Australian *Flexible* **Learning Framework**

Supporting Flexible Learning Opportunities

Resources for Teaching, Learning and Assessment Program

Online Assessment Strategies and Models

Research analysis – issues and implications

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Acknowledgments

Feedback

The project team welcomes any comments and suggestions on the research analysis. The analysis is a work-in-progress and a blueprint for the web-based guide – we will continue to refine the analytical structures, add examples, contact sources, review resources, and integrate research findings throughout the project.

Please contact Clint Smith with your comments, suggestions or samples.

Introduction

The project

Online Assessment Strategies and Models is a project of the Australian Flexible Learning Framework (Framework), one of several related initiatives under the Resources for Teaching, Learning and Assessment Program in 2003.

The project will develop support resources for vocational education and training (VET) practitioners, available through a web-based guide from December 2003. Flexible Learning Toolbox developers and users will be consulted to identify the issues faced when conducting assessment in online and blended learning environments. The project will provide useful strategies, tools and examples of assessment practice. This Research Analysis is the first output of the project.

Full details of the project are available at
http://flexiblelearning.net.au/projects/onlineassessmentstrategies.htm

Scope of this analysis

This research analysis aims to do somewhat less, but also a great deal more, than the conventional 'first document' from a research project. There are several reasons for this.

Two significant Australian publications relevant to online assessment in the VET context have been released since the project team began work. Hugh Guthrie's *Online learning: Research readings* (Guthrie ed, 2003) brings together key findings from major recent Australian research into online learning, including online assessment. *The development of quality online assessment in vocational education and training* (Booth et al, 2003) provides the most detailed analysis of issues supported by substantiating and current field research. Together with the excellent Framework Quick Guide, *What we have learnt about online assessment* (ANTA, 2002) we now have good access to the key messages from research in this area. This foundation of current information means there is little point adding another layer of summary desktop research from this project. Instead, we have moved on to our key focus, the 'So what?' questions:

> *What does it all mean for the people at the pointy end of assessing online?*
>
> *How do they do it? Who is involved, and at what stage?*
>
> *What should they keep doing, or what should they do that's new or better or different?*
>
> *What resources are there to help them do their work? What's missing?*
>
> *What's the best way to provide what they need, when they need it?*

Uses for the analysis

So, this document is a preliminary critical review of the available resources to help VET staff plan and conduct assessment in the online environment. Its main purpose is to inform the development of a new integrated, web-based guide to online assessment, to be available in December 2003.

To this end, the analysis also performs some other important functions for our project:

- it defines a working thesaurus of terms to help clarify what we're all talking about
- it provides a draft analytical framework – a 'map of the territory' for our own field research in July and August
- it provides a preliminary conceptual and site design for the web-based guide
- it identifies a range of available resources which can be fed into (or linked to) the guide
- it provides first drafts of several analytical tools which will assist users to identify their own patch and clarify their assessment choices when working in the online environment.

Finally, the analysis enables us to document the progress of our thinking about the business of doing assessment online, and invite focussed comment and suggestions from the wider VET community.

Structure of the analysis

The analysis is organised in eight sections, each triggered by a key research question which will carry over into the field research and the guide design (see Figure 1 on the next page)

Figure 1
Sections of the research analysis

Desktop research section	(Sample) field research questions	Possible guide resources
1 Types of delivery What main types of online learning have been described?	What is the range of current online learning delivery in VET? Which types are most common?	Case studies Map of types Planning guide
2 Available research What research is available on online assessment in VET? What other research is most relevant to online assessment?	Which research and professional development products are VET practitioners familiar with? Which have they found most useful for online assessment?	Quick Guide to research Select, annotated bibliography
3 Key issues What problems or challenges in online assessment have been identified?	What are VET practitioners' key issues, concerns and barriers in planning and implementing online assessment?	Problem/solution tables Troubleshooting guides Summaries of research findings by issue
4 Quality What standards and best-practice guidelines are available for online assessment in VET? What are the mandatory requirements under the AQTF?	What quality standards are currently used and monitored in online assessment in VET? How? What systems are RTOs using?	Quality checklists Audit/moderation tools Assessment templates Exemplars Quality models
5 Models and strategies What methods for assessing online have been described? What are the strengths and weaknesses of the online environment for assessing learning outcomes?	What is the range of current online assessment practice in VET? What is online good/bad for?	Map of options Scenarios, case studies Decision guides Exemplars
6 Stages, tasks and skills What are the common stages, steps and tasks in planning, designing, implementing and monitoring online assessment? What are the key roles involved? What skills are needed?	How is online assessment currently implemented in VET? Who does what? How do people develop the skills required?	Process map Case studies Planning guides Action plans Skills checklists
7 Resources for practitioners What practical guides for online assessment in VET are available?	What guides and tools do VET practitioners know about? Which do they use? How?	Select bibliographies Short reviews Uptake case studies
8 Gaps What further research or support resources are needed to assist practitioners?	What do practitioners want more information, clarification, or guidance about? What's missing?	Recommendations Briefs, proposals Specifications for guide products

1 Types of online delivery

What types of online delivery have been described?
Which of these are common in VET?

The constraints and opportunities for planning and conducting assessment in online environments will depend directly on the type of delivery mix available or being used. In a VET system geared to evidence-based demonstration of competence in workplace settings, the mixture of face-to-face and web-based interaction will be the key determiner of assessment options available to designers, teachers and assessors. Discussion about the strengths and weaknesses of 'online learning', then, will be of little use if there is no working consensus about which variety of the beast we are discussing. Online learning is not an 'it'.

Classifications

The Bonk continuum

Dr Curtis Bonk of Indiana University describes a continuum of web integration in teaching and learning in progressive stages.

Figure 2
A continuum of web integration in college courses (Bonk & Dennen, 1999)

	Stage	Description
1	Marketing/syllabi via the Web	Instructors use the Web to promote course and teaching ideas via electronic fliers and syllabi.
2	Student exploration of Web resources	Students use the Web to explore pre-existing resources, both in and outside of class.
3	Student-generated resources published on the Web	Students use the Web to generate resources and exemplary products for the class.
4	Course resources on the Web	Instructors use the Web to create and present class resources such as handouts, prior student work, class notes and PowerPoint presentations.
5	Re-purpose Web resources	Instructors take Web resources and course activities from one course and, making some adjustments, use them in another.
6	Substantive and graded Web activities	Students participate with classmates in Web-based activities such as weekly article reactions or debates as a graded part of their course requirements.
7	Course activities extending beyond class	Students are required to work or communicate with peers, practitioners, teachers and/or experts outside of their course, typically via computer conferencing.
8	Web as alternative delivery system for resident students	Local students with scheduling or other conflicts use the Web as a primary means of course participation, with the possibility of a few live course meetings.
9	Entire course on the Web for students located anywhere	Students from any location around the world may participate in a course offered entirely on the Web.
10	Course fits within larger programmatic Web initiative	Instructors and administrators embed Web-based course development within larger programmatic initiatives of their institution.

Although the language and sequential logic of this continuum is not intuitively obvious outside the American university teaching and learning context, these items might be clustered in VET terms as outlined in Figure 3.

Figure 3
The continuum in VET terms

	Bonk items	Possible category in VET	Key agency/organiser
1	**Marketing/syllabi via the Web**	Web-based course marketing and administration *e-commerce*	support staff (Web) (unlikely to be teachers in VET setting)
2–6	**Web as classroom enhancement**	Web-based enhancements of a single face-to-face course *blended learning*	teacher
8	**Web as alternative delivery system for resident students**	Parallel Web-based delivery of an individual course *mixed mode learning*	teacher, probably with support
9	**Entire course on the Web for students located anywhere**	Distance delivery of individual course *online learning, or e-learning*	teaching department, teachers
10	**Course fits within larger programmatic Web initiative**	Organisational online delivery capability *online learning, or e-learning*	managers, administrators, developers, teachers, support

Different blends?

The conclusion from our preliminary scan was that there is no widely accepted general definition of the broad types of online delivery and, more specifically, no adequate or useful description of the types currently being used in VET. In this situation, composite terms such as 'online learning', 'e-learning', 'Web-based learning', 'flexible learning', 'distance learning' and, more recently, 'blended learning' can often obscure rather than clarify the debate.

In addition, the implicit or default meanings of many of these terms are highly sector-specific, and often drive debate, policy, professional development and best practice without being explicitly acknowledged, so commentators are comparing apples with oranges.

In the language of many commercial courseware vendors in the corporate training market, for example, 'e-learning' is more-or-less synonymous with individualised, independent learning where the courseware provides all the teaching and assessment functions. It is technology-based learning, and in most cases is restricted to learning domains where pre-determined feedback predominates and the pedagogical range is very limited – notably in IT software training and some of the less complex 'soft skills'. In many cases, CD-based product has simply been ported to the Web as a distribution medium, with little change in functionality. In these settings, 'blended learning' may mean little more than 'adding learner support' as a response to unsatisfactory completion rates common in courseware-only approaches.

All sectors in Australian public education make exactly the opposite assumption – that online delivery or e-learning is about adding Web-based features to existing *facilitated* modes of delivery, whether face-to-face or distance. Each sector, quite predictably, takes its defining delivery technology and pedagogical culture as the 'norm' for current delivery, adapts the online environment to that culture, and then pronounces on how well e-learning 'works' – or doesn't.

This is perhaps one of the reasons research (and practice) in online learning doesn't travel well across sector boundaries within Australia. For example, the most recent major research report on online assessment in VET (Booth et al, 2003), having identified the difference between the 'knowledge-based' outcomes typical in higher education and the 'performance-based' outcomes typical in VET, presents assessment examples drawn mostly from universities. The rich emerging range of online practice in VET derived from the vocational norm of evidence-based, authentic assessment of competence is not as yet well-recognised or documented.

At the same time, performance technologist Allison Rossett (Rossett & Sheldon, 2002) argues that a whole new intregrated approach to workplace learning is emerging, based around the power of the Web to store, inform and communicate. She reports that e-learning is combining with knowledge management, communities of practice and supported self-directed learning to create a flexible learning culture, generating challenging new roles for training professionals. If this model describes the emerging practice for workplace learning, it has significant implications for VET practice.

Figure 4
Different e-learning cultures in Australian education, by sector (draft)

Sector	Default (traditional) delivery technology	Dominant e-learning model(s)	Meaning of 'blended learning'
Corporate training	Instructor-led group training with participant evaluation	Independent, technology-based tutorials, self-correcting (but changing rapidly to more integrated and supported approaches).	Add face-to-face support for independent learners using courseware tutorials. Emerging concept of web-supported learning using range of methods (e-learning, KM, communities of practice).
Higher education	Discipline-defined content delivery through lectures and reading, interaction through small-group, facilitated, discursive tutorials, norm-based assessment by individual tutor. Distance education variant provides custom-developed (institute) versions of content, with written and other feedback from lecturer/facilitator/tutor.	Lecturer–author uses website to progressively publish lectures and reading materials, and/or online activities (eg research), with or without online collaboration. and LMS-based distance delivery via Web, knowledge-based curriculum, usually in course teams to develop shared courseware and organise learning support.	Same: lecturer–author variations on using the Web to enrich campus-based program, including online collaboration functions or adding some online study options (units) as choice; including face-to-face components in facilitated online courses (as option for non-remote client groups).

Sector	Default (traditional) delivery technology	Dominant e-learning model(s)	Meaning of 'blended learning'
Secondary education	Teacher-led content delivery to broad curriculum goals through participatory classrooms with range of teacher-assessed individual and group work. Norm-based assessment.	Web-enriched classroom, including courseware and collaborative tools – almost no engagement with 'distance' or 'independent' models.	Using the Web in the classroom, increasingly with nationally funded courseware modules and online collaborative tools.
TAFE	Teacher-led skill development to industry-based standards, in classroom or workshop settings, with mixed assessment models (some knowledge-based, some performance-based) varying widely with content area. Off-campus variation of independent learning using centrally produced courseware, minimum tuition and correspondence-style feedback on assignments.	Web-enriched classroom (or library) can include access to courseware and use of collaborative tools and teacher facilitated, LMS-based online delivery of content and interaction via Web, using some state-funded or nationally funded courseware, to industry competencies requiring criterion-based assessment of performance outcomes in authentic settings (workplace).	Including face-to-face components or requirements in online courses or offering face-to-face students the option of taking some units or components in the online mode.
Adult Community Education	Facilitated, interactive, group-based, learner-centred delivery driven by participant objectives, with or without formal assessment and recognition.	Web in the classroom, with emphasis on collaborative tools and learner publishing. Short courses online, with emphasis on building the learning community.	Collaborative online communities.

Online usage in VET

The recently published report, *Researching the size and scope of online usage in the vocational education and training sector* (Hill et al, 2003) notes the lack of agreed terminology to describe the different types of online practice in VET:

> … the terms 'online learning', 'online delivery' and 'virtual education' tend to be used interchangeably … these data highlighted the need to identify and promote the use of consistent terminology in online learning. (p. 6)

The report notes three 'modes' of online learning currently in use:

- as an enhancement to the traditional mode of delivery where classes are held on campus, with interaction with fellow students and the teacher
- as stand-alone online delivery on campus with a classroom facilitator, often with a flexible delivery approach
- using only online material off campus with or without a flexible delivery approach. (p. 18)

'Flexible delivery' is not defined here, but appears to mean providing learners with a choice of face-to-face or distance methods of participation within the one course. The same report provides some useful preliminary data on the proportion of current VET online teachers who deliver totally online:

Figure 5

Relative proportion of modes of e-learning in VET (Hill et al, 2003)

	Online modules available	Modules in mixed mode	Modules totally online	Percentage totally online
NSW	80	40	40	50%
VIC	170	96	74	44%
TAS	36	1	35	97%
SA	na	na	na	70% est.
WA	na	na	na	na
QLD	120	—	—	>50% est

As members of the interview group were 'online teachers', the data would not necessarily capture the range and level of use of the Web for classroom enrichment.

Summary of online modes

At a macro level, there appear to be four broad types of delivery arrangements (or 'delivery modes') in the online learning environment in VET:

- **Web in the classroom**
  using the Internet in a variety of ways to extend activities for learners in the individual classroom both in and outside session hours

- **blended learning**
  providing an online course which includes face-to-face participation by learners, or a classroom-based course which makes significant components available online as an option to learners

- **fully online learning**
  providing facilitation and all course functions to learners online at a distance, with no provision for face-to-face interaction.

