

## **Exploring Educational Design:**

**A snapshot of eight case studies using e-learning in  
Australian VET**

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# Executive summary

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This research seeks to gauge the impact of educational design in the application of e-Learning in vocational education and training (VET). Eight case study sites in Australia were selected to help generate knowledge about a range of educational designs in four discrete VET contexts:

- VET in Schools
- Corporate training
- Accredited training provided by Registered Training Organisations
- English language learning for migrants

The following sites took part in the study:

- Bendigo Community College (Victoria)
- Box Hill Institute of TAFE (Victoria)
- Edith Cowan University/ITEC (WA)
- Joondalup Baptist College (WA)
- Curtin University of Technology, Kalgoorlie (WA)
- Riverina Institute of TAFE (NSW)
- Spherion (Victoria and WA)
- South West TAFE (Victoria)

The overall premise of the research was that educational design matters, and that appropriate educational design is a critical component in learner success

The research adopted a descriptive and interpretative stance, seeking to use qualitative methods to draw out key perceptions from learners and teachers for further analysis and discussion. Twelve teachers were interviewed to provide a sense of the e-Learning experience that was offered to learners. In addition, a total of 88 learners completed a questionnaire. Whilst quantitative data was collected using a student questionnaire, the number of respondents was small and the use of this data has been limited to basic arithmetic analysis to complement the qualitative data.

Generalisations drawn from eight case studies involving a relatively small number of learners are bound to be tenuous. A larger study, incorporating more case studies particularly from the corporate and small business sectors, would ensure a higher level of confidence in the data.

Despite limitations pertaining to the size and scope of the study, the research found that there are a range of educational designs currently applied in the VET sector. The research examined designs that exhibited best practice characteristics delivered in distance education and classroom settings (e.g. Toolboxes), alongside “content-free” models (Curtin University of Technology, Kalgoorlie), and project-based models that are presented electronically (Spherion).

The research indicates educational design is an important factor in creating engaging learning environments. However, two other factors seemed to be more critical in the overall success of the teaching and learning experience:

**The role of the teacher.** When teachers were enthusiastic and motivated about their pedagogical approach, the model tended to be successful. It is interesting that designs set in authentic contexts with engaging activity-based content were sometimes used in quite structured settings. Conversely, designs heavily structured were sometimes used in innovative ways.

**Communication and collaboration.** The impact of learner-learner and learner-teacher communication appeared to be associated with high levels of learner motivation.

In summary, it is difficult to gauge the strengths and weaknesses of any particular design of learning materials without consideration of the context in which this design was implemented. Educational design is not just about content; it is about the way in which teachers combine learner support, on- and off-line activities and resources, and ideas to stimulate peer-to-peer communication.

This research is premised on the notion that students have particular learning needs and preferences, and that it is possible to design to suit to these needs and preferences. The outcomes of the research suggest that learning experiences can be shaped using a range of educational designs in a range of educational contexts. It is not an either/or in relation to when to use directed e-Learning materials (e.g. presentation of textual content followed by multiple choice and true/false questioning techniques) and when to create an environment that requires active construction of knowledge (e.g. posing ill-defined problems and providing learners with tools in which to solve these problems). Teachers that have the sensitivity and skills to provide highly tailored solutions that can blend degrees of direction and self-direction will be of most value to learners.

In acknowledging that teachers provide blends of direction and self-direction to their learners, the study suggests that learners were more engaged with environments that provided an authentic context. A cohort that was in a position to compare a design based upon an authentic context, with one that focused primarily on understanding content (Joondalup Baptist College), was unanimous in its support for the authentic setting. Other cohorts like Curtin University of Technology, Kalgoorlie, seemed to be motivated by the application of problems to workplaces, and the opportunities for community building via sharing common problems.

This study confirms that the integration of e-Learning content into face-to-face contexts is a legitimate teaching practice. The move to presenting smaller chunks of e-Learning content (e.g. learning objects through a repository) are most likely to support the integration of e-Learning content with traditional delivery techniques.

