44)

The seven key principles of best practice distilled from this research are:

- ✧ developing a network of support (pp.45–6)
- ✧ ensuring a variety of learning styles and preferences (pp.46–7)
- ✧ designing interactive learning materials (pp.47–8)
- ✧ ensuring educationally driven projects (p.48)

- ✧ providing organisational and financial support (p.48)
- ✧ ensuring adequate security (p.49)
- ✧ using a planning tool (p.49).

Service and interaction are also identified as crucial elements of best practice, as is peer support and supervisory and tutorial support (ANTA 1997). The roles, tasks and skills required by all those involved in online delivery are clearly spelled out in the Booker (2000) publication.

Jasinski (1998) gives examples of online delivery methods suited to different environments, with a focus on the differences between learners and their contexts. These two studies contain a mixture of practical advice and theoretical discussion to underpin the choice of strategies and software. Both emphasise the importance of matching the medium to the students, and the institutional and administrative constraints that teachers will need to confront and solve if 'best practice' is to be achieved. These themes are also reflected in the findings of the University of Indiana (Graham et al. 2000) and University of Illinois (1999) studies.

However, practice is not pedagogy, and pedagogically sound principles again have to be inferred. A recent study tour of the United States by the author to study online delivery at a number of selected sites, including the University of Illinois, showed that best practice is characterised by both a mixture of contact modes and a strong emphasis on the importance of establishing community spirit, either technologically or preferably face-to-face, to ensure common levels of technological competence.

This principle is emphasised in the Harper et al. study:

> The preparation of students for the demands of the online environment, so that they are able to adapt readily to the new environment and to capitalise on its advantages, was also a major issue for students. In addition to providing technical training and support, some institutions are attempting to raise awareness and address expectations of prospective and beginning online students. (Harper et al. 2000, p.26)

Summary

Discussions of 'best practice' in the pedagogy of online delivery reflect the development of a more generic set of features which contribute to effective teaching and learning. The preparation of students and teachers to work online (induction) and the deliberate creation of a learning community are two crucial factors which, if present, help to guarantee success. However, the absence of a theoretical framework within which the 'themes' can be located, weighted and evaluated is a stark reminder of the limitations of even well-researched lists.

What factors are driving pedagogical change in the online delivery of VET?

This section examines the factors driving pedagogical change and includes cost-effectiveness, teacher/trainer confidence, student reactions, collaboration, policy initiatives, commerce and education.

Cost-effectiveness

Issues concerning cost-effectiveness of online delivery of VET are currently being debated and are creating an atmosphere of examination and reflection. Some researchers believe that the imperative for reducing costs of delivery of education and training is the primary driver of online learning expansion (McArthur & Lewis 2001). Limited models for determining cost-effectiveness that focus on materials design and the capacity to deliver education and training to mass audiences are clearly inadequate. The more expansive models for determining cost-effectiveness that include considerations of the quality of the materials and the student experience are controversial and contested. However, there is no one method for assessing the cost-effectiveness of online learning,

and in this state of flux the need to examine pedagogy is emerging as one dimension of the discussion (Marquardt & Kearsley 1999; Ryan 1998; Betz 2000; Carlson et al. 1998).

Large amounts of money and time have been spent on establishing online delivery systems and providing the professional development necessary to support it. This is largely attributable to a belief by the policy-makers of the benefits of online delivery (Marquardt & Kearsley 1999). Questions about cost-effectiveness have moved beyond the early debates about number of hits assessed against cost of setting up the system, and the effectiveness of student learning outcomes are beginning to be factored into the discussion (Betz 2000).

The early attempts at assessing cost-effectiveness focussed on transmission of information, with the issue of access assuming primary importance. Moving beyond access issues to a closer look at student learning outcomes has led to a focus on pedagogical practice as it exists in an online delivery mode. This discussion remains in its infancy, but has developed significantly in recent Australian work; see for example, Curtain (2002).

Teacher/trainer confidence

Online teachers and trainers have a pedagogical background that, in most cases, began with face-to-face contact with students. They have brought with them skills from another medium and their level of satisfaction in working online has not always been as high as it might be (Brennan et al. 2001). Questions about what is transferable from face-to-face contact to an online environment have to be asked and answered. This has been overlaid by a natural reluctance on the part of teachers and trainers to progress too far with a new technology and one with which they are not necessarily confident (Lau 2000). The more experienced face-to-face teacher may also be a novice online teacher and the skills of the experienced teacher are not necessarily useful or adaptable.

Student reactions

Student evaluations, the results of research into student satisfaction levels, literature relating to the lack of improved student outcomes online and the high attrition rates in online courses all provide a strong stimulus to further work in the area of online pedagogy. The tendency to think that delivery online is intrinsically effective is being replaced by a deep interest in how teaching and learning can be made more satisfying and achievable.

Collaboration

Major national initiatives such as Learnscope and the funding of collaborative research between industry, VET practitioners and the tertiary sector are producing new partnerships where the lines between theory and practice are being bridged.

Policy initiatives

The huge investment of public money involved in building the infrastructure as well as providing training staff to take advantage of online facilities are significant factors contributing to the growing interest in online pedagogy. The need for public accountability represents another. Two major Australian policy initiatives are the Commonwealth Government's *Strategic framework for the information society* (1998) and ANTA's *Australia's national strategy for vocational education and training 1998–2003: A bridge to the future*.

Commerce and education

In a globalised economy, the providers of education and training have proliferated. The availability of online courses has meant that education and training is accessible in new ways to a growing audience of people. Industry and enterprise have begun to take advantage of this flexibility (Sargant 2000). Since online delivery of training requires a substantial investment of funds, the relative 'profitability' of online delivery poses a significant question in the open market. In a highly

competitive educational environment, traditional providers of education and training are extending their spheres of influence by offering online delivery and support (Ryan 1998). The lines between commercial and educational activities become contested in this context, and after the first wave of technological euphoria has evaporated, institutions are beginning to evaluate and focus more on the pedagogical implications of delivery.