Another category needs to be included because of its popularity in corporate training, although there is little evidence of its uptake by VET providers for either program delivery or their own staff training:

- **independent e-learning**
  using the web to deliver individualised, self-directed, self-correcting training with or without provision for some learner support services. (This is commonly – and confusingly – called 'e-learning' in corporate training literature, particularly in the USA.)

Other Web-related modes

Corporate performance improvement specialists would include a further variety of Web-based learning – Electronic Performance Support Systems (EPSS) – but, rightly or wrongly, these 'just-in-time' strategies appear to have had little impact on VET training approaches and delivery modes, perhaps because they seem to be alternatives to 'learning' as it is understood or interpreted in VET. The four delivery categories listed above speak clearly from a familiar teaching-

and-learning perspective, rather than a more cost-conscious workforce outcomes culture.

As indicated by Bonk's continuum, there is a parallel set of Web-related functions to do with the e-commerce of education – the use of the Web for publicity, course information, enrolment, campus services, library access, IT help, access to records and so on. These services have been identified, with evaluative guides to exemplar e-learning providers across the world, in the TAFE frontiers *Virtual tour of online learning* at http://www.tafefrontiers.com.au/VirtualTour/welcome.htm.

The services identify not so much another teaching-and-learning delivery 'mode' as the administrative *readiness* of the whole organisation and its systems to support Web-based delivery options.

E-learning

Because the term 'e-learning' is often used as a generic term for any (or all) of these delivery modes, in this project we propose to use 'e-learning' as the inclusive term for all four Web-based delivery modes identified in this project. This is narrower than, but consistent with the usage described in the *Australian Flexible Learning Framework Quick Guide: Definitions of key terms used in e-learning usage* (Backroads Connections, 2003):

> **e-learning**:
> e-learning is a broader concept [than online learning], encompassing a wide set of applications and processes which use all available electronic media to deliver vocational education and training more flexibly. The term 'e-learning; is now used in the Framework to capture the general intent to support a broad range of electronic media (Internet, intranets, extranets, satellite broadcast, audio/video tape, interactive TV and CD-ROM) to make vocational learning more flexible for clients. (p. 5)

The role, constraints and available strategies for the online assessment component will clearly be quite different under each of these e-learning modes. It is likely that there will be useful sub-categories under both blended learning and fully online learning which can help clarify teaching and learning practice, and hence available assessment choices for teachers and learners. This will be an issue for our field research (July–August 2003).

Delivery types: implications for this project

The messages from the review of types of online learning for this project are:

- refine, validate and use the terminology for the four modes of e-learning consistently within the project

- develop assessment guidelines contextualised for these different modes ('if you are using blended learning, do this …')

- try to identify variations in practice under each category

- work to distinguish the assessment issues related to *delivery mode* (broad organisational arrangements determined by the provider) from those related to *learning methods* (specific practices determined by the courseware designer, the arranger/teacher/facilitator and the learner).

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2 Available research

What research is available on online assessment in VET?
What other research is most relevant to online assessment in the VET environment?

There is an extensive literature on the use of online assessment in the learning process, although much of it focuses on the higher education sector. Until recently, only limited research had been published on online assessment in the VET sector (Booth et al, 2003).

Many projects have focused on online teaching where assessment is either not mentioned or is given only brief treatment. This is contrary to an emerging trend to consider assessment issues and tasks as an integrated part of the learning design process – Booth emphasises the dangers of separating the design of assessment from other aspects of the teaching and learning process (Booth et al, 2003).

The timeline in Figure 6 outlines the main research relevant to online assessment in VET.

Figure 6
Timeline of key Australian research projects and publications relevant to online assessment in VET

Source	Focus
2001	
Online assessment as an integral part of flexible online delivery (Anderson, 2001)	Strategies & models

Janice Anderson offers some refreshing and uniquely VET-oriented reflections on the use and potential for online assessment. She views online assessment as an opportunity for innovation and reflection of purpose, not just the conversion of existing paper-based assessment to an online setting. There is a focus on 'authentic assessment':

- assessment integrated with the learning experience
- assessment within a relevant context
- assessment that demonstrates knowledge, understanding and skills.

She cites the need to ensure that practitioners in VET are given the skills to visualise and prepare holistic online assessment materials. Anderson cites the need to discover and share best practice.

Source	Focus
Teaching and learning online: A beginner's guide to e-learning and e-teaching in higher education (Oliver & Herrington, 2001)	Strategies & models

Although online assessment is not given a great deal of attention, it is placed firmly within the context of the integrated design of the learning tasks and programs. Mention is made of design of authentic assessment and problem-based approaches. Some examples given here are of Flexible Learning Toolboxes that are used within the VET sector. This is a useful summary of the area.

Source	Focus
2002	
Maximising confidence in assessment decision-making (Booth, Clayton, House, & Roy, 2002)	Quality

This is a resource for assessors and managers setting up assessment processes. It addresses assessment in the context of the quality assurance framework. Issues of online assessment are not addressed, however, some of the general strategies discussed are useful to the current project:
- assessment review strategies
- gathering evidence
- partnerships and networks:

As well as documenting strategies for assessors, the resource provides a number of templates and forms that could be adapted or modified for local use.

Source	Focus
Creating quality online assessment (Booth & Clayton, 2002)	Quality

This is a qualitative field research project involving practitioners in online assessment – national and international.

While the primary audience is the practitioner – designers and deliverers – many of the issues identified in this report can only be addressed at policy planning and management levels.

The website provides a useful summary of the identified issues and reflections on these under the headings:

- Relevance/importance,
- Problems/obstacles
- Ideas to consider.

The research also highlights the need for management-level involvement in a commitment to planning for, developing and supporting online assessment, and in supporting assessors, both at skills development level and in time allocation.

Source	Focus
Practitioner's guide to online assessment (Brewer, 2002)	Strategies & models
This is a valuable resource which features extensive case studies from the VET sector. It provides a useful starting point for the current project team in identifying practical and innovative use of the online environment to support assessment.	
Australian Flexible Learning Quick Guide: What have we learnt about online assessment (Backroad Connections, 2002) and ANTA	General
This provides an excellent summary of the range of assessment strategies and tools currently in use, and the constraints and critical factors facing teachers and developers. This report reviews the literature so far and its implications for the VET sector.	

2003

Source	Focus
Researching the size and scope of online usage in the vocational education and training sector (Hill et al, 2003)	Types of e-learning
A survey of current providers of e-learning in VET, this report provides a valuable snapshot of current e-delivery modes in TAFE – some classroom, some 'mixed mode', but the majority in most states delivered as fully online courses. Makes a very powerful point that existing data categories in VET make it almost impossible to capture the actual range and level of web-based learning. Although this report was published in 2003, much of the data relates back to 2001. It is likely that the actual numbers of online courses delivered throughout the VET sector is much higher than presented here.	
The development of quality online assessment in vocational education and training (Booth et al, 2003)	Quality Strategies & models
This is the most comprehensive review recently released This review offers a valuable description of the issues surrounding online assessment, quality issues with the AQTF, methods and technologies and design approaches, and offers some insights into solutions to the problems posed by the report. Unfortunately, most of the examples cited draw on experience in the higher education sector. Further research needs to be undertaken to find examples from the VET sector of innovative approaches to online assessment.	
Legal issues in electronic authentication for flexible learning **(Galexia Consulting, 2003)**	Key issues
A detailed and challenging review of current arrangements for authentication in VET and the implications for flexible and online delivery. Finds that VET is lagging behind other sectors in developing uniform, interoperable and secure systems, and that this presents some serious systemic problems in the online learning and assessment environment. With their focus is on system-wide issues, there is possibility that the findings overstate the current dangers in specific delivery settings, where VET organisations and practitioners appear to have developed a range of practices to manage the security and authentication risks involved in the online environment.	

3 Key issues

What problems, constraints or challenges have been identified in online assessment?

The promise of online assessment

Benefits for learners

Innovative educators have always sought to find effective and valid ways to assess the learning outcomes of their students. Online technologies offer a new range of tools and strategies and some exciting possibilities for adding new dimensions to the teaching and learning experience (Backroad Connections, 2002). These include:

* greater flexibility as to where, when and how assessment is conducted
* more choice in types and methods for assessment
* improved capability for ongoing and continuous self-assessment
* wider scope for engaging new forms of learning and assessment, such as simulations and problem-solving scenarios in courseware, and collaborative online activities.

Benefits for educators

Online assessment also offers some new ways of addressing problems which are part of the assessment process in accreditation settings (Anderson, 2001):

* improving access and flexibility for students in a range of settings such as workplaces
* providing opportunities for time-saving and efficiency through electronic management of assessment information
* engaging with younger students
* providing for a wider range of learning styles
* developing and assessing communication and collaboration skills
* encouraging and assessing reflection and critical thinking
* meeting and reporting compliance requirements.

Potential for performance improvement

Outside formal recognition and accreditation structures, online technologies promise new capabilities for providing feedback, self-assessment and learning support for staff development in businesses and organisations – including, potentially, for staff development in education and training organisations. New generation Integrated Learning Management Systems (ILMS), for example, promise extended capabilities (Smith, Elkner, and Malone, 2003) such as

* learning content management
* knowledge management
* skill or competency 'banks'
* assessment systems to determine current competencies
* personalised learning plan support and monitoring
* booking and recording services for training activities

- e-learning delivery and tracking
- collaborative tools for communities of practice and teams
- performance support tools and systems.

Figure 7 maps the possible features of such an integrated system.

Figure 7
Functions of new generation enterprise-level integrated learning systems
(from *The TAFE frontiers field guide to knowledge management in VET*, in preparation)

Administration

information management system

Document management

scanning
storage and access
version control
selection & distribution
archiving

backend systems

HR system

personnel records

Finance

payments
ROI data

System administration

access & security
uptake & purchasing data
hosting
reporting

Scheduling & registration

timetabling
course data

Performance

performance management system PMS

Performance management

goal & needs analysis
performance improvement
performance appraisal
career plans, pathways

Certification & accreditaion

workplace assessment
recognition & evidence

Competency & skills management

skills assessment
role analysis
job profiles
evidence systems

Basic LMS

e-course delivery
e-course results tracking

TAFE frontiers version 2.0 1/5/03

Learning

integrated learning system ILS

Knowledge management

knowledge capture
knowledge generation
knowledge access

Blended learning support

facilitated learning
self-directed learning
lifelong learning
communities of practice
coaching & mentoring

Communication & collaboration

facilitated online delivery
virtual communities
virtual teams

(learning) content management system (CMS)

Content management

customisation
personalisation
disaggregation
(learning objects)

Content authoring

content
development
content packaging

Implications for the project

We lack evidence of if or how the potential benefits of the online environment for assessment are being realised in VET. The project team will seek to document examples of these benefits during the field research stage of the project.

Investigating the use of online technologies for assessment functions in enterprise-level performance improvement systems, although of increasing relevance to VET practice, is outside the scope of the current project.

Issues in the VET environment

Pedagogical issues

Recent research (Backroad Connections, 2002; Herrington & Herrington, 1998; Booth et al, 2003; Brewer, 2002) has been focused on identifying and describing the questions which arise for courseware developers and course deliverers working in the online environment. They include:

- maintaining conventional assessment principles such as validity, reliability, fairness and flexibility
- determining whether and how the online medium allows for the full demonstration of competence
- determining whether or how online technologies can provide 'authentic' contexts for assessment
- clarifying which assessment approaches and strategies transfer or adapt well to the online environment, and which don't
- utilising the full range of assessment methods, levels and purposes, from computer-marked multiple choice to communication and collaborative options for higher-level skills
- analysing the full learning context and planning assessment from the beginning of a course or project
- engaging, extending and assessing generic skills through the particular features of the online environment
- integrating assessment activities with the learning process to achieve more holistic styles of assessment
- determining how to assess individuals and groups in collaborative online activities
- addressing W3C guidelines for accessibility in courseware design
- attending to cross-cultural issues in selecting assessment activities, as in learning design overall
- integrating practical strategies to reduce risks of plagiarism and ensure adequate authentication during learning and assessment.

This is a formidable, even overwhelming list. There is an urgent need to prioritise, prune and simplify the demands it makes on VET staff. A key task of

this project is to organise the available findings, guidelines and practical tips from a range of sources in an accessible, useable form to help VET educators make informed and innovative choices in their online work. We don't expect that to be easy.

Organisational and quality monitoring issues

Another cluster of issues, although they impact on developers and deliverers, relate more to the underpinning systems of the organisation (Booth, Cielens, & Hyde, 2003), and are likely to require whole-of-organisation responses involving managers, planners and the organisation's administrative and support units.

Key issues include:

- implementing the Australian Quality Training Framework (AQTF), which requires a further layer of interpretation for the online environment
- providing adequate professional development so staff have adequate skills to engage with the new medium
- ensuring that learners have the technical skills and access to technology required to complete assessment
- providing adequate protocols and systems for security of data and privacy for learners and clients
- organising agreed processes for exchange, purchase or licensing of digital learning resources, including assessment materials (eg through reusable learning objects available in repositories)
- planning for adequate interoperability in assessment and recording systems
- providing adequate systems for authentication of individuals in the online environment, and especially for assessment processes.

This project will be dealing with the implications of AQTF for online assessment in detail, providing tips and tools for VET educators for all the key tasks identified in the process of planning, designing and conducting assessment online. We expect the resulting guide to practice will assist VET providers to prepare and support all their staff to work in the online environment at the same time as integrating AQTF requirements in their work processes.

Many of these issues are part of the expanding agenda of interoperability, the subject of a range of other current research and project initiatives in VET. One of the challenges identified as particularly significant for online assessment is authentication, or techniques for confirming the identity of students and clients. This is clarifying as an issue of e-commerce – an inevitable part of doing business in the digital age, rather than a just a challenge for e-learning, and has complex, serious and system-wide implications (Galexia Consulting, 2003). The project team will seek advice on any emerging practical implications for VET staff involved in online assessment.

Key issues: implications for the project

Challenges for online assessment in VET

Amongst these many issues, some stand out as having particular importance for this project, not the least because they represent an implied but persistent criticism of current online practice in VET.