It may be timely to review the policy of developing online content for the Internet in an environment where its use is primarily in localised non-Internet settings.

The notion that time-poor student do not necessarily want deep learning experiences was not supported by the research. Those who were employed and/or had other priorities still sought to be deeply engaged by the e-Learning environment.

The study suggests that there is no relationship between constructivist design principles and AQF levels. It seemed that learners at Certificate I and Diploma levels equally benefit from undertaking authentic tasks that generate high levels of engagement (e.g. problem-solving, application of learning to real life situations). Activities and resources may be presented differently at various AQF levels, but the objective of actively engaging the learner remains constant, and constructivist pedagogy appears to be the best way of achieving this.

The following five recommendations arose from this study:

**1. Professional development**

Encourage professional development that looks at means of integrating e-Learning into existing practices. This might include tailoring of e-Learning content and promotion of communication between learners. This may mean building onto the existing guidelines of national and state professional development initiatives to ensure that guidelines support such activities. It may also be appropriate to engage experienced e-Learning practitioners who focus on pedagogic strategies (e.g. Flexible Learning Leaders) to act as mentors.

**2. e-Learning content development**

Develop e-Learning content design specifications to reflect the need for small chunks of highly customisable and interoperable learning.

**3. Target audience for e-Learning content development**

Develop e-Learning content design specifications to recognise the non-Internet contexts in which e-Learning content is delivered.

**4. Case studies**

Disseminate the results of innovative learning designs at conferences, in the Australian Flexible Learning Community, and in journals/e-journals.

**5. Promotion of e-Learning content**

Actively promote e-Learning content developed by the AFL Framework, particularly in the schools and corporate sectors.

# Background

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## e-Learning designs in VET

Over the past five years, there has been a significant investment into online learning product development in all sectors of education and training in Australia. For example, the Le@rning Federation, an initiative of state and federal governments of Australia and New Zealand, has committed \$65 million between 2001-2006 to develop “interactive curriculum content specifically for Australian and New Zealand schools”. (From the Le@rning Federation website, <http://www.the-Learningfederation.edu.au/tlf/newcms/d2.asp>, accessed 2 December 2003). This substantial investment is set to continue. An issues paper, *Sustainable Provision Of Online Curriculum Content Beyond 2005* (2003) has as one of its key propositions, that online curriculum content procurement continues beyond 2005.

The Australian Flexible Learning (AFL) Framework Toolbox initiative has also made an important commitment to online learning product development. Since 1999, over \$20 million has been expended to create online learning products that support training packages. In addition to these publicly-funded initiatives, a plethora of e-Learning design and development companies (e.g. Element K, Electric Paper, NetG), have entered niche VET markets.

Yet for all of the substantial investment in online learning materials, data from a recent survey of student outcomes undertaken by the National Centre for Vocational Education Research (NCVER) indicates that less than 2.5% of respondents participated in learning programs that involved at least some online learning component (2002:2).

This research project stems from a curiosity about the reported slow take-up of e-Learning. It suggests that there is a relationship between appropriate educational design and teacher/learner satisfaction with e-Learning experiences.

The research focuses on e-Learning as opposed to online learning. The move towards blended learning solutions, with a mix of media and learning support strategies to optimise flexibility, indicates that e-Learning is a more attractive option to most VET teachers and students than learning primarily mediated over the Internet (online learning).

The definition of e-Learning adopted for the purposes of this research includes any use of information and communications technologies in the learning process. This can include access to electronic learning materials and/or electronic forms of communication like email, chat and discussion boards. This definition of e-Learning is broader than the notion of online learning and our suspicion is that the number of learners engaging in e-Learning is probably far higher than 2.5% of the VET population.

The definition of e-Learning as adopted by the AFL Framework in its ‘Quick Guide: Definitions of key terms used in e-Learning usage’ (2003), adopts a similar broad conceptual stance:

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)

This research acknowledges the range of e-Learning designs that operate in VET, and seeks to create new knowledge that will help developers apply appropriate e-Learning designs to fit the range of VET contexts. The research focuses on four VET cohorts:

- VET in Schools delivery in Certificate I IT
- Corporate training in Frontline Management
- Accredited training provided by Registered Training Organisations in Business and IT
- English language learning for migrants.