Summary

The factors driving pedagogical change include cost-effectiveness, teacher/trainer confidence, student reactions, collaboration, policy initiatives, and the relationship between economics and education. The 'second wave' of technology has encouraged a stronger focus on the pedagogy of online delivery of VET in Australia, as teachers and researchers move beyond the use of the 'equipment' to an evaluation of what we are doing and why.

Conclusion

The literature review indicated that a variety of methodologies have been used by researchers to collect insights into online pedagogy. Online teaching practice has been examined from a variety of standpoints, including concepts of effectiveness, learning theory, students' learning styles and preferences, instructional strategies, the construction of knowledge and skills online, aspects of a robust online pedagogy, world's best practice and factors driving pedagogical change. The literature generated a large number of factual premises. Thus the reports and conclusions about the 'nature, performance and impact' of online pedagogy that can be legitimately synthesised by the researcher for further evaluation.

The principles of meta-evaluation have been used to distil the themes and threads from the literature for this further analysis.

> Meta-evaluation is … tied to a critical perspective in which no single evaluation or evaluation report should be considered definitive. The most technically competent evaluation in terms of methodology may still be flawed when broader issues of interpretations or policy implications are discussed. The goal of meta-evaluation is to obtain a broader range of views by soliciting heterogeneous perspectives on a study or a group of studies. The synthesis of these various perspectives is intended to raise the reader's consciousness about all issues relevant to the program being evaluated. (Straw & Cook 1990, p.58)

The meta-evaluation of the literature has been used to inform the framework of indicators of pedagogical effectiveness which have been tested and refined through the process of interviews with practitioners, policy-makers, course designers, evaluators and managers of online learning initiatives. The development of the framework is described in the following chapter, while details of the interviews are given in appendix 1.

A framework for online pedagogy

Introduction—exemplars from the literature

A discussion of the online pedagogy of VET delivery is more than problematic. The technological environment can change overnight, definitions expand and contract, delivery methods alter their focus, the student clientele changes its expectations and behaviours, and the relationship between teachers, learners, content and context are worlds away from the common understanding of what constitutes teaching and learning.

The literature reviewed for this study is clearly limited by its concentration on the surface features of pedagogy. There have been few attempts in the literature to impose any kind of organising framework on the aspects of pedagogy discussed, or to integrate the features of pedagogy into a broader picture of what happens online. This integration is crucial to our analysis of current online practices and our recommendations for change. For this reason, the work of Bernstein (1996) and an Australian study by Ailwood et al. (2000) is relevant here.

Bernstein (1996) considers pedagogy in terms of 'framing'—who controls what? He has analysed and described pedagogic practice by imposing a set of categories on the teaching and learning environment and by analysing the interactions that take place between teacher and student in this environment. The framework for analysing pedagogy provides a way of tying together the information and research results described in the literature review.

The process of framing (Bernstein 1996) involves an analysis of the following dimensions of pedagogy:

- the selection of communication
- its sequencing (what comes first and what comes second)
- its pacing (the rate of expected acquisition)
- the criteria
- the control over the social base which makes this transmission possible

(Bernstein 1996, p.27)

An examination of these issues provides information about the relative roles of the teacher, learner and the context for learning and makes judgements about pedagogy as a consequence. The answers therefore help to resolve the research questions at the heart of this project.

In this study, the pedagogy of the online environment in VET can be 'framed' in the following way.

Selection of communication

The online environment offers forms of communication that include email, web-based forums, bulletin boards, chat, print-based expositions, video-streaming, sound, cartoons, quizzes and embedded links to the world wide web.

The selection of the forms of communication used is circumscribed by factors, such as the practice of materials design, teacher availability, the technological capacity of both teacher and/or learner,

budgeting considerations, teacher acumen and comfort, the extent of course accreditation, and the characteristics of the learners.

Sequencing

The sequencing of teacher–learner activities varies remarkably in the online environment. Some materials are sequenced in a lock-step process and complemented by assessment hurdles at regular intervals. Other materials are constructivist in intent, while others encourage flexible movement paced by the learner him/herself. The level of complexity of the materials being delivered, the technological competence of the teacher and learner, and the accreditation or otherwise of the particular online course also influences the sequencing of the materials and activities.

Pacing

The rate of anticipated acquisition of knowledge and skills varies in tandem with the sequencing. Some online courses are paced according to a linear sequential view of knowledge acquisition, while others are predicated on the learner's capacity to acquire new knowledge in a problem-based, free-ranging and information-rich environment. The flexibility provided by online learning implies that the pacing can also be controlled or determined by the learner.

The particular technological tools chosen for delivery influence 'pacing', with the focus moving from print-based delivery at one end of the continuum, to a focus on interactivity at the other.

Criteria

The criteria used in the construction of online teaching/learning are a hybrid of intersecting pressures. Policy initiatives, competitiveness, the interaction or otherwise of teachers, designers and curriculum experts, all influence the selection of the criteria on which the courses and teacher/learner experiences are based. These are often very different criteria from those used to construct face-to-face teaching/learning experiences and the hard-copy materials used in flexible delivery.

Control

The 'control over the social base which makes this transmission possible' (Bernstein 1996, p.27) represents the pressure of government initiatives and large buckets of funding at one end of the continuum, to the individual's ability to flick a switch at the other.

Constructing the framework

The previous analysis has shown that the relative roles of the teacher, the learner, and the context, ebb and flow in response to myriad gravitational pulls. In this 'disintermediated' environment, the roles appear fractured when compared with more traditional forms of VET delivery. The resulting pedagogies are disparate and by definition developmental. Online pedagogy is multi-dimensional.

Ailwood et al. (2000, p.2) have built on the Bernstein framework and their extensive Australian study supports a 'multi dimensional model of classroom practices', where the complexities of student and teacher populations interacting with content have been mapped and conceptualised into a framework which richly describes and accommodates these complexities. This has led to the development of the concept of 'productive pedagogies'.