- **Limited capability to assess performance outcomes**

  'How can you assess competence online?' For many (including most sceptics), there is an inherent contradiction in online delivery and the evidence-based, workplace-centred assessment of applied outcomes which is at the core of the VET system. The authors of the Framework Quick Guide put it politely, but dismissively:

  > (the online environment) does not as yet lend itself to testing of competencies that require demonstration of a particular skill or work-based task. (p. 5)

  Response
  To address this issue, the project will aim to:

  - clarify that online environments in VET include blended environments
  - identify and showcase ways in which providers of fully-online courses in VET have addressed this challenge
  - clarify which types of performance-based outcomes (eg communication skills) can be assessed in the online environment.

- **Lack of assessment of higher-level cognitive skills**

  This view is commonly linked with observations (Booth et al, 2003) that VET online materials use predominantly basic-level recall strategies (such as multiple-choice quizzes) or 'computer testing' (Backroad Connections, 2002) and lack more complex, integrated assessment strategies required for skills higher in Bloom's taxonomy. As Booth comments:

  > Generally speaking the VET sector delivers training within the Australian Qualifications Framework levels 1-6. The higher-order skills and knowledge assessed by universities in the online assessment approaches may not be relevant to the VET sector. (p.16)

  Response
  To address this issue, the project will aim to:

  - clarify the role of formative assessment and self-assessment, including knowledge-based testing, in online learning design in VET
  - identify examples of the full repertoire of assessment strategies from current VET courseware and delivery practice.

Implications for the project (continued)

Challenges for online assessment in VET

- **Difficulty of using constructivist approaches to online learning in a competency-based assessment system**

  For example, the Framework Quick Guide describes the growing use of communication tools for 'assessable activities', including approaches such as group discussion, simulation, case studies, project work and peer and self-assessment. However, the authors observe (pointing to 2000/2001 sources) that such uses are 'not commonplace' in VET.

  Response
  To address this issue, the project will aim to:

  - clarify which learning contexts in VET are appropriate for constructivist approaches to learning and assessment
  - gather examples of collaborative and innovative assessment practice in VET.

- **Difficulty of guaranteeing authentication and preventing plagiarism in the online environment**

  For example, the authors of *Legal issues in electronic authentication for flexible learning* claim that the very future of flexible learning in VET is at risk:

  > Our primary conclusion is that electronic authentication (and hence flexible learning) is unlikely to advance further in the VET sector without the implementation of a model that involves…the adoption of electronic authentication across the whole VET sector…

  The project team has become aware that this aspect of compliance is also considered very problematic by AQTF agencies.

  Response
  To address this issue, the project will aim to:

  - clarify whether or not these concerns apply to all forms of assessment in the online environment, or only to fully-online varieties
  - document how emerging online VET practice (such as blended learning and collaborative group learning) may be addressing concerns about authentication
  - clarify how practitioners and RTOs rate the authentication risk, and what measures they already take to reduce it.

Implications for the project (continued)

Challenges for online assessment in VET

- **Difficulty adjusting to requirements of accessibility standards**
  Meeting accessibility standards has very significant impact on the cost and complexity of designing learning and assessment tasks in online courseware. It is becoming clear that there are some real dilemmas involved. VET developers, especially in the current Flexible Learning Toolbox series, are having to find creative ways to meet the standards at the same time as maintaining engagement and appeal for all users.

  Response
  To address this issue, the project will aim to:

  - clarify the practical implications for developing online assessment tasks while addressing the W3C standards

  - gather examples of accessibility solutions for assessment in VET online courseware.

4 Quality

What standards and good-practice guidelines are available for online assessment in VET?
What are the requirements of the AQTF in relation to online assessment?

Quality and the AQTF

The Australian Quality Training Framework (AQTF) requires all training organisations delivering nationally endorsed qualifications to demonstrate compliance with the national Standards for Registered Training Organisations (ANTA, 2001). Registered Training Organisations and teachers offering online assessment will need to be aware of the AQTF standards, which apply during various stages of the planning, development and implementation of online assessment. These will include:

- development of quality management systems
- selection and implementation of appropriate technology
- development of learning and assessment strategies
- guidelines for learner support
- expertise of staff developing online assessment methods
- administration and records procedures.

Relevant standards

The AQTF standards identified by the ANTA Guide, *Quality auditing of online learning* (Booth et al, 2003) as relevant to online learning and assessment have been analysed to identify those standards which have *specific implications* for designers, developers and deliverers of online assessment. The project team also identified other standards which *some relevance* to online learning and assessment. The AQTF standards not identified as specifically relevant to online learning and assessment (ie in either the ANTA Guide or by the project team) are Standards 3, 10, 11 and 12.

While all VET practitioners involved in online assessment will need to be aware of and comply with all AQTF standards, some of these issues will fall under the umbrella of broader organisational responsibility. Others will impact directly on the work and responsibilities of the online practitioner.

The following three tables (see Figures 8a, 8b and 9) identify the AQTF standards *relevant to online delivery* against areas of responsibility within a Registered Training Organisation:

- Figure 8(a) outlines the relevant AQTF standards related to broader organisational issues and responsibilities
- Figure 8(b) identifies the relevant AQTF standards related to skills for staff involved in online learning and assessment
- Figure 9 addresses the relevant AQTF standards with specific implications for designers, developers and deliverers of online assessment.

Figure 8a

Organisational level: relevant AQTF standards, related to broader organisational issues and responsibilities

Standard 1	Systems for quality training and assessment

The RTO has systems in place to plan for and provide quality training and assessment across all of its operations.

- RTO policies and procedures
- Organisational chart
- Risk management
- Client feedback
- Continuous improvement

(Other standards address specific compliance issues in these areas.)

Standard 2	Compliance with Commonwealth, State/Territory legislation and regulatory requirements

The RTO ensures compliance with Commonwealth, State/Territory legislation and regulatory requirements relevant to its operations is integrated into its policies and procedures, and compliance is maintained

- occupational health and safety
- Workplace harassment
- Anti-discrimination and equal opportunity
- VET training (apprenticeships, etc)
- Legislation affecting staff duties and client participation
- Insurance, staff awards

Standard 4	Effective administrative and records management procedures

The RTO has effective administrative and records management procedures in place.

- Storage and backup of electronic records
- Archiving of records
- Staff qualifications
- Enrolment, participation and fees
- Currency and version control

Standard 5	Recognition of qualifications issued by other RTOs

The RTO recognises the AQF qualifications and Statements of Attainment issued by any other RTO

- Credit transfer

Standard 6	Access and equity and client service

The RTO applies access and equity principles and provides timely and appropriate information, advice and support services which assist clients to identify and achieve their desired outcomes.

- Access and equity
- Information for clients
- Learner support

Figure 8b

Organisational level: relevant AQTF standards, related to skills for staff involved directly in online delivery/assessment

Standard 7	The competency of RTO staff
	Each member of the RTO staff who is involved in training, assessment or client service is competent for the functions they perform. • Staff recruitment, induction and professional development • Staff induction – VET • Staff qualification (assessors) • Staff qualification (teachers/trainers)

Figure 8b

Organisational level: relevant AQTF standards, related to skills for staff involved directly in online delivery/assessment

Figure 9
Teaching and learning level: AQTF standards with specific relevance to online designers, developers and deliverers.

AQTF Standard	What this means	
	Designers/developers	Deliverers
AQTF 1.9 a Collect client feedback The RTO must collect and analyse stakeholder and client feedback and satisfaction data on the services it provides	• incorporate online feedback tools in assessment task design	• inform learners of feedback/client satisfaction processes
AQTF 2.1 Comply with laws The RTO must identify and comply with relevant State or Territory laws including Commonwealth or State/Territory legislation on: (i) occupational health and safety (ii) workplace harassment, victimisation, bullying (iii) anti discrimination, including equal opportunity, racial vilification and disability discrimination	 • ensure all tasks comply with current OH&S regulations • n/a • ensure task design complies with current legislation	 • ensure learners are informed of current Institute OH&S information • manage communication and monitor for inappropriate online behaviour • ensure equal access in an equal environment for all learners
AQTF 4.1 Maintain records The RTO must document and implement procedures to assure the integrity, accuracy and currency of records that include, but are not limited to: (i) secure storage, including backup of electronic records	 • ensure online design includes: - storage of records - backup - secure access in accordance with the RTO's procedures	 • record, log, document online tasks and outcomes
AQTF 4.2 Retain records The RTO must retain up-to-date records of: (ii) enrolments and participation	 • incorporate - records of enrolment - tracking of online participation	 • ensure all learners are enrolled online • record evidence of online participation
AQTF 6.1 Access and equity The RTO's policies and procedures must incorporate access and equity principles	• develop a range of assessment submission alternatives (where possible) • respond to identified target groups and learner needs • use 'intuitive' and logical navigation design	• offer a range of assessment and submission options as appropriate for identified learner group • provide support in accessing and submitting assessment

AQTF Standard	What this means	
	Designers/developers	Deliverers
AQTF 8.1 RTO assessment The RTO must ensure that assessments, regardless of whether through a training and assessment pathway or an assessment-only pathway:		
(i) comply with the assessment guidelines included in the applicable nationally endorsed Training Packages or the assessment requirements specified in accredited courses	• Refer to Training Package and Assessment Guidelines and design tasks to: - address assessment requirements - address all assessment criteria in Learning Outcome (See (iii))	• Refer to Training Package and Assessment Guidelines (See (iii))
(iii) comply with the principles of validity, reliability, fairness and flexibility	• Evaluate appropriateness of online as an assessment mode • Include a range of assessment tasks as appropriate • Incorporate feedback and support mechanisms • Investigate verification processes to authenticate student performance • Validate task	• Select assessment strategies and types to suit target group and learner needs • Integrate assessment into program delivery • Provide feedback and support to learners • Integrate strategies to authenticate student performance
(iv) provide for applicants to be informed of the context and purpose of the assessment and the assessment process	• Include ways of informing learners of assessment requirements and processes in assessment design	• Inform learners of assessment requirements and processes
(v) where relevant, focus on the application of knowledge and skill to the standard of performance required in the workplace and cover all aspects of workplace performance, including task skills, task management skills, contingency management skills and job role environment skills	Where relevant: • Identify specific workplace standards for incorporation into task design • Identify Learning Outcomes which could be assessed online	• Conduct assessment in the context of the workplace • Select appropriate assessment mode
(vi) involve the evaluation of sufficient evidence to enable judgements to be made about whether competency has been attained	• Ensure number and/or range of task/s enables collection of sufficient evidence	• Ensure assessment provides sufficient evidence of competency
(vii) provide for feedback to the applicant about the outcomes of the assessment process and guidance on future options	• Ensure access to assessment outcomes and feedback for learners	• Provide assessment outcomes and feedback to learners
(viii) are equitable for all persons, taking account of cultural and linguistic needs	• Design tasks appropriate to target learners	• Select assessment strategies and types to suit target group and learner needs

AQTF Standard	What this means	
	Designers/developers	Deliverers
AQTF 8.2 RPL a. The RTO must ensure that RPL is offered to all applicants on enrolment	• Include information about the availability of RPL	• Inform learners of the availability of RPL
AQTF 9.1 Learning and assessment strategies The RTO identifies, negotiates, plans and implements appropriate learning and assessment strategies to meet the needs of each of its clients. (a) The RTO must develop and implement strategies for training delivery and assessment for each Training Package qualification and accredited course within the RTO's scope of delivery.	• Refer to and address Training Package or accredited course outcomes	• Address Training Package or accredited course outcomes

(b) The assessment strategies referred to in Standard 9.1a must be developed in consultation with enterprise/industry.	• Consult with industry:
	  - content specialists
	  - industry advisers
		• Consult with industry:
		  - content specialists
		  - industry advisers

(c) The delivery and assessment strategies referred to in Standard 9.1a should identify proposed target groups, delivery and assessment modes and strategies, assessment validation processes and pathways	• Identify target group • Identify appropriate assessment mode/s and strategies • Validate tasks	• Identify target group • Identify and implement appropriate assessment mode/s and strategies • Validate assessment performance • Identify assessment pathways
(d) The RTO must document the strategies referred to in Standard 9.1a on application for registration and extension of scope.	• Document steps taken in Standard 9.1a, b and c	• Document steps taken in Standard 9.1a, b and c
AQTF 9.2 Validation The RTO must validate its assessment strategies by: (I) reviewing, comparing and evaluating the assessment processes, tools and evidence contributing to judgements made by a range of assessors against the same competency standards at least annually; and	• Validate assessment tasks and process	• Attend validation meetings as arranged by the RTO

AQTF Standard	What this means	
	Designers/developers	Deliverers
AQTF 9.3 Delivery and assessment processes The RTO must ensure that in developing, adapting or delivering training and/or assessment products and services: (i) methods used to identify learning needs, and methods for designing training and assessment, are documented (ii) the requirements of the Training Package or accredited course are met (iii) core and elective units, as appropriate, are identified (iv) customisation meets the requirements specified in the relevant Training Package or, for accredited courses, meets the NTQC customisation policy (v) language, literacy and numeracy requirements develop the learning capacity of the individual and are consistent with the essential requirements for workplace performance specified in the relevant units of competency or outcomes of accredited courses (vi) delivery modes and training and assessment materials which meet the needs of a diverse range of clients are identified (ix) where assessment or training is conducted online or by distance, the RTO has effective strategies for learner support, monitoring and assessment.	Document instructional design processes as they relate to: • Training Package (core and elective units, customisation, target group) • learner needs (language, literacy, numeracy; learning styles; online medium) • Incorporate online monitoring, feedback and support tools in assessment task design: - tracking learner activity - bulletin boards - email - resource links	Document • Training Package - core and elective units - customisation - target group • learner needs - language, literacy. numerac - learning styles) - appropriate modes of assessment (especially online delivery) • the assessment process • Provide information about support services • Monitor learning and assessment *(See also Standard 8.1)*

Quality: implications for this project

The project team believes it is important to locate quality as something which flows from and is embeddded in good practice and innovation – as a way of providing training and assessment solutions to meet learners' needs, rather than an add-on driven by compliance.

To this end, the project will aim to:

- emphasise the pedagological issues at the core of online assessment
- drill down to describe the tasks involved and locate AQTF requirements in their action context
- seek tools to generate, as well as document, good practice
- articulate the necessary support systems and structures.

5 Models and strategies

What methods for assessing online have been described?
What are the strengths and weaknesses of the online environment for assessing learning outcomes?