The research is premised on the notion that students have particular learning needs and preferences, and that it is possible to design to suit to these needs and preferences. There is no one size that fits all. Some clients of VET require small chunks of just-in-time learning, some benefit from an authentic context with immediate application to virtual workplaces, some are interested in practical application to physical workplaces, some simply want information, some are searching for knowledge, some require teamwork and collaboration, and for some this may be an extravagance.

The question is, are there any patterns to these needs and preferences? Can we tailor e-Learning designs to cohorts or is the tailoring required at an even greater level of specificity?

## **Literature review**

In attempting to understand and articulate the variety of e-Learning designs in VET, what has emerged is a complex picture involving:

- educational design (e.g. support materials, activities, assessments etc),
- the way in which the design is implemented (the teaching, facilitation, mentoring or coaching in place at the point where the learner interacts with the educational content), and:
- the organisational culture that operates where the learning is situated (e.g. whether this is supportive of the use of technology in education and training; supportive of the teacher and teacher empowerment to create and customise learning opportunities; supportive of a Computer Based Training model of learning etc).

It is difficult to separate out these elements and consider them in isolation. For instance, what may appear as “constructivist content” may, in fact, be quite the opposite at the teacher/learner interface.

In acknowledging this complexity, there appears to be some dominant e-Learning models that have emerged in the different contexts of education and training. These are captured in the draft document, *Online Assessment Strategies and Models: Research Analysis – Issues and Implications* (July, 2003, p.10). A range of e-Learning cultures are discerned across the education and training sectors.

**Table 1: 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<br><br>(but changing rapidly to more integrated and supported approaches).  | Add face-to-face support for independent learners using courseware tutorials.<br><br>Emerging concept of web-supported learning using range of methods (e-Learning, knowledge management, 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.<br><br>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.<br><br>And<br><br>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<br><br>Or<br><br>Adding some online study options (units) as choice; including face-to-face components in facilitated online courses (as option for non-remote client groups). |
| 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.  |

| Sector | Default (traditional) delivery technology | Dominant e-Learning model(s) | Meaning of 'blended learning' |
|--------|---|------------------------------|-------------------------------|
|--------|---|------------------------------|-------------------------------|

|                           |   |   |  |
|---------------------------|---|---|--|
| TAFE                      | <p>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.</p> <p>Off-campus variation of independent learning using centrally produced courseware, minimum tuition and correspondence-style feedback on assignments.</p> | <p>Web-enriched classroom (or library) can include access to courseware and use of collaborative tools</p> <p>And</p> <p>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).</p> | <p>Including face-to-face components or requirements in online courses</p> <p>Or</p> <p>Offering face-to-face students the option of taking some units or components in the online mode.</p> |
| Adult Community Education | <p>Facilitated, interactive, group-based, learner-centred delivery driven by participant objectives, with or without formal assessment and recognition.</p>   | <p>Web in the classroom, with emphasis on collaborative tools and learner publishing.</p> <p>Short courses online, with emphasis on building the learning community.</p>  | <p>Collaborative online communities.</p>   |

The literature review reported here is limited by the focus of the research, and to literature that might provide clues about the appropriateness of educational designs that may be particularly suited to the different contexts of the corporate world, VET in Schools, accredited training delivered by Registered Training Organisations and English language learning. Knowledge about these cohorts would be particularly beneficial to the research.