> [Productive pedagogies] provide a framework and a language by which educators can describe and discuss classroom practices. It is not an exhaustive list of pedagogical practice but a discussion starter and a window into the usually private space of teachers' work.
>
> (Ailwood et al. 2000, pp.19–20)

The four dimensions of 'productive pedagogies' are: 'intellectual quality, relevance, supportive classroom environment and recognition of difference' (Ailwood et al. 2000).

The first of these establishes the principle 'that a focus on high quality is necessary for all students to perform academically' (Ailwood et al. 2000, p.11). Relevance refers to the way in which the knowledge that is presented is integrated or related to another body of knowledge or experience. The ideal of a supportive classroom environment is based on extensive research and introduces the concept 'that students require a supportive classroom environment if they are to achieve what teachers ask of them' (Ailwood et al. 2000, p.13). The fourth dimension of the productive pedagogies paradigm is concerned with the recognition of difference and how this difference is acknowledged through language, narrative and text type.

Each of the dimensions of effective pedagogy generates a set of questions that can be used to interrogate available data and current practice. These questions appear in appendix 6.

Although this framework was developed specifically for schools, it is equally applicable to an analysis of pedagogical practices online and has the capacity to provide a clear picture of what is happening currently and to offer directions for future change.

An initial framework

The literature review, particularly the pedagogical frameworks identified from the literature, and the interviews, generated a long list of attributes of online pedagogy which work effectively in specific circumstances using different technologies and engaging a range of learners. They also reflected a growing sophistication in thinking about the ways in which the individual elements of pedagogy contribute to effective online learning. The meta-evaluation of the literature and the interviews have extended this thinking and have provided a set of themes across a range of studies.

The defining criteria that have been used to generate these themes are:

- ✧ the frequency of their occurrence within the literature
- ✧ the extent to which the existing research has approached the topic in a holistic way leading to generalisations
- ✧ the level of synthesis provided by the interviews
- ✧ the extent to which they fit within the concepts of 'framing' and the elements of 'productive pedagogies' (Bernstein 1996; Ailwood et al. 2000).

The following is the initial list of online pedagogical effectiveness indicators. They are grouped thematically to provide an initial framework for discussion and comment. Pedagogical effectiveness in an online environment is indicated by:

- ✧ a learner-centred environment
- ✧ constructivist approaches to teaching and learning (approaches enabling learners to build new knowledge and skills based on those they already have)
- ✧ high-quality materials design
- ✧ teaching and learning strategies that develop cognitive skills
- ✧ high levels of interactivity between all participants
- ✧ guaranteed and reliable forms of access to the technology
- ✧ quick and easy access to the technology and the particular site of online learning
- ✧ engagement with the online materials
- ✧ learning experiences that encourage synthesis and analysis

- ✧ opportunities for 'deep learning'
- ✧ consistent levels of feedback
- ✧ thoughtful matches between materials, learning styles and learning contexts
- ✧ a model of delivery which includes thorough planning, monitoring, reviewing and evaluating of course materials and student progress
- ✧ a range of available navigational choices for students
- ✧ teachers who are imaginative, flexible, technologically gymnastic, committed, responsive and expert communicators
- ✧ a different treatment of content at various levels of sophistication, depending on the prior knowledge of the learner
- ✧ appropriate feedback and opportunities for review and self-testing
- ✧ shortcuts for those who are short of time or who are already competent.

The literature reviewed and interviews conducted indicate that there are no absolutes in getting the 'right mix' of these indicators to guarantee effective learning. The realities of online teaching and learning acknowledge that there is a continuum along which teachers and students are located at any one time, and it is the complex interaction of these which defines the current pedagogy.

The initial framework described below collects these indicators, groups them into themes and provides a way of mapping current practice. The framework has been informed to some extent by the theoretical principles of effective pedagogy suggested by Bernstein (1996) and Ailwood et al. (2000).

The initial framework was circulated to the members of the reference group, the people who have been interviewed for the study, a wider audience of critical friends and was the subject of a symposium presented at the NCVER No Frills Conference (2000). The feedback was used to modify the framework.

Explaining the framework

The realities of online teaching and learning acknowledge that there are a number of continua along which teachers and learners are located at any one time, and it is the complex interaction of these that define effective pedagogy. Figure 2 sets out these continua diagramatically.

Levels of guidance

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

Experience of learning

Axis 2 plots levels of self-management and the levels of guidance that students require. It extends from those 'novice' learners who require extensive guidance and support to those 'expert' learners who have high degrees of readiness, autonomy, motivation and other skills that equip them for self-

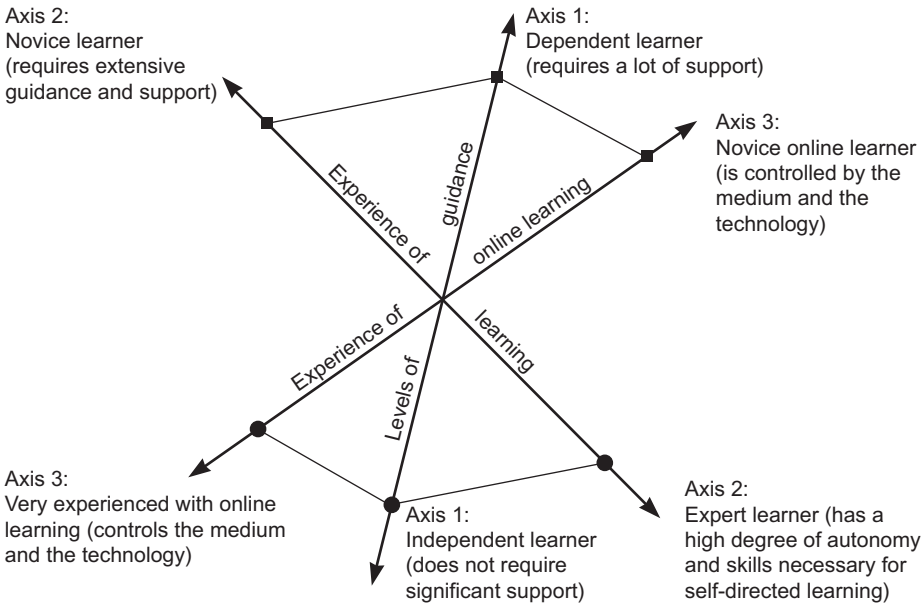
directed learning. It takes into account the relative levels of critical literacy, procedural knowledge, meta-cognitive awareness and the learner's understanding of their own ways of learning.