Introduction: learning and assessment in VET

Different cultures

The role and nature of assessment in a system or organisation will obviously depend on its dominant assumptions or models of teaching and learning. Booth (Booth et al, 2003) points out that higher education in Australia uses a predominantly knowledge-based approach to learning and assessment, with a rhetoric which stresses generic outcomes (such as the development of critical thinking), whereas VET (as a sector) supports a performance-based approach, resulting in evidence of achievement against national standards in authentic settings, and workplaces in particular.

The reality is not quite so simple. TAFE institutes, for example, have a range of sub-cultures in their teaching and learning practice; trade, business, community services, hospitality, access and humanities departments have very different methods and approaches to learning and assessment within an overall competency framework. As an indicator, some will use conventional essay-style, knowledge-based assignments (both formative and summative); others will use no essays at all. Some will use extensive small group work and participatory learning methods; others will base their teaching on the instructionist coaching style they bring into TAFE from the training culture in their industry. These differing practices and assumptions are likely to carry across when they design learning and assessment in the online environment.

Learning activities or assessment tasks?

One clarification is important in the link between learning and assessment. We suggest that 'assessment tasks' are just a special case of 'learning activities':

- like assessment tasks, learning activities can be formative (a step along the way) or summative (drawing all skills and knowledge together)

- assessment tasks are identical to learning activities – the only difference is the way in which they will be used, and when

- the same range of options for learning activities (case studies, scenarios, demonstrations etc) is available for designing assessment tasks.

This has implications for this project, because designing good assessment is very similar to designing good learning activities, so assessment involves the full range of pedagogical issues and methods. Describing a repertoire for online assessment, in other words, is effectively describing the range of learning activities available in the online environment.

As an illustration, the VET national Flexible Learning Toolboxes which provide support resources for online delivery do not include prescribed assessment tasks to cover all outcomes. However, assessment tasks can be customised, and many of the more holistic learning activities can be adapted by teachers for the purposes of formal assessment against the competencies.

5.1   Models of learning and assessment

Models: Macro-level descriptions or representations of assessment systems or approaches, usually presenting a preferred conceptual framework for planning and conducting assessment, and its role in teaching and learning.
— from the project glossary

At the macro level, we will describe a number of influential learning models and theories which have different implications for assessment practice.

5.1.1   Adult learning theories

Adult learning theories describe the special characteristics of adults as learners. An understanding of these characteristics is considered essential for designing quality learning and assessment. A review of sample literature (Knowles, 1980; Campbell, 2001; Lieb, 1991) provides a list of the adult characteristics relevant to learning.

Adult learners:

- are continuous learners

- are autonomous and prefer to manage their own learning

- need to be shown respect

- expect learning to be meaningful and relevant

- need to know what they are learning and why they are learning it

- have previous experiences that may include work-related activities, family responsibilities and previous education

- are problem-centred rather than content-oriented

- are goal-oriented

- are best motivated by internal motivators such as self-esteem, quality of life or increased job satisfaction

- have responsibilities beyond the training situation

- have varied learning styles.

Implications for assessment

Assessment responsive to adult learners will:

- acknowledge and build on the learner's previous experience and learning

- adapt outcomes and assessment tasks to match learners' needs and motivation

- encourage learners to be self-directed by taking control of their learning and assessment pathway

- emphasise problem solving for tangible outcomes

- emphasise experiential and contextual learning and assessment approaches, so learners can demonstrate outcomes in their life or work setting

- take learners' preferred learning styles into account in designing assessment options.

5.1.2 Systematic Design of Instruction (SDI)

SDI grew from a combination of systems theory and cognitive psychology, and is best represented by the classic text of the same name by Dick and Carey from Florida State University (Dick & Carey, 2000). This approach involves:

- preparing explicit and detailed behavioural objectives
- completing a thorough analysis of learners and the learning context
- formulating assessment tasks *before* developing the content, activities and courseware
- specifying skills for entry level, with a pre-test to check these
- selecting methods and strategies most suited to the outcomes
- developing and testing learning materials before delivery
- using explicit formative assessment (self-assessment) for learners to mark progress throughout the program
- iterative improvement of the materials and instructional system through continuous evaluation.

This approach has evolved as the ADDIE model of instructional design (Analysis, Design, Development, Implementation and Evaluation) which has been adapted for the design of the product from this project. The model also owes much to Gagne's 'conditions of learning', which emphasise the sequence and nature of the instructional events which are necessary to engage learners, enhance information retention and stimulate recall – an information processing cognitive model.

The model has been widely criticised as inflexible, unwieldy, expensive, unrealistically linear and 'instructionist', now the most serious offence. SDI is best suited to large-scale projects involved with developing expensive courseware which needs to be quality-tested; the 'stages' of the model, it can be argued, are almost commonsense generic requirements in online courseware development – or any 'project' for that matter. The full model is less useful for the single teacher/author preparing and adapting a course for learners who may be unknown until the first session – which covers much of VET practice.

Implications for assessment

Assessment has a clear shape in SDI:

- state all outcomes as performances during the analysis stage
- draft (design) assessment tasks before beginning development, indicating the evidence required for satisfactory standard of performance
- construct the learning activities to build systematically to competence for the assessment tasks (and avoid distractions and irrelevant content)
- provide formative assessment, including self-assessment, throughout.

In broad terms, this sounds very similar to the assessment approach inherent in the assessment protocols in National Training Packages.

Example

Perhaps because of the relative complexity of preparing learning materials (courseware) for the online environment, elements of the SDI model are common in online developer practice.

TAFE frontiers in Victoria uses a version of the ADDIE process for the contract management of its commissioned courseware:
 http://www.tafefrontiers.com.au/static/TF_Usability/files/process.pdf

Interestingly, contractors have generally had no problem with the model but often express resistance at the requirement to draft assessment tasks before development begins (ie at design stage), suggesting that this aspect of performance-based design is less than fully accepted in the system.

5.1.3 Criterion Referenced Instruction (CRI)

CRI is best represented by the training approach developed by Robert Mager. The program explicitly teaches how to express training goals as performances, analyse skill and knowledge requirements, design training and assess outcomes (Mager, 2000).

'Criterion-referenced' is a near-synonym for 'competency-based', although Mager does not link performance statements to national standards – the training practitioner does this analysis to describe the learning outcomes for the target group, a process similar to preparing competency standards on a local scale. CRI therefore teaches the explicit core skills of goal analysis, process analysis (flowcharting), skill analysis and preparing behavioural objectives. These skills are very useful when designing the learning program to achieve the performance outcomes (or competencies), particularly for areas of convergent knowledge and agreed procedures.

Implications for assessment

CRI is similar to SDI, and adds:

- analyse all outcomes into performances, using goal analysis techniques – 'How would you know one (a competent performer) when you saw one?'
- identify what performance improvements you aim to achieve, and analyse which of these can be addressed by training (ie identify whether they are due to a skill or knowledge deficit)
- delete performance outcomes which can be met by means other than training (the most expensive and difficult option), such as work redesign, job aids, incentives
- make assessment tasks explicit to learners at the outset of the program, and show the steps they will take (a course map)
- require 'mastery' at formative assessment levels – get it right before you move on.

5.1.4 Constructivism

Constructivism is a theory of learning which holds that learners learn by actively constructing meaning by interacting with their environment and incorporating new information into their existing knowledge base. Interaction and cooperation are considered essential to provide motivation, support, modelling and coaching. Implicit in the theory is that delivery systems, including assessment,

should support these organic patterns of learning rather than imposing 'instructionist' frameworks.

Unlike applied models such as SDI and CRI, constructivism as a theory offers no particular process or guide to practice, but advocates a range of teaching and learning methodologies considered compatible with the theory. Most of these are similar to practices recommended by adult learning theorists, but with a stronger emphasis on exploration, collaboration and problem solving. They include:

- promoting active learning engaging learners actively in the learning process
- providing opportunities to construct meaning by assisting learners to build their own cognitive structures, based on previous knowledge, to integrate new knowledge and skills
- encouraging collaboration, by providing environments in which people learn from each other and solve problems together
- supporting intentional learning, by linking learning to the learner's goals
- addressing real problems, engaging learners in solving the complex and ill-structured problems they will encounter in the real world
- contextualising learning, by situating learning in some meaningful real world task, or by using simulated, case-based or problem-based learning
- promote conversation by involving learners in dialogue so that they can appreciate multiple perspectives
- promote reflection, by providing opportunities for learners to reflect on learning process and how they can apply what they have learnt to new situations.

Constructivism can be linked to a range of social theories identified by the term 'post-modernism'. For example, Reeves (1997) points to the wider recognition that there is no 'absolute' knowledge and that there is more than one viable perspective on knowledge in many areas, including mathematics and science.

Constructivism in the online environment

Wonacott (2000) has summarised the advantages and disadvantages of the online environment as a vehicle for constructivist learning approaches.

The Web has high potential and capability to support constructivist approaches to teaching, learning and assessment by:

- providing a rich, exploratory information environment
- providing wide options, learner choice, multiple perspectives
- catering for different styles, intelligences
- having the capability for self-assessment and feedback
- being rich in opportunities for collaborative activities (communication tools)
- encouraging a facilitator/guide role for the instructor.

On the other hand, there are reasons why online practice falls short of the promise:
- information overload – the uneven quality and reliability of material

- learners may lack skills (to operate, navigate, manage) and get lost
- learning designers don't use the potential
- constructivism is not always appropriate (for the learning outcomes, the content area or the timeframe)
- constructivist courseware is expensive to develop
- many instructors are uncomfortable with the facilitator role, which may be even more challenging in the online environment, and requires very distinct communication skills and techniques.

There are other challenging issues for VET. Peter Smith's studies (Smith, 2001) of traditional VET learner cohorts indicates that they prefer:

- clear structures and outcomes
- guidance on how to work through materials
- learning support (from the instructor)
- a chance to learn with others, face-to-face
- hands-on learning, demonstrations, practice
- limited amounts of text, writing and reading
- clear links and consistency between learning materials and the instructor's input.

This would indicate that for some VET clients there may be significant limitations on the appeal of constructivist approaches and online delivery, especially when these are combined. On the other hand, constructivist approaches promise much for developing the valuable collaborative, innovative and self-managing capabilities in demand in the workplace. Perceived needs at a societal or policy level may not translate smoothly into demand at the level of personal choice.

Identifying and articulating the appropriate uses of constructivist methods in online assessment in VET will be one of the key challenges of this project.

Implications for assessment

Constructivism challenges many of the conventional assumptions in the assessment of learning:

- the learner is not an empty vessel, but an individual with pre-existing knowledge, aptitudes, motivations, and other characteristics, so these need to be acknowledged
- most meaningful learning is collaborative, not individual, so new methods of assessment are needed to discriminate between individual and group performance
- ongoing self-assessment (and self-monitoring) is a key part of learning, so summative assessment becomes only part of the picture, not the whole game
- if meaning is a group and individual construct, outcomes will be divergent and comparisons less appropriate.

Australian research on online learning and assessment makes much of the need to develop a more constructivist pedagogy, but provides little analysis of its relevance to VET curriculum and VET target groups.

5.1.5 Situated learning

A variation of learner-centred constructivism is social constructivism or more simply 'situated learning'.

In his discussion of theories to underpin development of genuinely collaborative tools for the web environment, Bonk (1995) contrasts the teaching practices and principles of a 'cognitive constructivist' and the 'social constructivist' approaches. The core distinction is in the concept of mind – instead of identifying the mind with the head (cognitive variety), the social variety locates the mind in social interaction, so knowledge emerges from a community of practice.

Implications for assessment

Bonk summarises the different assumptions about assessment of the two forms of constructivism:

- cognitive
  focus on individual cognitive development within predefined stages; use authentic portfolio and performance-based measures with evaluation criteria and scoring rubrics

- social
  focus on assessment in team as well as individual participation in socially organised practices and interactions; standards are socially negotiated; embed assessment in authentic, real-world tasks with challenges and options; focus on collaboration, group processing, teamwork and sharing of findings; assessment is continual, subjective, collaborative, cumulative and less formal.

While there are aspects of both forms of constructivism apparent in the guidelines for competency-based training in VET, the social variety seems to be better suited to work-integrated, performance improvement models of learning in organisations – and to the collaborative learning potential of the Web environment which Bonk explores.

5.1.6 Problem Based Learning

Problem Based Learning (PBL) is a logical extension to the constructivist approach. Many people advocate PBL as one of the most meaningful and important kinds of learning as it involves utilising domain knowledge, semantic mapping, goal setting, motivational and attitudinal components and meta-cognitive processes (Jonassen, 1997).

The types of problem solving available to the designer fall primarily into two areas: *well-structured* and *ill-structured* problems. The use of well-structured problems is more common in the VET sector as solutions are usually based upon a constrained set of knowledge or skills. Ill-structured problems can be more beneficial to the learner as they emulate the sorts of real problems they will face in the workforce. However, Jonassen (2002) concedes that the complexity of such problems often calls for the learner to demonstrate skills they do not yet have.

Implications for assessment

The approach to assessment in PBL poses challenges for the designer working in the environment of competency-based training and national Training Packages because

- CBT does not easily offer opportunities for assessment of the higher order analytical and problem-solving approaches that are inherent in PBL
- the problem-solving process may not fall neatly into the stated competencies and often dictates a group assessment process.

The online environment adds a further layer of complexity to the task. It is clear here that the designer and teacher may need to provide a great deal of scaffolding to support a problem-centred learning and assessment process, particularly for learners in the lower qualification levels in the VET sector.

5.1.7 Competency-based training

Competency-based training as a pedagogy is similar to criterion-referenced instruction. In Australia it has been combined with a system of nationally recognised competency standards and a qualifications framework to form the distinctive national training and assessment model for the VET system.

The features of the Australian model most relevant to learning and assessment include:

- training outcomes developed by analysis of the roles, tasks and current needs of industry
- publication of outcomes as national standards, uniform performance statements with detailed performance criteria
- evidence-based assessment against the published criteria with assessment conducted in authentic settings, including workplaces
- publication of detailed guides to the evidence appropriate in assessing competence
- systematic moderation of assessment for quality control.

The parallel recognition system includes a variety of regulatory and compliance components, as well as an underpinning qualifications structure.

Implications for assessment

The competency-based system creates a very distinctive teaching and assessment environment for VET practitioners. The project team has identified the most significant differences for assessment in the online environment.

- **Common outcomes and resources**
  The competency standards provide opportunities for sharing learning and assessment materials locally and nationally, especially with a large bank of funded Crown copyright resources (Flexible Learning Toolboxes).