Again, the draft publication, *Online Assessment Strategies and Models: Research Analysis – Issues and Implications* (July, 2003, p.34-39) proved to be a useful resource. Six models of learning and assessment were identified. These are summarised in Table 2:

**Table 2: Models of learning and assessment**

| Model                                  | Characteristics   | Criticisms  |
|--|---|---|
| Systematic design of instruction (SDI) | Has its roots in systems theory and cognitive psychology. Responds to explicit behavioural objectives. Specifies skills for entry level and provides formative assessment opportunities throughout. | Unwieldy, linear, difficult for individual teachers to customise, instructionist. |
| Criterion Referenced Instruction (CRI) | Training goals expressed as performances and design tightly tied to performance outcomes. Requires mastery at assessment levels before moving on.   | Linear, limited opportunities for exploration and incidental learning.            |

| <b>Model</b>                 | <b>Characteristics</b>   | <b>Criticisms</b>   |
|------------------------------|--|---|
| Constructivism               | Learner actively constructs meaning by interacting with their environment and incorporating new information into their existing knowledge base.  | Information overload; content is sometimes difficult to configure for the specificity of the learning outcome or competency.  |
| Situated Learning            | Knowledge that emerges from social interaction and communities of practice.  | Best suited to work-integrated, performance improvement models of learning in organisations. Less appropriate learners whose primary motivation is to get a job.  |
| Problem Based Learning (PBL) | Learning involving "utilising domain knowledge, semantic mapping, goal setting, motivational and attitudinal components and meta-cognitive processes (Jonassen, 1997). Problems can be structured or ill-structured. | The less structure, the more chance that learners will need to use skills that they may not yet have. There is a tension between PBL and Competency Based Training (CBT); CBT does not necessarily offer opportunities for higher order analytical tasks or problem solving.                          |
| CBT                          | A systematic approach to training where outcomes are developed by an analysis of the roles, tasks and current needs of industry. Assessment of outcomes is evidence-based against published criteria.                | May not be particularly effective in developing flexibility, adaptability and capacities to innovate; problematic in its capacity to develop transferable skills in learners; questionable whether CBT meets the requirement of a diverse range of industry stakeholders (NCVER Research Forum, 1999) |

It is important not to see these models as exhaustive or mutually exclusive. However, they do set a useful context in which to consider the eight case study sites.

In recent times, policy that promotes the use of online technology for teaching in VET has strongly supported the development of learning materials (e.g. Toolbox products) that are described as constructivist. An underlying theme to the origins of this research is that the Australian VET system had become a little evangelical about constructivist designs within what is essentially a competency-based framework. For this theme to be explored further, the particular flavour of constructivism, as expressed through Flexible Learning Toolboxes, requires some attention.

The AFL Framework is indebted to Ron Oliver for his work in building an educational design framework for the development of Flexible Learning Toolboxes. Oliver (2001:209) suggests that there are a set of principles that could be applied to underpin the design of best practice online learning products. These principles are described in Table 3.

**Table 3: Framework for describing critical elements of online learning settings**

| <b>Learning design elements</b> | <b>Description</b>   | <b>Examples</b>   |
|---------------------------------|--|---|
| <b>Learning activities</b>      | The tasks, problems, interactions used to engage the learners and upon which learning is based.  | Reading activities, computer based interactions, simulations, inquiry tasks, projects, open ended problems, collaborative tasks |
| <b>Learning resources</b>       | The content, information and resources with which the learners interact in completing the tasks. | Web pages, readers, textbooks; computer based tools, Web links, notes, documents, workplace manuals, case studies, databases.   |
| <b>Learning supports</b>        | The scaffolds, structures, motivations, assistances and connections used to support learning.    | Learning guides, discussions, chats, suggested learning pathways, mentors, buddies, workplace trainers.                         |

(from Australian Journal of Educational Technology, 2001, 17(2), p 209).

Oliver's notion of learning activities, resources and support all operating in tandem to optimise student learning is compelling. The way in which the teacher configures this mix seems to be of critical importance. For instance, in corporate and small business training contexts, resources may be of most value; in a VET in Schools class, it may be activities that promote higher levels of learner engagement; in a TAFE distance education context, collaboration may be the key.