Supervision of online learning

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

In an ideal world the axes intersect and there is a concurrence between teacher and student skills, knowledge, experience and control. The online world is less than ideal, and the literature, experts, policy-makers, managers, teachers and students define pedagogies for sets of learners, teachers and circumstances at various points along the three axes through a process of explicit linking. It is true that, in all teaching and learning situations, there are distances between teachers and learners. However, in an online environment these distances are stretched, and the range of abilities, predispositions, styles and preferences displayed by both teachers and learners and overlaid by course design, mean that the matches between content, delivery style and learning effectiveness are more divergent than convergent. The diagram is a picture of the best and the worst of online pedagogy as it is currently constructed and a map for the development of more effective teaching and learning.

Figure 2: Some dimensions of online pedagogy



Overview of findings

This study has confirmed some of the existing evidence about the pedagogy of the online delivery of VET. It has also provided new evidence about online pedagogy by bringing together a variety of snapshots from the perspectives of teachers, students and course materials. The new evidence has settled some questions and posed many more.

The views of a number of experts are summarised below and in appendix 1. Findings from the workshops are presented in appendix 2 and both these sources of information have been used to inform the pedagogical effectiveness indicators presented in the previous chapter. In addition, survey information has been gathered from both teachers (appendix 3) and students (appendix 4). Appendix 5 reports on the analysis of a range of real courses. This analysis has covered the technologies used to deliver content, the self-management skills learners needed to persist in the course, the assumptions made about the learners and the levels of interactivity available. The courses were also rated in relation to the pedagogical effectiveness indicators which the project has established and validated. Finally (in appendix 6) the pedagogy of online learning has been evaluated using Ailwood et al.'s productive pedagogies framework (Ailwood et al. 2000).

Views from the literature and the experts

The literature review for the study demonstrated that the subject of online pedagogy is complex and multifaceted. For this reason it is important to capture the voices of those working in and using the online environment in a number of capacities.

The range of experts interviewed explored the range of pedagogical assumptions underlying online delivery, noting that these were made about:

- the nature of learners and the learning process, and their control over it
- the 'art' of teaching and the extent to which competent traditional teachers could transfer and use their skills in the online environment
- whether or not teachers were needed at all
- access issues for learners
- the balance between, and relative importance of informal and formal learning
- whether comprehensive new online learning approaches were sustainable after introduction.

The literature review, the expert opinion (appendix 1) and the workshops (appendix 2) all helped to produce the pedagogical effectiveness indicators presented in the previous chapter of this report. This research project has demonstrated that there are a number of indicators of pedagogical effectiveness that are clearly expressed by all stakeholders involved in the online delivery of VET.

Nevertheless, the research has also shown that pedagogical practice rarely conforms to these principles. The experts interviewed agreed that current practice is underpinned by a range of assumptions that, however valid, are not matched by teacher capacity, student ability, course design and content. The dominating influence of the technology has created assumptions about the nature

of learning, the role of the teacher and the student characteristics, and these are poorly matched with teacher and learner expectations. This becomes particularly clear when the data from appendices 2 to 5 are examined.

The participants in the workshops (see appendix 2) were both experienced and highly contributory. The discussions of the research questions typically covered a wide set of topics directly and indirectly related to the online pedagogy of VET delivery.

Views from practitioners and students

All the participants in the workshops (appendix 2) recognised the potential for online delivery of VET to make a difference to the flexibility and effectiveness of student learning. They considered that the pedagogical assumptions which underpin effective online delivery included factors relating to levels of teacher and student independence, enthusiasm and a commitment to inclusivity. However, they identified that current pedagogy is constrained by pressures from 'outside', such as the rapid pace of change, external design of materials and limited opportunities for teacher reflection. The participants agreed that some content areas are more suited to online delivery than others, and that student and teacher familiarity with the technology was a critical determinant of effectiveness.

The teaching and learning areas that are most suited to online learning in VET were influenced by factors such as student and teacher expectations, levels of content complexity and the flexibility of entry arrangements into courses.

Participants in the workshops agreed that the teaching and learning styles which facilitate online learning focus on independent learning, problem-based learning, and constructivist learning. The characteristics of effective online teachers and learners include flexibility, high levels of intrinsic motivation, persistence and technological and literacy skills.

The interactions at the individual learner level that promote effective learning in online VET include collaborative activities, sustained contact, the development of relationships and high levels of course content organisation.

Participants in the workshops agreed that online pedagogy has entailed new skills and roles for teachers and learners. It is not simply a matter of transferring face-to-face practice into a new environment. In particular, the issues of teacher accountability, the reconceptualisation of assessment and new levels of technological and communication skills were considered critical. Participants were less sure about what constituted world's best practice online, and commented on the need to adopt a hybrid approach to delivery which is holistic and supported by constantly updated resources.

The workshops confirmed that online pedagogy is a difficult topic to address and that the day-to-day practices of teachers are disparate and not altogether satisfying. Participants identified the pedagogical potential of online delivery, supported its development and clearly recognised areas for change and improvement.