- **Evidence-based assessment**
  Assessment tasks are based on demonstrated capability, so underpinning knowledge is part of formative assessment, not the final or summative assessment process.

- **Workplace-based assessment**
  Assessment settings need to be as authentic as practicable.

- **Wide range of outcomes**
  VET courses address a more extensive range of outcomes, skill levels and knowledge types than other sectors, so designers need a wide repertoire of assessment strategies.

- **Wide range of training methods**
  VET organisations encompass a range of approaches to learning and assessment to meet the needs of different subject areas and more diverse client groups.

- **Generic skills**
  As well as subject or industry-specific skills, VET courses address identified generic skills which need to be integrated into training and assessment processes.

- **Moderation processes**
  VET staff are accustomed to participating in collaborative processes for testing assessment reliability across providers, a system which builds richer interpretations of the performance criteria and increases skills and awareness of assessment methods.

- **Assessor training and accreditation**
  Specific qualifications are required to conduct assessment in VET.

Models: implications for the project

Assessment options and approaches will be strongly conditioned by underlying models of learning. The project should:

- assist practitioners to clarify their own assumptions and personal 'model' of assessment

- provide assistance in identifying when an instructionist or more constructivist approach is appropriate and relevant

- clarify the practical differences in designing assessment according to each model

- provide examples of the different models in practice

- identify any other tools, guides or resources for developing valid assessment activities in the newer constructivist methodologies.

- provide advice on choosing an eclectic mix of strategies which suit the needs of the learning context.

Figure 10 demonstrates how several of the models and theories identified are integrated into current guidelines for developers of VET learning and assessment resources.

The project will keep in close touch with the current ANTA research project (E Learn WA/ TAFE frontiers), *To instruct or construct? That is the question*, which is investigating *learner responses* to constructivist features in existing learning materials in VET.

Figure 10
SAMPLE: Instructions to course designers from the TAFE frontiers developers kit

> The principles show elements of adult learning, SDI, competency based training, constructivism, and situated learning.

Learning design principles

TAFE frontiers encourages you to design and develop learning materials which emphasise the active, engaged role appropriate for adult learners, with these design principles.

Learner focus

- **Provide a context**
  Provide advice and opportunities for learners to relate their learning to their goals, background, experience, and current life and work setting.

- **Acknowledge capabilities**
  Address learners as adults, and design learning activities which encourage them to utilise their existing work and life experience.

- **Acknowledge other learning**
  Provide comments, prompts and advice to help learners integrate the course with their other ongoing learning (reading, on job practice etc).

- **Motivate learners**
  Actively encourage learners by describing specific benefits, highlighting challenges, providing variety, and prompting them to apply their learning.

Active learning

- **Engage the learner**
  Challenge learners to apply and develop their skills and knowledge by providing a variety of learning activities throughout their course.

- **Provide a pathway**
  Design learning activities which systematically build competency by rehearsing all the skills and knowledge required for each assessment task.

- **Encourage knowledge construction**
  Provide opportunities to locate and organise information, research the options, develop frameworks, invent strategies and find solutions.

- **Generate interaction**
  Plan activities which require contact with trainers and collaboration with other learners, using the TAFE VC communication facilities.

Skill development

- **Integrate higher-level skills**
  Ensure that materials in all subject areas address a full range of cognitive skills such as problem solving, synthesis, and reflective thinking.

- **Build learning skills**
  Integrate advice, tools and prompts to encourage learners to monitor their own learning, identify learning strategies and build their learning skills.

- **Build technology skills**
  Integrate advice, tools and prompts to build skills in using information and communication technologies (ICT) effectively for learning.

Applied outcomes

- **Assess for performance**
  Design assessment to measure the learner's competency to perform meaningful tasks by applying their knowledge and skills.

- **Encourage follow-up**
  Provide tools and prompts to learners to plan ways to apply and build on their learning during and beyond the course.

5.2 Strategies for learning and assessment

Strategies

Methods of assessment at the program or course level, including the repertoire of options available to meet the needs of the learners, the learning context, the type of learning outcomes and the culture of assessment.

– project glossary

Describing the options

Although there is an extensive literature on assessment methods in general, including evidence-based assessment of performance outcomes, there is still surprisingly little agreement on describing the repertoire available to designers, trainers and assessors, or about which techniques are appropriate in the online environment or can be readily adapted.

Purposes for assessment

Booth (2003) summarises the main types of assessment (in 'institution-based learning') according to the purpose of assessment:

- diagnostic (or pre-course) assessment)
  - granting recognition of current skills and knowledge
  - testing for course placement
  - identifying learning needs for course design

- formative assessment

- summative assessment.

Learning designs

Oliver and Herrington (2001) describe these varieties of 'learning design':

- situated learning

- problem-based learning

- case-based learning

- project-based learning

- inquiry-based learning

- role-playing.

These categories sit somewhere between 'models' and 'strategies' as we have defined them for this project. They can describe a whole approach to learning adopted for a course or across a larger program or specific design options within a course. Since there is little reason why designers in the VET context would want to restrict themselves to any one of these approaches, we will aim to articulate these designs as optional strategies within a course.

Oliver's more recent work identifying exemplar structures or templates for the learning designs is not yet available. It promises to provide valuable practical tools for designing learning and assessment online.

Web-friendly instructional activities

Curtis Bonk (2001) surveyed online trainers and teachers in the USA and asked them to rank specific 'instructional activities' in order of their suitability for Web-based learning. The activities identified, in order of suitability were:

- critical and creative thinking
- laboratory activities
- scientific simulations
- data analysis
- performance.

As we have discussed, most types of learning activities can also be used as assessment tasks. In blended learning environments, course designers can use guides such as this to help decide what assessment can best be done online, and which can best be done face-to-face. The project team aims to gather Australian data on current usage from our field research.

Assessment methods

Brewer (2002) identifies the following methods in use in VET in Australia:

- workbook/portfolios
- case studies
- on-the-job demonstration with workplace witness testimony
- assignments
- digital imaging
- videotaped online role-play/workplace simulation
- bulletin board/chat
- problem-solving scenarios
- computer generated marking
- work-based activities.

Methods and tools

Booth (2003) lists the following activities, combining 'methods' and 'tools':

- online discussion
- bulletin boards
- collaborative assignments
- self assessment
- online exams
- online quizzes
- computer-marked assignments
- portfolios
- role-play
- simulations
- email
- Web publication
- Web design and development.

Lesson structures

William Horton (2000) provides perhaps the most practical and explicit guide available to online designers and teachers. He describes six 'common lesson structures' suitable for Web-based training:

- classic tutorials
- activity-centred lessons
- learner-customised tutorials
- knowledge-paced tutorials
- exploratory tutorials
- generated lessons.

The interesting aspect of Horton's approach is that he describes and illustrates diagrammatically the particular components for each structure, including testing or assessment, providing explicit advice for organising effective 'learning sequences'. Few other sources reach this level of specificity, or effectively provide a 'template' for practitioners. Horton also lists and discusses these 'common learning activities' for Web-based training:

- webcast
- presentation sequence
- drill and practice
- scavenger hunt
- guided research
- guided analysis
- team design
- brainstorming
- case study
- role-playing scenario
- group critique
- virtual laboratory
- hands-on activity
- learning game.

Finally, Horton describes what Web-based training can add to regular classroom activities, and how to convert classroom activities to the Web-based environment.

Approaches, methods, types and tools

The TAFE frontiers webtool *Doing assessment online,* Atkins and Hannon (2002) provide a wide range of sample online assessment tasks and an extensive database of software tools which can be used to extend the functionality for assessing online. The site also provides one of the most detailed and practical menus of assessment options for developers and teachers, supported by a framework which comes closer than most to capturing the complexity and range of learning and assessment in VET.

After describing the context of the course by completing a detailed course 'profile', users are invited to analyse their 'teaching-learning model' by considering where their course sits on a continuum against five characteristics of the assessment.

Figure 11
Selecting an assessment approach (teaching-learning model)
from *Doing assessment online*

From …		to …
Closed/Convergent ⟶		**Open/Divergent**
Assumes there is one or perhaps several correct answers typically associated with MCQ		Assessment which is open-ended and allows for creativity
Collaborative ⟶		**Individual**
Requires students to work cooperatively in pairs/groups		Requires students to work individually
Embedded ⟶		**Discrete**
Assessment forms part of the regular activities of the learner eg blogs, contributions to a forum		Particular sessions are designated as assessment sessions eg final exam
Knowledge ⟶		**Performance**
Assessment of what learner knows eg can recall a fact		Assessment of evidence that student can perform a particular task eg. write a report under given conditions
Learner monitored ⟶		**Teacher monitored**
Feedback from assessment goes straight to the learner and perhaps to the teacher		Feedback goes directly to teacher or is generated by teacher and then conveyed to student

Users of the webtool then move on to select appropriate 'methods' and 'types' of assessment.

Figure 12
Selecting assessment methods and types
from *Doing assessment online*

Assessment method	Assessment types
Factual, logical, "objective" testing	Closed assessment: • quizzes: multiple choice, True/False • calculation • text entry or gap fill exercises • crossword • matching pairs
Formative assessment (self-assessment)	Closed assessment: • quizzes: Multiple choice, True/false, short answer questions • open assessment: • draft reports or essays
Direct observation of workplace tasks	Checklists of • points to be observed • tasks • performance criteria
Short answer written responses	Written questions, gap-fill or open response
Report or essays	• written questions • sample answers
Role play/simulation	• description of scenario/s • simulation instructions
Projects: case study, report, journal or website	• description of tasks • case study information • journal entries
Written response to online discussion threads	• description of tasks • sample response to thread
Written or oral reports from workplace supervisor/colleague	Checklists of • points to be observed • tasks • performance criteria
Oral questioning	• List of questions • pro forma for recording responses
Formal examination	• examination paper • sample answers • marking criteria
Portfolio of workplace evidence	• checklists • reports of completed projects • minutes of meetings • action plans • evidence of project outcomes
Peer group assessment	• case study information • journal entries • reporting the group

Strategies: implications for the project

A focus of the field research for this project will be describing and extending the identified range of strategies for assessment in the online environment. The clear difficulty encountered in the research scan is that there is a bewildering confusion of terms and categories, representing a considerable barrier to practitioners wanting practical ideas and guidance.

We will aim to clarify the terminology and find synergies between the available descriptions and categorisations. This will allow us to re-cluster the strategies so that developers, designers and teachers can make informed decisions about the most appropriate approach for their particular context.

Our challenge will include describing:

- practitioners' evaluation of the suitability of the different assessment strategies for the Web
- which strategies to select (online, face-to-face) in blended learning settings
- assessment options in fully online delivery
- which skill or industry areas in the VET sector may not lend themselves easily to online assessment.

Another key task for the project will be to identify emerging and potential strategies for assessment in the online environment.

6 Stages, roles and tasks

What are the common stages, steps and tasks involved in planning, designing, implementing and monitoring online assessment?
What are the key roles involved? What skills are needed?

The development and delivery process

The review of the literature has confirmed the typical stages and tasks relevant to developers and deliverers of online assessment tasks.

Booth (2003) offers a useful outline of the key points that will assist practitioners to develop effective online assessment under the following categories:

- the planning stage
- developing strategies
- implementation
- assessor support and review.

An extended and detailed description of these stages has been prepared by the project team.

Describing the stages and tasks

The project team's *Outline of the assessment process* (see Figure 13) lists the typical steps involved, drawing on the ADDIE instructional design model to describe the main stages. It provides a recognised and systematic way of investigating practice, as well as then structuring information and support tools.

The draft outline includes an additional first stage – 'Plan' – which has enabled the project team to address the underpinning institutional and systemic tasks needed to shape and support the teaching and learning program. In this way, all relevant AQTF standards can be woven into the process at the appropriate stages.

The more detailed *Overview of stages* table (Figure 14) details the key tasks relevant to assessment in each stage, and identifies the AQTF considerations relevant to each task. During the consultation phase of the project, developers and deliverers will be asked to comment on:

- the usefulness of such a staged process for describing and structuring their work
- the areas of greatest support need
- key technical tools and platforms available to assist at each stage
- examples of good practice at each stage.

Figure 13
Outline of the assessment process: typical stages and tasks involved in the online learning assessment process

Shows the key tasks related to assessment. The process is rarely as linear as the diagram would suggest, but all tasks will need to be addressed in some way, according to the type of online learning and the roles of staff responsible.

A Plan	B Analyse	C Design	D Develop	E Deliver	F Evaluate
A1 Describe assessment requirements	**B1** Describe learners	**C1** Select assessment approach	**D1** Construct tasks	**E1** Ensure learners are informed of criteria	**F1** Validate assessment tasks and procedures
A2 Plan online support arrangements	**B2** Describe assessment context	**C2** Draft assessment tasks	**D2** Write assessor guides	**E2** Conduct and manage the assessment process	**F2** Evaluate assessment process
A3 Ensure staff have appropriate skills	**B3** Review current practice	**C3** Identify tasks suitable for RPL	**D3** Conduct PD for teachers (as required)	**E3** Support learners	**F3** Evaluate assessment tools (software etc)
A4 Plan testing schedule for online courseware	**B4** Identify existing resources		**D4** Trial assessment tasks	**E4** Record results	**F4** Modify assessment process, tools and/or tasks as required
A5 Allocate resources	**B5** Evaluate range and type of assessment		**D5** Revise or modify tasks as necessary		

Figure 14
Overview of stages: the development and delivery process, showing task detail and AQTF standards applicable to each task

Includes all tasks. Most practitioners will be involved in only a sub-set of these, depending on their role and the type of online learning approach being used.

Plan	Analyse	Design	Develop	Deliver	Evaluate
A1 Describe assessment requirements *AQTF 8.1 (i)* • balance of evidence • variety of sources • consistent and repeated demonstration	**B1 Describe learners** *AQTF 6.1* *AQTF 9.1 (c) 9.3* • learning styles/adult learning • familiarity with technology • access • accessibility issues *AQTF 2.1* • candidates for RPL *AQTF 8.2*	**C1 Select assessment approach** • Include range/possibility of blended approach • provide non-online opportunities if possible *AQTF 6.1 AQTF 8.1 (i) (iii) AQTF 9.1 (c) AQTF 9.3 (i)*	**D1 Construct tasks** • select appropriate development tools (software etc) • author tasks *AQTF 1.9 (a) AQTF 4.1 AQTF 4.2 AQTF 8.1 (vii)* • adapt tasks for RPL purposes *AQTF 8.2*	**E1 Ensure learners are informed of criteria for assessment** *AQTF 8.1 (i) (iv)* • clearly state criteria/timelines	**F1 Validate assessment tasks and processes** *AQTF 8.1* *AQTF 9.2* • ensure currency and accuracy of assessment task with current Training Package • share resources • moderation

Plan	Analyse	Design	Develop	Deliver	Evaluate
A2 Plan online support arrangements – quality *AQTF 8.1 (v)* • help desk • website management • technical infrastructure • complaints, grievances • backup and recovery procedures • feedback and communication • support information *AQTF 1* *AQTF 6*	**B2 Describe assessment context** *AQTF 8.1 (v)* • content area • theoretical/practical	**C2 Draft assessment tasks** *AQTF 8.1 (vi)* • seven characteristics of authentic tasks • create learner-centred tasks • opportunities for peer and self-assessment • provide models of appropriate tasks • develop key competencies (communication, problem solving, teamwork, collaboration) • legal issues • information for learners regarding assessment requirements • validate tasks *AQTF 8.1*	**D2 Write assessor Guides** *AQTF 9.1*	**E2 Conduct and manage the assessment process** *AQTF 8.1 (i)(iii)(v)(vi)* *AQTF 9.3 (i)* • select/offer appropriate mode/s of assessment • access and equity issues *AQTF 6.1* *AQTF 2.1* • strategies for electronic management • recording assessment *AQTF 4.1* *AQTF 4.2* • where to store? plagiarism/security *AQTF 6.3* • assess competency	**F2 Evaluate assessment process** • was the information about assessment task sufficient? • clarity of task: did students need further information? • feedback from tutor *AQTF 8* *AQTF 9*

Plan	Analyse	Design	Develop	Deliver	Evaluate
A3 Ensure staff have appropriate skills	**B3 Review current practice**	**C3 Identify tasks suitable for RPL** *AQTF 8.2*	**D3 Professional development for teachers (as required)** *AQTF 7.1*	**E3 Support learners** *AQTF 9.3 (ix)*	**F3 Evaluate assessment tools (software etc)** *AQTF 8* *AQTF 9*
• identify and schedule professional development for staff developing and delivering (as required) • generic underpinning ICT skills *AQTF 7*	• What works well? • identify opportunities for improvement • identify opportunities for innovation (online) *AQTF N/A*		• (Just In Time)	• provide support in accessing and submitting assessments *AQTF 6.1* • provide feedback to learners *AQTF 8.1(vii)* • provide opportunities for learners to clarify task • inform learners of feedback/satisfaction procedures *AQTF 1.9 (a)*	• evaluation of tools (ease of use, technical hitches etc)

Plan	Analyse	Design	Develop	Deliver	Evaluate
A4 Plan testing schedule for online courseware *AQTF 9.4*	**B4 Identify existing resources** *AQTF N/A*		**D4 Trial tasks** *AQTF 9.2*		**F4 Modify assessment process, tools and/or tasks as required** *AQTF 9*

Plan	Analyse	Design	Develop	Deliver	Evaluate
A5 Allocate resources • budget • staff • software • etc *AQTF N/A* *(covered above)*	**B5 Evaluate range and type of assessment** • RPL • informal • formal • summative *AQTF 8* *AQTF 9*		**D5 Revise, modify tasks as necessary** *AQTF 9.2*		

Who develops the online assessment tasks?

A continuing difficulty in discussing online practice is the inadequacy of conventional role and position titles to express the new tasks and relationships required for work in online environments

The COLIS project (Dalziel, 2002) has addressed this problem by coining a number of new function-based terms (rather than 'developers' or 'teachers') to describe the agents involved in processes related to the creation, distribution and use of learning materials (content).

Figure 15
The 'Global Use Case', or map of transactions, in utilisation of learning materials (Dalziel, 2003)
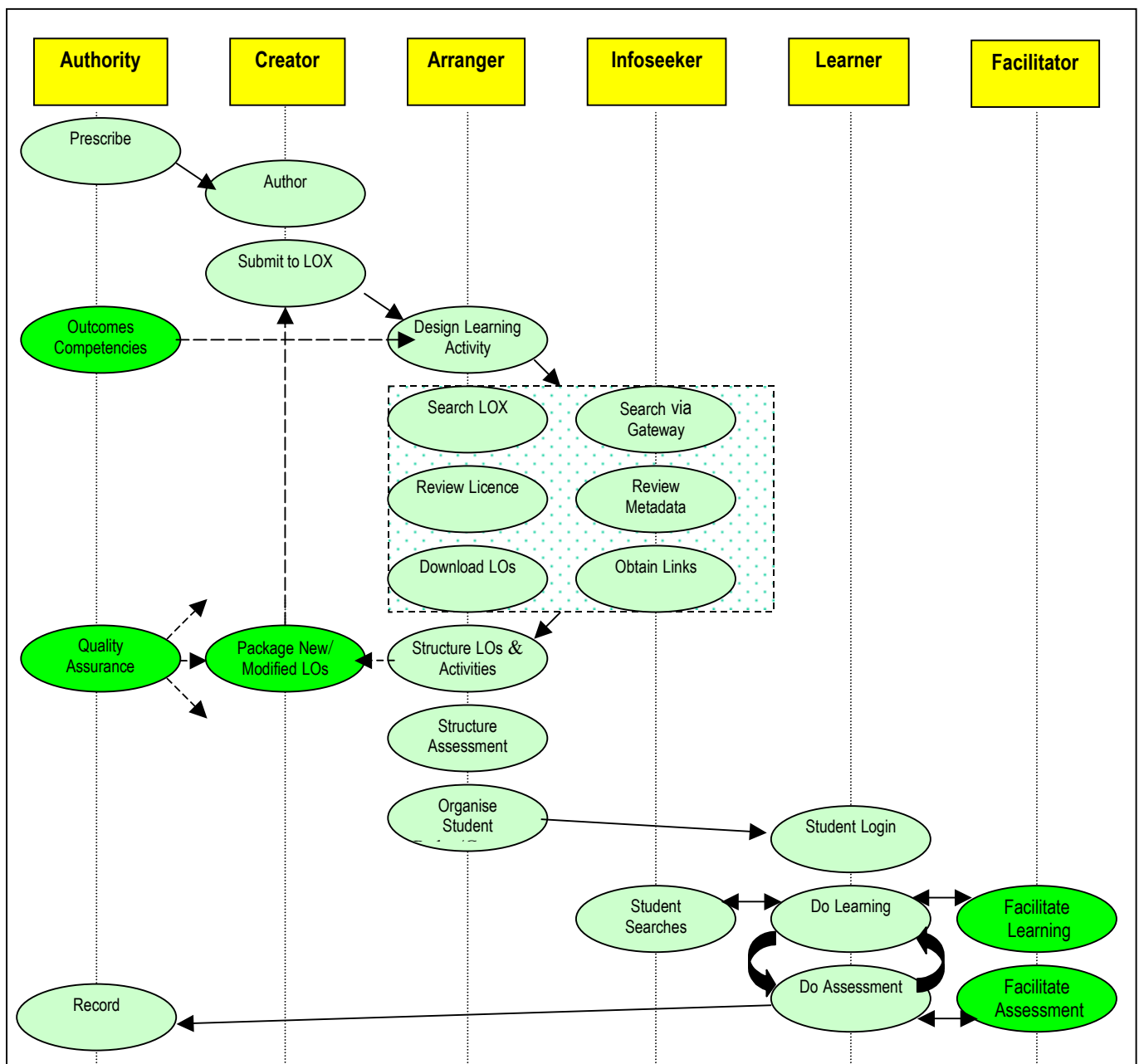
The COLIS concepts of author, arranger, and facilitator may be especially useful in describing the range of assessment practice in VET. The project team has identified some likely 'culture of use' scenarios to begin to clarify the different possible roles of VET practitioners in the development of online assessment.

There are four initial scenarios – we will explore these further in the field research. If the scenarios match practice in the field, we will be able to provide some optional 'guided tour' pathways through the website, so users get the kind of help most relevant to their role. We have currently plotted two of these scenarios (Figures 16 and 17)

- **The Collector** (arranger, facilitator)
  The teacher, usually working alone or with limited support, selects and re-arranges existing online courseware and assessment items from any available sources (such as Flexible Learning Toolboxes). The teacher/arranger effectively takes over from the point where the courseware developers stopped, and are mainly involved in the delivery and evaluation stages of the cycle, taking the assessment tasks as they are provided or modifying as needed. They are likely to need some help.

- **The Lone Ranger** (author, arranger, facilitator) **— see Figure 16**
  The individual teacher works through the various stages of the online development cycle and develops their own materials as needed, including the assessment tasks, using a range of available tools according to their skill level. It is likely that they will have limited time and resources and need quick solutions to the problems they are faced with. Especially if they are in a smaller private or community-based RTO, Lone Rangers are likely to be highly innovative and resourceful.

- **The Deliverer** (facilitator)
  The Deliverer works in a composite team or unit which designs, develops and delivers online programs from start to finish, perhaps for a client organisation or to meet an identified gap in the market. The Deliverer may be involved in various parts of the courseware development, but their main role is to deliver the program when the online materials and support are in place. They will use the assessment approach and items designed into the courseware. They are likely to be sessional teachers and be thrown in the deep end.

- **The Dream Team** (authors) **— see Figure 17**
  Working in a team (eg Flexible Learning Toolboxes), the designer designs the assessment approach and materials after a careful analysis with the target group and teachers involved in the delivery. The team is likely to be developing tasks with high-level software tools at their disposal, but may never be involved in the actual delivery. Members of the Dream Team are likely to be trained in instructional design.

Of course, these roles are not always distinct and all groups may need to dip in and out of the various stages of the Web-based guide depending on their situation.

Figure 16

Sample user pathway – the Lone Ranger

This sample user pathway shows the priority assessment-related tasks for teachers arranging to offer their course online as an essentially individual initiative with limited systems support.

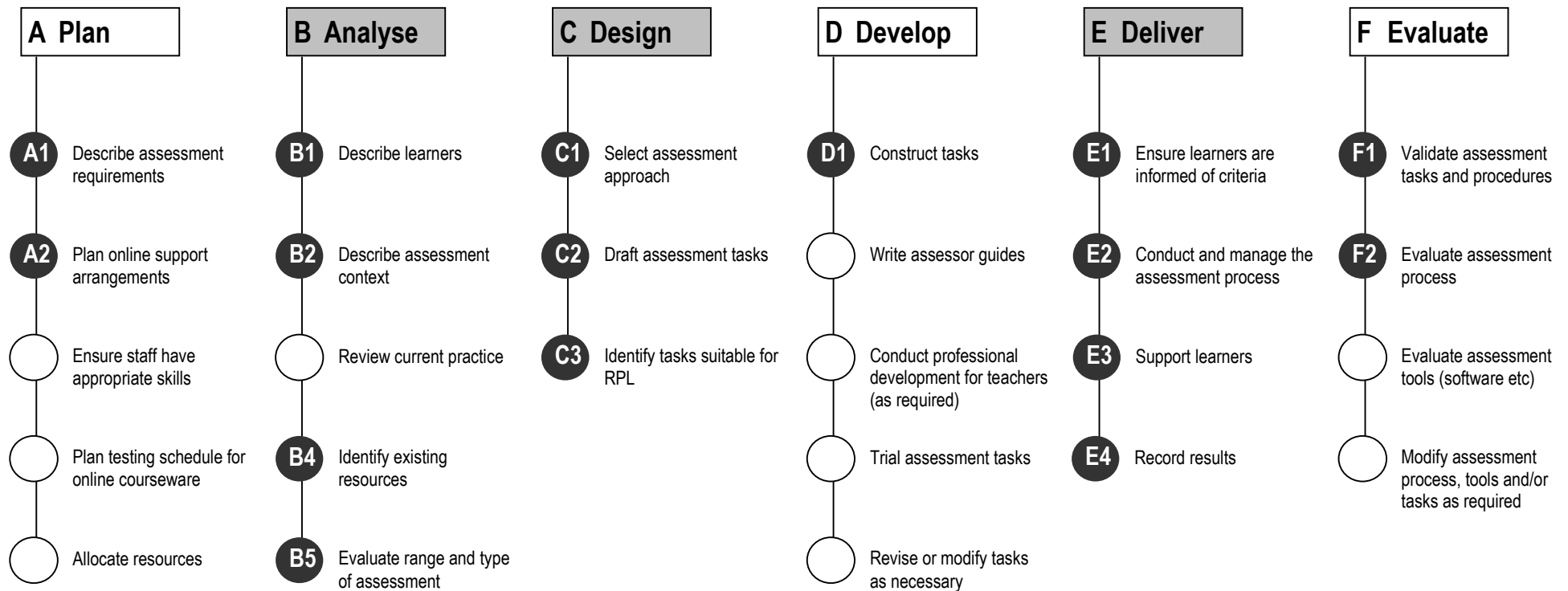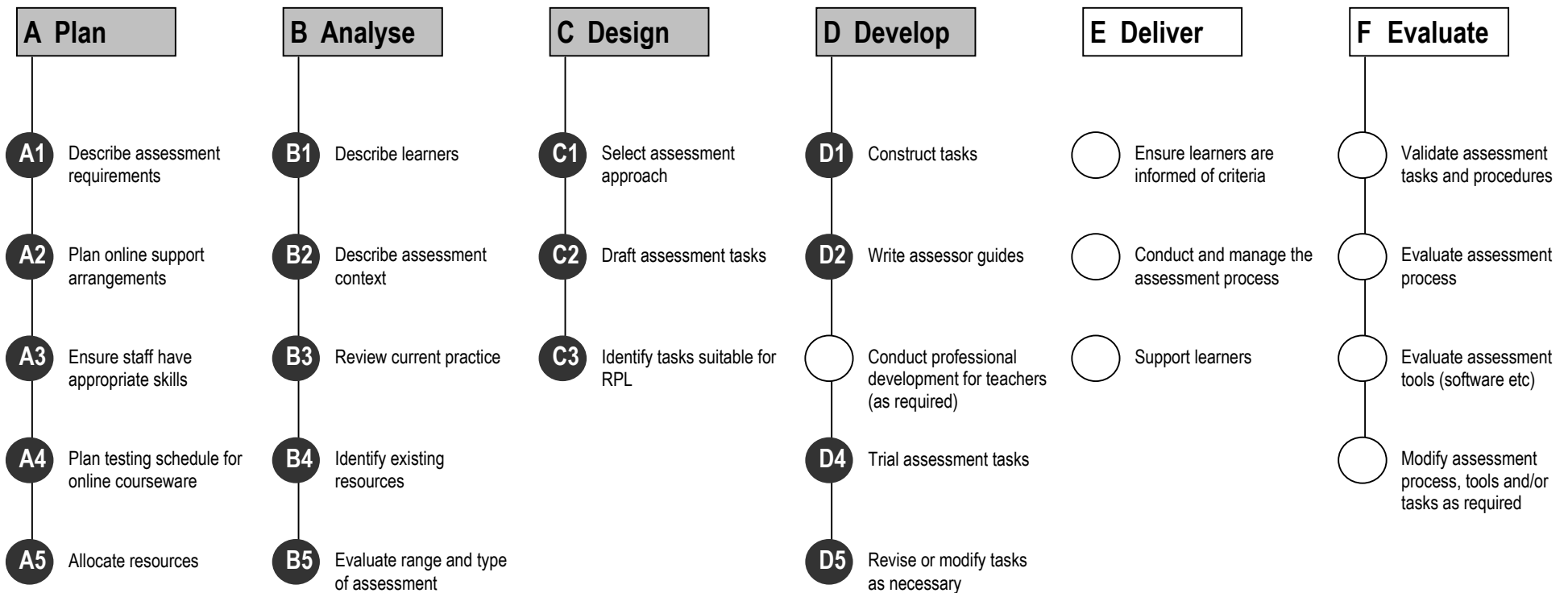| A Plan	B Analyse	C Design	D Develop	E Deliver	F Evaluate
A1 Describe assessment requirements	**B1** Describe learners	**C1** Select assessment approach	**D1** Construct tasks	**E1** Ensure learners are informed of criteria	**F1** Validate assessment tasks and procedures
A2 Plan online support arrangements	**B2** Describe assessment context	**C2** Draft assessment tasks	○ Write assessor guides	**E2** Conduct and manage the assessment process	**F2** Evaluate assessment process
○ Ensure staff have appropriate skills	○ Review current practice	**C3** Identify tasks suitable for RPL	○ Conduct professional development for teachers (as required)	**E3** Support learners	○ Evaluate assessment tools (software etc)
○ Plan testing schedule for online courseware	**B4** Identify existing resources		○ Trial assessment tasks	**E4** Record results	○ Modify assessment process, tools and/or tasks as required
○ Allocate resources	**B5** Evaluate range and type of assessment		○ Revise or modify tasks as necessary		