The workshops confirmed the validity of the pedagogical effectiveness indicators. Participants modified the language and emphasis, leaving the intent unchanged. They also reinforced the usefulness of applying a research-based theoretical framework to the complexities of online pedagogy. The range and depth of discussion about the factors influencing online delivery, the effects on teachers and learners, and the multiple perspectives on the different dimensions of online pedagogy underpin the application of the productive pedagogies framework to the project data.

The teachers' survey (see appendix 3) gathered information about teacher and course characteristics, the teaching behaviours they used, information about their roles, skills and the necessary changes to

their teaching approaches. This information was complemented by information collected from students (see appendix 4), including their experience of online learning, their perceived skill needs to be a competent online learner. The analysis of both the teacher and student questionnaire results can be summarised as follows.

- ✧ Students and teachers agreed that web-based course content and email were used most often to facilitate learning.
- ✧ Students felt that the features of effective pedagogy are 'sometimes' characteristic of their learning. Teachers felt much more strongly that these features characterised their online teaching behaviour, although the strategies they used did not always support this commitment.
- ✧ Students and teachers disagreed about the extent to which building online relationships was part of their experience. Teachers maintained that the behaviours which they used online did this far more effectively than students reported.
- ✧ Teachers reported that they could cater for students' learning preferences and styles 'sometimes/ usually'. The student responses confirmed this report.
- ✧ The student and teacher free responses to questions about the match between online learning and student learning styles and preferences indicated that teachers clearly appreciated the range of opinions that students held about the suitability of the medium for effective learning.
- ✧ Teachers and students agreed that online teaching is 'fairly suitable' to the specific subject area. The teacher and student issues raised to support the ranking showed a remarkable equivalence. Both groups surveyed recognised that, where content and delivery method were complementary, as with information technology, suitability increased. In the case of complex concepts or discussion-based and values-oriented content, face-to-face communication and interaction does not transfer well to an online environment.
- ✧ Teachers and students agreed that online delivery had led to the acquisition of new skills. The teacher skills were more strongly clustered around using the technology than was the case with the students. Both survey groups recognised the importance of developing personal/affective skills to cope with the sometimes frustrating idiosyncrasies of the technology.
- ✧ Students' descriptions of their new roles were both positive and negative. Teachers' responses were more focussed on the possibilities for facilitating, motivating, mentoring and guiding students' learning. However 'inexperienced' or 'average' teachers were decidedly less enthusiastic and expressed feelings of frustration at their apparently deprofessionalised status.
- ✧ Both teachers and students agreed that a mixture of online and face-to-face teaching was the ideal as it allowed for both flexibility and communication.

From the review of the online courses (appendix 5), it is clear that text-based delivery dominated and that this type of delivery made significant assumptions about the nature of the students enrolled in them. In relation to the pedagogical effectiveness indicators, they were strongest in the following key features:

- ✧ The course encourages an engagement with the online materials.
- ✧ The course is characterised by high-quality materials design.
- ✧ The course offers shortcuts for those who are time-poor or already competent.
- ✧ The course creates a learner-centred environment.

They appeared weakest in relation to:

- ✧ The learning experiences embedded in the course encourage synthesis and analysis.
- ✧ The course creates opportunities for 'deep learning'.
- ✧ The course uses constructivist approaches to teaching and learning.
- ✧ The course encourages high levels of interactivity among participants.

The qualitative data analysis based on the productive pedagogies framework (appendix 6) suggests that if online pedagogy is to become more 'productive' and effective for VET students, all the dimensions of pedagogy need to be addressed in the design and delivery of online materials. In particular:

- ✧ The cultural dimensions of learning require attention.
- ✧ The capacity of the online environment to cater for and build on cultural difference in an inclusive way needs to be embedded into delivery.
- ✧ The online environment must develop pedagogies that value difference and that begin with valuing the student knowledge base.
- ✧ The transference of strategies to include students with disabilities in online learning is an issue that requires will and talent.
- ✧ The critical skills of information and functional literacy need to be accepted as integral parts of online pedagogy.
- ✧ The social dimensions of learning and the encouragement of democratic learning practices require detailed attention in this environment.

Discussion

The findings of the study generated a number of issues for consideration and discussion, all of which impact on current online delivery as well as having implications for future policy development and practice in this area. As before, the focus for the discussion of the issues is informed by the research questions.

Pedagogical assumptions underlying online delivery of training

The data for this project were collected in different forms from across Australia. The quantitative data came from teachers and students in four states and one territory located in a mixture of rural, remote and urban contexts. The qualitative data came predominantly from two states and one territory, although the interviews were conducted Australia-wide, and the courses analysed were being delivered nationally and internationally.

The individual focus implicit in a great deal of online pedagogy, while ostensibly conforming to learner-centred practices, may not do so and in fact, may represent a backwards step. Learning is a social activity as well as a cognitive one, and unless this 'sociability' is guaranteed by online materials, only the most motivated students will persist.

Pedagogical principles remain but practice is quite different. It is not simply a matter of transferring skills across. The discourse of the online experience is quite different for both teachers and learners. New genres, protocols for language and expression, new scanning strategies, attention spans and reading skills are required, particularly for learners who may be very used to the dynamics of face-to-face delivery.

There is a high degree of disharmony in the pedagogical assumptions made by the various participants in the online delivery of VET. The dominating influence of the technology has created assumptions about the nature of learning, the role of the teacher and the student characteristics which are poorly matched with teacher and learner expectations. Teachers are holding firmly to the sound principles of pedagogy and students are reiterating the importance of these. Communication, interactivity and the development of social cohesion are regarded as laudable goals in an environment which frequently militates against their achievement. Teachers are not only struggling with the technology, but also with an often unfriendly teaching context where the principles of sound pedagogy conflict with course design and the realities of an isolation created between teacher and learner. It is a credit to teacher professionalism and dogged persistence that online delivery works as well as it does.

The pedagogical assumptions made about the learner in an online environment are currently based on the transmission of information. Teachers and informants recognise that effective online practice has to move beyond this model. If this movement is encouraged and if the resources are available to create more interactive learning experiences, then the pedagogical assumptions become even more complex. Learners are assumed to have independent learning styles and possess high levels of critical information literacy. They must have high levels of persistence as well as language, literacy and numeracy skills that match the demands of the medium. The learners must also be self-regulated and self-motivated and confident with the medium itself. The assumption is made that the

materials and the teacher input will cater to their particular learning styles and preferences through the provision of constructivist and experiential materials.

In the majority of cases, the teachers in this project felt that they were focussing on the features of pedagogical effectiveness in their online teaching practice. However, these aspirations did not match the current practices that they were using and this gap is reflected in their comments about the frustrations involved in being an online teacher. When their aspirations are placed beside the actual teaching strategies used, investigation and research and interactivity are characteristic of their teaching for about 50% of their time. Practice and repetition were also important aspects of their teaching. Teacher behaviour and educational commitment were therefore not easily translated into the online learning experience for their students.

The reasons for this gap between aspiration and reality were explored by other informants. The need for a coherent pedagogy was recognised as crucial, but a number of obstacles were simultaneously recognised. These included the rapid acceleration of change in the technology itself which frequently left both teachers and students behind. The dominance of the 'Bill Gates pedagogy' where: 'you don't have to be best just first' intersects with the exigencies of a highly competitive VET sector, forcing teachers to move into pedagogies with little time for reflection on or evaluation of their practices. Other participants felt that they had lost their pedagogical control and that their sense of their own teaching practice was now subjugated to the design of materials and courses into which they had little input. Online pedagogy was being framed by the software and then consolidated by the exigencies of time. Casualisation of the teaching staff also contributed to the acceptance of less than pedagogically satisfying materials. Moreover, while participants agreed with the list of indicators of pedagogical effectiveness and could articulate their support for these, they questioned their capacity to deliver the practices that matched their commitment.

The students involved mostly described themselves as competent and experienced computer users and were positive about these experiences. In the majority of cases these students identified that the features of effective pedagogy outlined earlier were only 'sometimes' characteristic of their learning. It is significant to notice that, despite teacher commitment and enthusiasm, only 58% of students reported that the building of relationships online was 'always' or 'usually' part of their experience.

In summary, the topic of the pedagogical assumptions that underlie online delivery of training are complex, multifaceted and influenced by the roles of those discussing the topic. Teachers have aspirations that are often not realised, and students recognise that the prerequisites for success have more to do with persistence and independence than with anything intrinsic to the medium itself. The reasons for the gaps between understood good pedagogical practice and the realities of online delivery relate to time management, workplace arrangements, materials design and the rapidity of change, all of which often leave teachers deprofessionalised.

The suitability of teaching and learning areas to online delivery of VET

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

In areas where the mode of delivery and the content area were very similar, such as information technology, online delivery became an effective form of workplace training. By contrast, teaching and learning areas that required practical tasks or where the processes of communication, critical thinking and values clarification were central to the subject area, such as that of welfare, were unsuitable, given the present state of technology.

In spite of the superficial attractiveness of online delivery in a competency-based (CBT) framework, a range of other factors had to be considered in making judgements about its suitability. These

variables included considerations about learning styles and preferences, the competence and confidence of the learners and the importance of the social dimensions of learning.

The courses make unequivocal assumptions about learner characteristics and traits, and unless these are matched to the skills and attributed of the learners, suitability becomes a problematic area.

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

The limitations of online assessment also impact on judgements of suitability.

Teaching and learning styles that facilitate effective online delivery

Teachers require time to enable them to facilitate online delivery effectively. Currently, online delivery is often seen as another overlay on an already cramped workload. Teaching styles which facilitate effective online delivery are attributable largely to the attitude and personality of the teacher but, understandably, the misapprehension that the acquisition of technical proficiency will guarantee sound teaching practice still prevails.

Both teachers and students preferred a 'blended learning' approach that captured the best features of flexibility and mixed these with the social interactions of the classroom. When courses were fully online, then opportunities for induction, orientation and training were critical to student success and teacher satisfaction.

Effective interactions at individual learner level

Interactivity was unequivocally regarded as the most effective teacher–student interaction. This consisted of:

- ✧ consistent feedback
- ✧ communication
- ✧ clear guidance and a sense of course/module organisation.

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

New roles and skills of online teachers and learners

The roles and skills of teachers and learners are different in degree, depending on whether the online delivery supplements classroom time or replaces it. However, in both cases, new definitions of time and work patterns are required. New technological and facilitation skills and experience are needed as teachers make the transition. There are new rules for interaction, security and privacy to be learnt and codified. Teachers have to institute new management practices and students have to manage their time in a highly self-regulated way. The price of flexibility is work re-organisation for teachers and effective self-management skills for students.

The literary demands imposed by many online courses and modules as well as the cultural homogeneity characterising many of them, raises questions about the ability of the skills of students from a non-English-speaking background and Aboriginal and Torres Strait Islander groups to undertake online learning. During the project, teachers and students generated lists of skills they considered essential for effective online learning and students from these two groups may not come to an online course possessing all or some of them. Fundamental issues such as the cultural appropriateness of questioning, conversational conventions, language acuity and student attitudes

towards interaction with authority take on a heightened importance in an online environment. The possibility exists that the new skills and roles required may in fact be antithetical to the culture from which these students come. In traditional Indigenous culture for instance, knowledge is transmitted verbally, obviously in direct opposition to current online practice. In classrooms, diversity is an asset. In an online environment it may be a distinct disadvantage.

The new roles and skills for the online teacher come from attitudinal predispositions. Qualities such as perception, compassion, collaboration and creativity are considered essential prerequisites for online delivery success. These attitudes are the initial building blocks from which teachers develop new facilitation, motivational, mentoring and guiding roles and skills. Communication is profoundly different online where teachers are concentrating on clarity and regularity. Constructivist approaches to teaching and learning entail new teacher roles and skills and the idea of the 'flexible facilitator' is encouraged by courses that are commercially or centrally designed.