Figure 17
Sample user pathway – The Dream Team

Shows the priority tasks related to assessment for a project team developing funded courseware to be available through a VET repository.

A Plan	B Analyse	C Design	D Develop	E Deliver	F Evaluate
A1 Describe assessment requirements	**B1** Describe learners	**C1** Select assessment approach	**D1** Construct tasks	Ensure learners are informed of criteria	Validate assessment tasks and procedures
A2 Plan online support arrangements	**B2** Describe assessment context	**C2** Draft assessment tasks	**D2** Write assessor guides	Conduct and manage the assessment process	Evaluate assessment process
A3 Ensure staff have appropriate skills	**B3** Review current practice	**C3** Identify tasks suitable for RPL	Conduct professional development for teachers (as required)	Support learners	Evaluate assessment tools (software etc)
A4 Plan testing schedule for online courseware	**B4** Identify existing resources		**D4** Trial assessment tasks		Modify assessment process, tools and/or tasks as required
A5 Allocate resources	**B5** Evaluate range and type of assessment		**D5** Revise or modify tasks as necessary		

The skills needed

It is clear from the previous discussion on stages and roles that the skills needed will be many and varied. Depending on the complexity of the project or teaching situation the developers and teachers may need to develop skills in a range of areas. It is also worth noting that it may be impractical for one individual to gain all of these skills and a team-based approach will need to be employed to ensure coverage across the range of skills. This has implications for the organisation in its workforce planning and training.

Some of the skills that may need to be addressed are

- analysis and research
- planning and project management
- design (identifying, mapping, scoping, storyboarding, writing)
- software development skills in a range of applications from the simple (eg Hot Potatoes) to the complex (eg Flash).
- delivery and management skills in the use of online learning platforms
- e-moderation skills to ensure the appropriate use of discussion tools for assessment.

Skills: implications for the project

The project team will aim to address many of these areas by providing a range of tools for practitioner as well as a way of describing, organising and discussing their approach to assessment. However, it is important to note that the web-based guide being developed by this project is not a self-paced course, and does not attempt to replace the professional development strategies required to upskill staff for the online environment. Rather, the guide is being designed as a job aid which will provide just-in-time support through practical guides and tools.

Within the scope the project budget the team will prioritise development of any new support tools to fill gaps in available resources. We expect the guide will:

- confirm and clarify the user pathways to follow when developing online assessment
- clarify of roles and responsibilities in online assessment
- provide easy access to a range of selected guides and resources to meet different needs
- model a constructivist approach by allowing users to build their own assessment approach using the tools most relevant to them.

7 Resources for practitioners

What practical guides are available for online assessment in VET?

Types of support resources

For the purposes of this project, it is important to distinguish between the different types of resources which staff might use at different stages of planning, developing and implementing assessment in online environments. The project team has developed these basic categories across a continuum of increasing practical relevance for managers, developers, teachers and assessors:

Figure 18
Range of support resources

Resource type	Description
Models	Macro-level descriptions or representations of assessment systems or approaches, usually presenting a preferred conceptual framework for planning and conducting assessment, and its role in teaching and learning.
	Related terms: theory, approach, map, framework, system, authentic assessment, evidence-based assessment, competency-based assessment, criterion-referenced learning
Guidelines	General summaries of desirable or recommended features of assessment in the online environment. Usually do not provide any specific information on how to put the guidelines into practice. In quality contexts, usually describe requirements for compliance.
	Related terms: best-practice guidelines, assessment principles, assessment guides, policy objectives, quality requirements, research findings, quality standards.
Guides	Professional development materials designed to help staff to increase their knowledge and skills in assessment in the online environment by providing information, advice and/or structured practice and activities.
	Related terms: portals, books, manuals, websites, tutorials.
Strategies	Methods of assessment at the program or course level, including the repertoire of options available to meet the needs of the learners, the learning context, the type of learning outcomes and the culture of assessment.
	Related terms: learning activities, assessment tasks, portfolios, tests, quizzes.
Job aids	Practical tools used to help complete specific tasks at any of the various stages of planning and conducting online assessment.
	Related terms: tools, checklists, rubrics, process maps, instructions.
Software tools	Software programs that provide assessment functionality in the online environment. Includes features built into Learning Management System software (like quizzes), add-ons, which can provide increased functionality to larger systems, and stand-alone tools.
	Related terms: tools, applications, programs, toys.
Assessment instruments	Course-specific materials used to conduct and record a particular assessment, including materials to be filled in by learners. Some of these can be customisable templates.
	Related terms: assessment tools, record books, assessment instructions.

Increasing practicality

Test banks	Collections of assessment tasks which can be adapted or used to meet local needs,
	Related terms: repositories.
Case studies	Contextualised examples of good practice which can serve as models or sources of ideas for others.
	Related terms: exemplars, models.

What is available for VET practitioners?

The project team has identified the key resources which can be the source of guides and tools for each of the tasks involved in designing, managing and conducting assessment in the online environment.

The project site will provide focussed 'job aids' for each task, and will specifically avoid references out to a layer of secondary sources which would require further reading, analysis and synthesis.

Types of resources

The resources accessed through the guide can include:

- existing copyright-free items which can be included or accessed
- items which are available commercially
- existing items which can be modified for the project, with relevant permissions
- items which can be converted to tools (checklists, decision guides, flowcharts) from data in existing discursive materials (reports, summaries, field data)
- new items developed by the project team.

Figure 19
Summary: key resources available for online assessment in VET

Resource	Description
Practitioner guide to online assessment (Brewer, 2002) http://www.tafefrontiers.com.au/static/oav3/toolsmethods.htm	This guide is a TAFE frontiers professional development resource for VET practitioners. The guide describes the current situation in the VET sector regarding online assessment. Sections in the guide include online: assessment tools and methods (best practice case studies); challenges in developing online assessment; challenges in designing online assessment tasks that collect a balance of evidence (valid, sufficient, current and authentic); professional development resources; and a report on the online survey. Some of the information in this report is interesting (although the small number of respondents may limit the applicability of the research) and communicates the thoughts and frustrations of practitioners.
Doing assessment online (Atkins and Hannon, 2002) http://project.vetonline.vic.edu.au/letsdoit/2002/index.html	This website developed by Swinburne University and TAFE frontiers is a hands-on resource and construction manual for developing online assessment. The user is guided to identify their learner group, context and teaching/learning models and the select appropriate assessment methods (from a list). The website then provides a range of online software (both free and available for purchase) for generating assessment tasks. A practical and generally clear guide which would be useful for VET practitioners. The resources section, although comprehensive, could be a little daunting to the novice as it does not offer sufficient explanation of the listed tools.
Toolbox Central, job aids and guides (ANTA, 2001) http://flexways.flexiblelearning.net.au/toolboxcentral/	A website which provides resources for the development, implementation and evaluation of online learning. The site is divided into sections for facilitators, developers, managers, learner support and workplace trainers. The facilitator section in particular addresses the issue of assessment with a small section focussing on online assessment. Under the following headings: • plan assessment • plagiarism • measuring IT competency and literacy The information is not very current, and there are some difficulties accessing and navigating the site. The information on assessment is very generalised.
Framework Quick Guide: What we have learnt about online assessment http://www.flexiblelearning.net.au/guides/assessment.html	This Quick Guide looks at the nature of assessment in a changed (and changing) Australian Vocational Education and Training (VET) context, and considerations and issues for online teaching. It provides an excellent high-level summary of research findings and issues, although much of the research summarised has limited engagement with the practical issues and pedagogy of competency-based learning and assessment in the online environment.
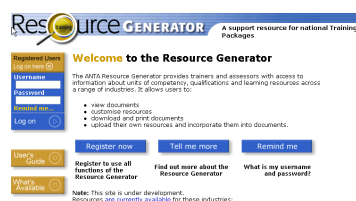
Resource Generator: Training package assessment guides http://www.resourcegenerator.gov.au/Login.asp 	The ANTA Resource Generator provides trainers and assessors with access to information about units of competency, qualifications and learning resources across a range of industries. It allows users to: • view documents • customise resources • download and print documents • upload their own resources and incorporate them into documents. This site promises much and delivers little. It supposedly allows you to build a personalised resource kit and also allows access to a series of Training Package Assessment Guides. The resource kit generator is difficult to use if you are not sure of the questions you want to ask. The Training Package Assessment Guides are merely a collection of a large number of PDF documents which need to be downloaded and printed.
Assessment Generator, WestOne, 2002	We have been unable to access this product for reviewing.
VET Assess test banks http://www.vetassess.com.au/FrameOnline.htm 	The VETASSESS Online Assessment System provides testbanks and resources to support both on- and off-the-job assessment. For each unit of competency, you can access: • tests of underpinning knowledge • a copy of the unit of competency • assessment guidelines for the relevant Training Package • an evidence plan • an observation checklist and questions • a third party report • a portfolio (information for the candidate and assessor) The resources can be accessed online but NOT used in any online delivery platform due to licensing conditions.

Review of resources

The practicality of currently available support resources varies considerably.

- Some resources, such as Toolbox Central, are password protected and this is a significant barrier to users looking for a speedy solution to practical problems.

- Others confront the user with many large PDF documents to download. This can be frustrating to a user who needs to locate appropriate information easily and quickly.

- Some resources also lock the user into a predefined role or pathway, which assumes their responsibilities are clearly defined, and precludes them from investigating other potentially valuable parts of the site.

- One resource, the Assessment Generator, is in the final stages of development and deployment and has not been available for review.

Generally, open websites such as *Doing assessment online* and *The practitioner guide to online assessment* (Brewer, 2002) provide greater usability for the practitioner and allow timely support. The most useful resources provide simple and transparent navigation, with all linked materials on hand at the appropriate place.

Summary

The scan of the resources listed above indicates the following issues:

- **Imbalance**

  There is a preponderance of material at the 'models and guidelines' 'theory and policy' end of the resources spectrum, much of it directed at issues involved in defining standards and monitoring compliance. There is more about how to check and record what you've done than there is on how to actually do it.

- **Problematisation**

  There is an apparent emphasis on the difficulties, barriers and perceived limitations of online assessment and much less material on the successes, benefits and opportunities for innovation.

- **Poor accessibility**

  The available resources are relatively difficult to find and access, and are usually listed in research settings rather than practitioner or professional development locations and communications.

- **Dispersal**

  Although there are now some excellent summary materials such as the Quick Guide series, most information is not easily gathered together or able to be viewed as a whole.

- **Poor differentiation**

  The intended audience for materials is not always clear; in format, length, style and tone, many are apparently intended for a default audience of fellow-researchers and policy-makers, and are unlikely to communicate well to VET staff engaged in the business of assessing learners.

Practitioners have more material about what they *ought* to be doing than useable information on *how* to do it – how to generate effective assessment approaches. This is an emerging area of practice and VET educators have mostly had to develop and test their own online assessment options within their teaching and learning contexts.

Resources: implications for the project

Professional development

There have been several recent initiatives to provide professional development resources to inform and guide practitioners in their work in the online environment. The project team has identified and analysed a number of these resources to see how well they provide:

- easy access for the busy practitioner
- clear models and examples relevant to the VET sector
- strategies for planning and conducting online assessment in a systematic way
- clear and accessible tools for developing assessment items, ranging from the simple to the complex.

Features of our product

The project team has clarified that the final product of this project will be an integrated Web-based guide to assessing online, which incorporates a number of design features to ensure maximum uptake by managers, developers, teachers, support staff and assessors.

These features will include:

- access for all users to information and guidance for the full range of stages and tasks involved in assessment
- flexible navigation to relevant tasks, avoiding misleading nominal roles ('teacher', 'designer' etc)
- embedded guidelines to meet AQTF requirements
- a highly selective choice of resources to point users to the best and most useful, not 'everything available'
- as far as possible, resources for access or download provided within the site, to avoid the frustration of hyperlinkitis
- a clear indication of the type of resource, who it's for, and when to use it
- an upside-down informational and navigational hierarchy: the most practical resources at the first level, with option to drill down (or out) to supporting models and research as needed
- optional 'guided itinerary' navigation through the steps and tools for identified user types (to be validated in the field research).