Pedagogical features and world's best practice

This was the least clear set of results. There seemed to be a reluctance to commit to principles of world's best practice and perhaps this is explained by the relative youth of this phase of technology and the shortage of rigorous evaluation in the area.

However, by applying the productive pedagogy framework to the data, it was possible to measure the gaps that have to be closed between current practice and extant knowledge of how learning can be best facilitated. Online delivery of VET is a relatively recent innovation and this research shows that, in spite of teacher effort, professional development and high levels of technical resourcing, there are some startling distances between its pedagogical features and world's best educational practice.

Issues for further consideration and research

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

- ✧ reduce their reliance on text
- ✧ explore and value their intellectual, social and cultural backgrounds
- ✧ develop their knowledge beyond the transmission and assessment of content
- ✧ reflect on their own learning
- ✧ be part of an inclusive learning environment
- ✧ communicate extensively both with their peers and their teachers
- ✧ become self-regulated and engaged with their own learning
- ✧ develop a group identity that connects them with their learning and the broader social environment.

This project has demonstrated that all of the dimensions of effective pedagogy require further evaluation and research. In particular, there are some crucial questions and which require thoughtful attention and well-researched answers:

- ✧ How can online delivery of VET be made more socially and culturally inclusive?
- ✧ If the key competencies and communication skills are considered to be integral to the successful implementation of training packages, what can be done about addressing these more explicitly and effectively in an online environment? In particular, 'working in teams', 'communication' and cultural awareness' raise questions beyond the scope of this study.

- How can the models for course design be broadened to give teachers a more active and professional role in the construction of online materials?
- Assessment beyond the summative and frequently simplistic strategies that are embedded in current online pedagogy requires a great deal of attention. Assessment does not match the striving for high-quality course content and sound instructional design.

References

Ailwood, J, Grant, D, Gore, J, Hayes, D, Ladwig, J, Lingard, B, Luke, A, Mills, M, Warry, M 2000, 'The four dimensions of productive pedagogies: Narratives and findings from the Queensland school reform longitudinal study', paper presented to AERA (American Educational Research Association) Conference, New Orleans, 24–28 April.

ANTA (Australian National Training Authority) 1997, *From desk to disk: Staff development for VET staff in flexible delivery*, ANTA, Brisbane.

—— 1998 *A bridge to the future: Australia's national strategy for VET, 1998–2003*, ANTA, Brisbane.

Beach, B 2000, 'An integrated flexible delivery case study', paper presented to Net*Working 2000 Conference, Canberra, 1–14 November, http://flexiblelearning.net.au/nw2000/talkback/p08.htm [accessed January 2002].

Bennett, S, Priest, A & Macpherson, C 1999, 'Learning about online learning: An approach to staff development for university teachers', *Australian Journal of Educational Technology,* vol.15, no.3, pp.207–21.

Bernstein, B 1996, *Pedagogy, symbolic control and identity,* Taylor & Francis, London.

Betz, M 14 Jan. 2000, *Curriculum, instruction, and the internet*, Ifets-discuss@LISTSERV.READADP.COM [accessed January 2002].

Booker, D 2000, *Getting to grips with online delivery*, NCVER, Adelaide.

Brennan, R, McFadden, M & Law, E 2001, *All that glitters is not gold: Online delivery of education and training*, NCVER, Adelaide.

Brown, B 1998, *Learning styles and vocational education practice*, *practice application brief,* ERIC Clearinghouse on Adult, Career, and Vocational Education, Ohio (ERIC Document Reproduction Service ED 422 478).

Bull, K, Shuler, P, Overton, R, Kimball, S, Boykin, C & Griffin, J 1999, 'Processes for developing scaffolding in a computer mediated learning environment', in *Rural special education for the new millennium,* conference proceedings of the American Council on Rural Special Education, Albuquerque, New Mexico, 25–27 March. (ERIC Document Reproduction Service ED 429 765).

Carlson, R, Downs, E, Repman, J & Clark, K 1998, 'So you want to develop WEB-based instruction—points to ponder', in *Site 98,* Society for Information Technology & Teacher Education International Conference, Washington DC, 10–14 March (ERIC Document Reproduction Service ED 421 097).

Cashion, J & Palmieri, P 2002, *'The secret is the teacher': The learner's view of online learning*, NCVER, Adelaide.

Choy, S & Delahaye, B 2000, 'Learning approaches, study orientation and readiness for self-directed learning of youth in TAFE', in 9th annual vocational education and training research conference, North Coast Institute of TAFE, Coffs Harbour, New South Wales, 4–7 July, conference proceedings, NCVER, Adelaide.

Choy, S, McNickle, C & Clayton, B 2002, *Learner expectations and experiences: An examination of student views of support in online learning*, NCVER, Adelaide.

Curtain, R 2002, *Online delivery in the vocational education and training sector: Improving cost effectiveness*, NCVER, Adelaide.

Dewald, N 1999, 'Web-based library instruction: What is good pedagogy?', *Information Technology and Libraries,* vol.18, no.1, pp.26–31.

Duffy, T, Dueber, B & Hawley, C 1998, *Critical thinking in a distributed environment: A pedagogical base for the design of conferencing systems,* CRLT – Indiana University, Bloomington, US, http://crlt.indiana.edu/ [accessed January 2002].

Firdyiwek, Y 1999, 'Web-based courseware tools: Where is the pedagogy?', *Educational Technology,* vol.39, no.1, pp.29–34.

Graham, C, Cagiltay, K, Craner, J, Lim, B & Duffy, T 2000, *Teaching in a web based distance learning environment: An evaluation summary based on four courses,* CRLT, Indiana University, Bloomington, United States, http://crlt.indiana.edu/ [accessed January 2002].

Harper, B, Hedberg, J, Bennett, S & Lockyer, L 2000, *The on-line experience: The state of Australian on-line education and training practices*, NCVER, Adelaide.

Holzl, A & Khurana, R 2000, 'Flexible learning: Can we really please everyone?', *Educational Technology & Society,* vol.2, no.4, http://ifets.ieee.org/periodical/vol_4_99/formal_discussion_1099.html [accessed January 2002].

Jasinski, M 1998, 'Teaching and learning styles that facilitate on line learning: Documentation project', project report, Douglas Mawson Institute of TAFE, Adelaide.
Kemshal-Bell, G 2001, *The online teacher,* final report prepared for the Project Steering Committee of the VET Teachers and Online Learning Project, TAFE NSW, Department of Education and Training, Sydney.
Kerka, S 1996, *Distance learning, the internet, and the world wide web*, ERIC Clearinghouse on Adult, Career, and Vocational Education, Ohio (ERIC Document Reproduction Service ED 395 214).
Kingham, J 2000, 'Online teaching and delivery in TAFE—the Parkes experience: A profile of online delivery by TAFE in a small, rural township', paper presented to Net*Working 2000 Conference, Canberra, 1–14 November, http://flexiblelearning.net.au/nw2000/talkback/p86.htm [accessed January 2002].
Lau, W 2000, 'How the web can be used to enhance interaction language teaching activities in a conventional classroom setting', paper presented to Net*Working 2000 Conference, Canberra, 1–14 November, http://flexiblelearning.net.au/nw2000/summary/ [accessed January 2002].
McArthur, D & Lewis, M 2001, *Untangling the web: Applications of the internet and other information technologies to higher learning*, RAND, California, http://www.rand.org/publications/MR/MR975/ [accessed January 2002].
McKavanagh, C, Kanes, C, Beven, F, Cunningham, A & Choy, S 2002, *Evaluation of web-based flexible learning*, NCVER, Adelaide.
Marquardt, M & Kearsley, G 1999, *Technology-based learning: Maximising human performance and corporate success*, St Lucie Press, Boca Raton, LA.
Mitchell, J & Bluer, R 2000, *A planning model for innovation: New learning technologies,* State Training Board of Victoria, Melbourne, http://www.otfe.vic.gov.au/planning/model [accessed January 2002].
O'Connor, B 2000, 'e-learning and students with disabilities: From outer edge to leading edge', keynote address presented to Net*Working 2000 Conference, Canberra, 1–14 November, http://flexiblelearning.net.au/nw2000/summary/sum_key.htm#key4 [accessed January 2002].
Pan, A 1998, 'Optimize the WEB for better instruction', in *Site 98*, Society for Information Technology & Teacher Education International Conference, Washington DC, 10–14 March (ERIC Document Reproduction Service ED 421 298).
Powers, K 1999, 'A self-fulfilling prophecy: Online distance learning for introductory computing', in *Spotlight on the Future, NECC '99,* proceedings from the 20th National Educational Computing Conference, Atlantic City, 22–24 June.
Rice, M 1997, 'Finding out what works: Learning from evaluations of information technologies in teaching and learning', in *ASCILITE '97 Conference,* Curtin University, Perth, 7–10 December, http://www.curtin.edu.au/conference/ASCILITE97/papers/Rice/Rice.html [accessed January 2002].
Ross, J & Schulz, R 1999, 'Can computer-aided instruction accommodate all learners equally?', *British Journal of Educational Technology,* vol. 30, no.1, pp.5–24.
Ryan, Y 1998, 'Time and tide: teaching and learning online', in *Australian Universities Review,* vol.41, no.1, pp.14–19.
Salmon, G 2000, 'Learning submarines: Raising the periscope', keynote address presented to Net*Working 2000 Conference, Canberra, 1–14 November, http://flexiblelearning.net.au/nw2000/summary/sum_key.htm#key3 [accessed January 2002].
Sargant, N 2000, *The learning divide revisited: A report on the findings of a UK-wide survey on adult participation in education and learning*, NIACE, Leicester.
Schofield, K, Walsh, A & Melville, B 2000, *Online learning and the new VET practitioner,* RCVET–UTS, Sydney, http://www.uts.edu.au/fac/edu/rcvet/working.htm [accessed January 2002].
Schrum, L 1998, 'On-line education: A study of emerging pedagogy', in *Adult learning and the internet,* ed. B Cahoon, Jossey-Bass, San Francisco.
Selwyn, N 1999, 'Virtual concerns: Restrictions of the internet as a learning environment', *British Journal of Educational Technology*, vol.30, no.1.
Slay, J 1997, 'The use of the internet in creating an effective learning environment', in *Third Australian World Wide Web Conference,* Southern Cross University, 5–9 July.
Stein, M, Smith, M & Silver, E 1999, 'The development of professional developers: Learning to assist teachers in new settings in new ways', *Harvard Educational Review,* vol.69, no.3, pp.237–69.
Straw, R & Cook, T 1990, 'Meta-evaluation', in *The International Encyclopedia of Educational Evaluation,* eds H Walberg & G Haertel, Pergamon Press, Oxford.
University of Illinois, 15 Dec 1999, *Teaching at an internet distance: The pedagogy of online teaching and learning* (online), the report of a 1998–1999 University of Illinois faculty seminar, http://www.vpaa.uillinois.edu/tid/report/ [accessed January 2002].
Wallace, A 2000, *An exploratory study of the factors influencing the construction of computer self-efficacy*, published doctoral dissertation, Charles Sturt University, Wagga Wagga.
Zorfass, J, Remz, A & Gold, J 1998, 'Strategies to ensure that online facilitators are successful', *Journal of Online Learning,* vol.9, no.4, pp.9–16.

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

NCVER undertakes and manages research programs and monitors the performance of Australia's training system.

NCVER provides a range of information aimed at improving the quality of training at all levels.

ISBN 1 74096 157 9 print edition
ISBN 1 74096 158 7 web edition