8 Gaps

What further research or support resources are needed to assist practitioners?

- **Need for VET specific examples and models**

  Although recent reports (Booth et al. 2003) have provided an excellent overview of the issues surrounding the development of online assessment options for the VET sector, most of the examples come from the higher education sector. There is a scarcity of examples of good practice which relate directly to the VET sector,.

- **Implications of the AQTF**

  There is a need for VET developers and practitioners to be able to easily access relevant information on how the AQTF impacts on online assessment. Although a number of resources exist (Booth et al, 2003) that broadly describe the AQTF standards and requirements, these have not been extrapolated to the stages, tasks and roles involved in online assessment.

- **Tools and guides**

  Recent Australian projects (Atkins and Hannon, 2002; Brewer, 2002) have identified and developed tools and guides which may be of use for the developer and practitioner. However, some of these are difficult to work with or not clearly aligned to the various roles, stages and tasks involved in online assessment. Also, the wealth of tools available globally is overwhelming for practitioners in the field. There is a need for streamlined lists which can be accessed at the appropriate stage of the online assessment development and delivery process.

- **Constructivism and the National Training agenda**

  It is not clear from the literature how developers and practitioners can align the requirements of Training Packages and Competency-Based Training with the pedagogical imperatives of constructivism. Guidance is needed so that innovative online assessment practices can be developed.

Summary

The task

There is a considerable amount of information available relevant to online assessment, both as general research reports and as practical guides for conducting assessment. What is needed most is to filter out the material specifically relevant to the Australian VET sector (ie directed at competency-based assessment addressing AQTF requirements) and a method of disseminating this information as compact practical strategies for practitioners in all the roles involved.

The project team has now surveyed the literature, analysed the issues, identified the key concerns in the VET context, mapped the tasks against the AQTF requirements, and completed an initial design and prototype of a web-based guide. The working title of the guide is *Assessing online: a practical guide.*

The prototype site will be developed further following the results of the field research. The research analysis and field research will both feed into the content for the final product – the website.

The analytical framework

During the desktop research, the project team has identified a range of ways of describing assessment in online environments. As enquiry and analysis tools, these structures will help to 'drill down' to investigate the repertoire of current and potential practice in online assessment in VET.

Figure 20
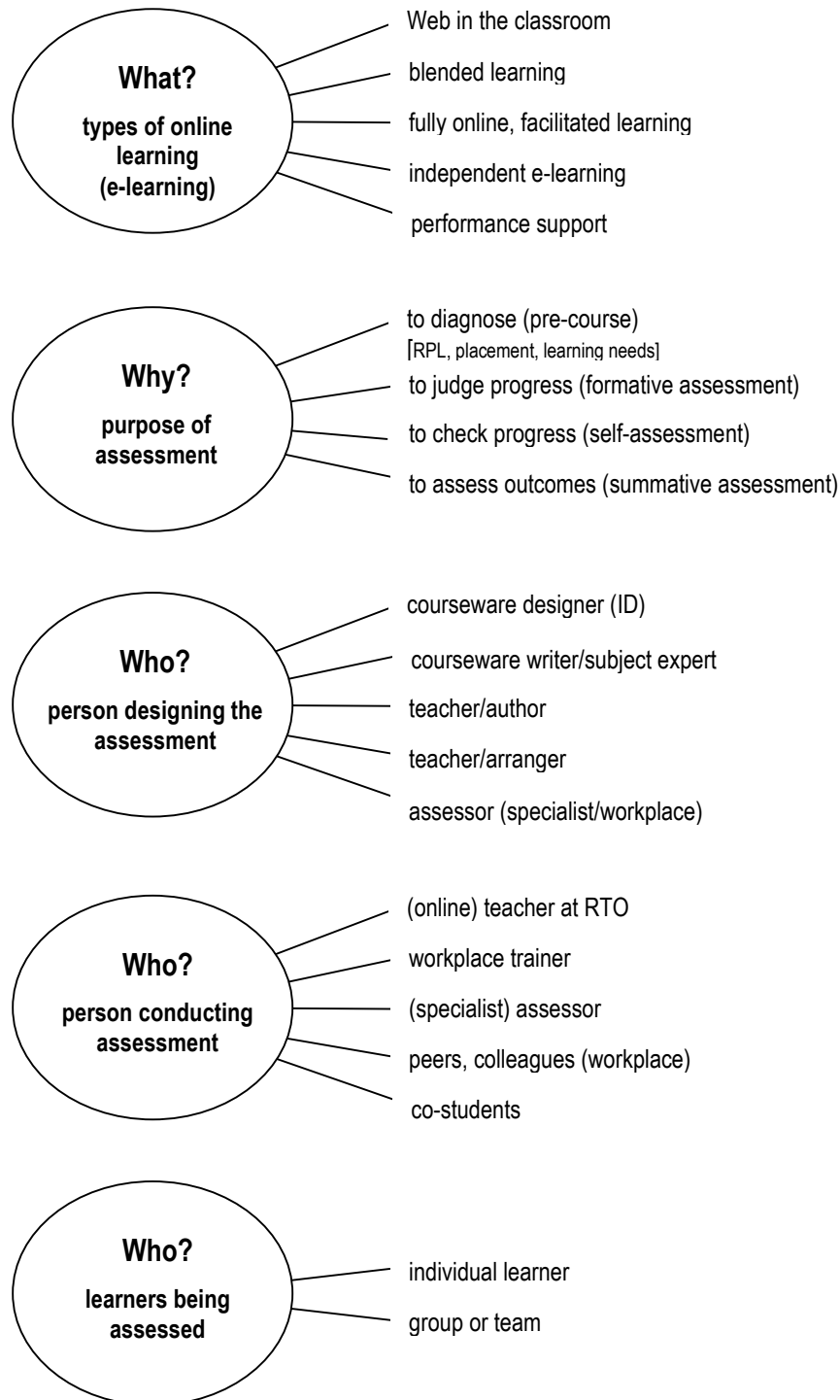**Analytical framework for the project: types and roles**

What?
types of online learning (e-learning)
- Web in the classroom
- blended learning
- fully online, facilitated learning
- independent e-learning
- performance support

Why?
purpose of assessment
- to diagnose (pre-course) [RPL, placement, learning needs]
- to judge progress (formative assessment)
- to check progress (self-assessment)
- to assess outcomes (summative assessment)

Who?
person designing the assessment
- courseware designer (ID)
- courseware writer/subject expert
- teacher/author
- teacher/arranger
- assessor (specialist/workplace)

Who?
person conducting assessment
- (online) teacher at RTO
- workplace trainer
- (specialist) assessor
- peers, colleagues (workplace)
- co-students

Who?
learners being assessed
- individual learner
- group or team

Figure 21
Analytical framework for the project: models and strategies

How?

stages in process

- plan
- analyse
- design
- develop
- deliver
- evaluate

How?

macro, models and theories

- competency-based
- criterion referenced
- constructivist/sociocultural
- systematic design
- problem-based

How?

macro (course level) approaches

- situated learning
- problem-based
- case-based
- project-based
- inquiry-based

How?

micro, evidence strategies

- portfolios
- assignments
- simulations
- role plays
- performances
- tests

How?

micro, online tools

- quiz tools
- discussion forums
- computer assignments
- chat tools
- email

The webtool

The planned web-based guide will have three levels, each available at any time to the user, providing more detail at each successive level.

Figure 22
Webtool design: description of levels

Level 1	**Home page**
	The home page will outline the purpose of the site. A left-hand menu will be provided, which can be expanded to reveal the steps and tasks identified in Section 6 above.
Level 2	**Tasks**
	At this level the sub-sections of each step will be outlined and an AQTF indicator placed next to relevant sections. Where possible, graphical devices will be used to capture interest.
Level 3	**Resources**
	This level will contain the resources for the particular sub-task. There will be: - a short description of the issues drawn from the research analysis - a description or demonstration of what needs to be done at this stage - some tools, downloads or links to resources and software which will assist the practitioner at this stage - an AQTF quick check - case studies of VET practitioners who are employing innovative approaches at this point of the process.

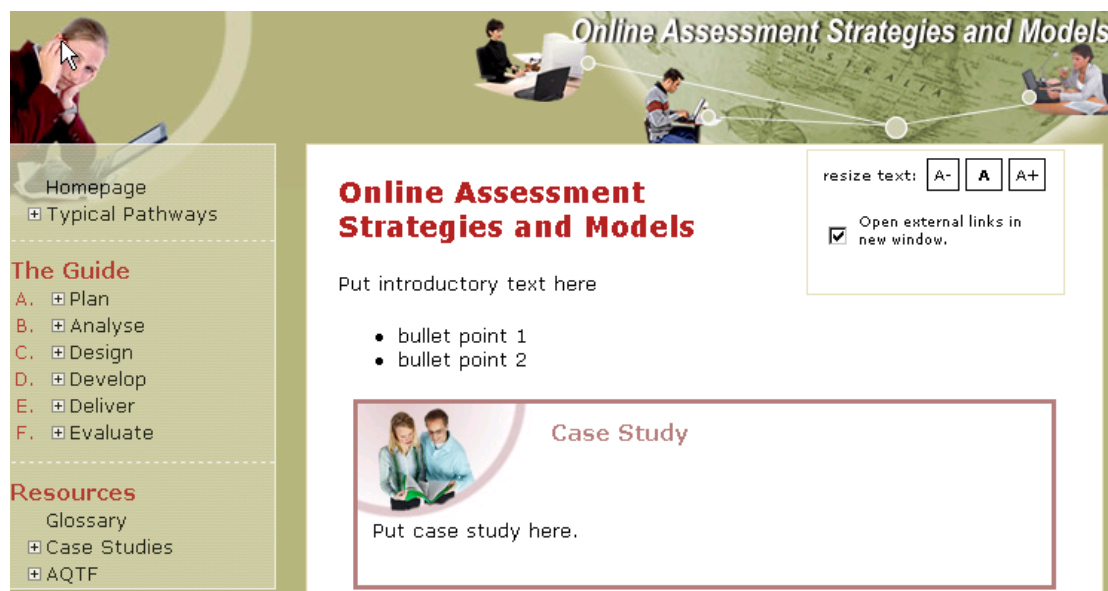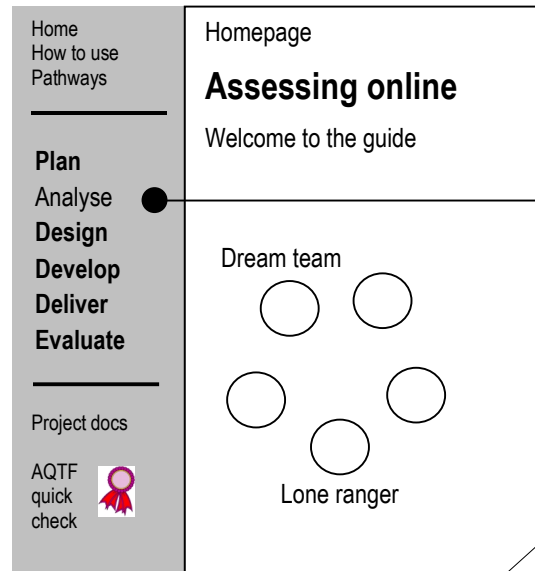*Figure 23*
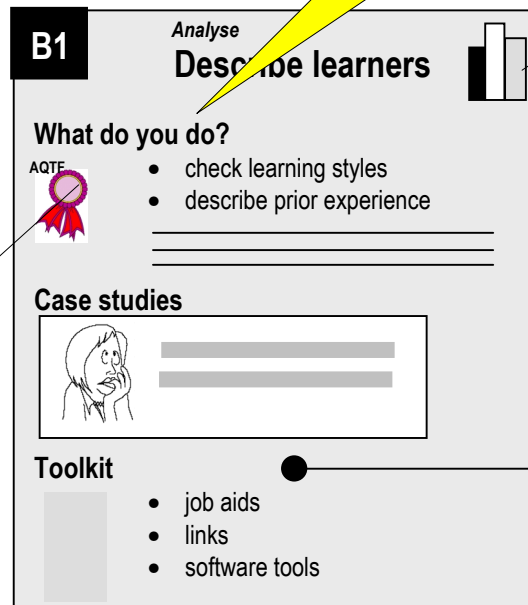## Webtool design: prototype home page

Figure 24
Webtool: site information structure

Level 1 Stage, task & path selector

Home
How to use
Pathways

Homepage

Assessing online

Welcome to the guide

Plan
Analyse
Design
Develop
Deliver
Evaluate

Dream team

Lone ranger

Project docs

AQTF
quick
check

From the Research Analysis research
Action summary
- key research messages
- best practice principles

Data check icon
- pop-up research graphs
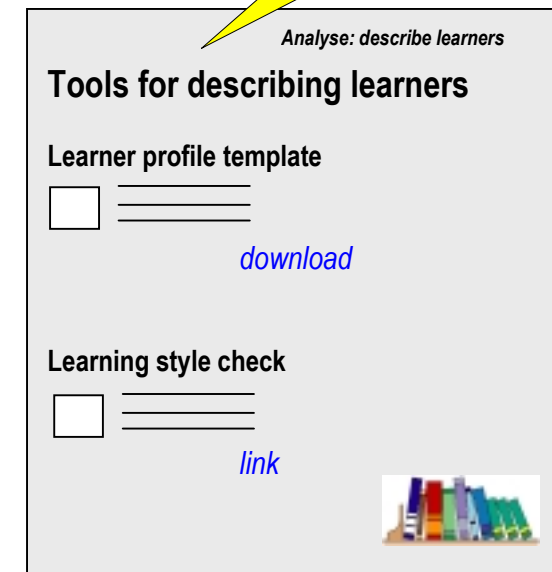- key qualitative findings

Level 2 Task guide

B1

Analyse
Describe learners

What do you do?

AQTF

- check learning styles
- describe prior experience

Case studies

Toolkit
- job aids
- links
- software tools

From all sources
Selected resources
- available tools
- tools adapted for VET
- original resources (team)

Level 3 Tools

Analyse: describe learners

Tools for describing learners

Learner profile template

download

Learning style check

link

AQTF check icon
- indicates standard met
- click to see standard

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