Karen Ho (2003) used data from annual Student Satisfaction Surveys in Western Australia to determine learner preferences in relation to delivery strategies. There are some parallels between Ho's study and this research. Both come from a perspective that the VET market is complex and that learner preferences may vary according to their goals. However, whilst Ho's research was largely quantitative examining preferences towards a range of learning options including face-to-face delivery, our study is essentially qualitative in nature, focusing on eight case studies that had adopted e-Learning as a primary pedagogical approach.

It is clear from Ho's study that the e-Learning market in Australian VET is not mature. Most learners prefer face-to-face teaching:

The research has shown that the experience of the majority of vocational education and training (VET) students is dominated by face-to-face teaching and, on the whole, they are fairly satisfied with this traditional and familiar method of delivery.

(Ho: 1)

This finding is consistent with that of Peter Smith (2001) who identified learners preferred:

- clear links and consistency between learning materials and the instructors input;
- learning support (from the instructor);
- hands on learning, demonstrations and practice; and
- a chance to learn with others (face-to-face).

In Ho's research, segments of the VET population are identified as showing signs of being receptive to flexible learning options ('career changers', 'skill improvers' and the 'self-employed'). These segments are largely defined by how learners describe themselves in the Student Satisfaction Survey.

Ho's research raises a number of questions about the readiness of VET for e-Learning, and the extent to which e-Learning designs should take account of learner preferences. For instance, if most learners prefer a face-to-face model of delivery, should designs strive to complement face-to-face instruction? If this is the case, it may be appropriate to build e-Learning materials around the notions of:

- A learning object model designed to complement a lesson or class. This is not dissimilar to that currently being developed by the Learning Federation. The further refinement of the AFL Framework's learning object repository, based upon Toolbox materials, suggests that the VET system is exploring this option.
- What Oliver, Omari and Herrington (1998) describe as a converged learning environment that caters simultaneously for on- and off-campus learners.

Ho's assertion that 'career changers', 'skill improvers' and the 'self-employed' are the most receptive to flexible learning is interesting. That such conclusions are drawn mainly from Student Satisfaction Survey data indicates a likelihood that these learners, having enrolled in VET programs, are single subscribers. This group has taken responsibility for their careers and is using VET as a vehicle that will improve career options to enhance skills.

Another cohort that is claimed to be adopting e-Learning with increasing enthusiasm is the corporate sector. In recent history, corporate e-Learning has been largely synonymous with Computer-Based Training (CBT). The trainer (if there is one at all), typically operates as a workplace coach or an informal mentor and outcomes of e-Learning are seen as rapid skills transformation. Corporate e-Learning is primarily about return on investment (ROI), and the learning needs of the individual are sometimes different to those of the organisation. Nevertheless, there has been a great deal of interest in e-Learning in large organisations, and some human resources performance experts such as Rossett & Sheldon (2002) argue that a new approach to workplace learning is emerging. This is said to be based around the power of the Web to store, inform and communicate. Rossett & Sheldon report that e-Learning is merging with knowledge management, communities of practice and supported self-directed learning to create new flexible learning opportunities that challenge the roles of training professionals.

A good example of increased flexibility in large corporations is found in the e-Learning initiatives being undertaken by Crown Casino in Melbourne. One of the key training strategies is around compliance and ethical issues. As an organisation, Crown Casino strives to make new employees aware of their responsibilities; run responsible serving of gaming; and be responsible for the serving of alcohol. Crown has implemented a flexible learning solution that offers web-based delivery in conjunction with flexible learning facilities, on site that are open 24 hours a day, 7 days a week. The web delivery strategy would appear to have been particularly successful:

It fits in much better with [employees] work patterns. It can occur Sunday night, or Monday morning at 3 a.m. So from a trainer's point of view, two weeks of traditional training might be preceded by a week of online intensive work, where the trainer is acting as an online tutor through that period. They actually enjoy that different engagement as well. So it's been terrific. From an employee point of view, our feedback tells us that they absolutely love the idea of being able to access training from their homes.

Interview with Peter Coyne, General Manager, People Development and Planning (Crown Casino) Accessed 6 December 2003. [http://www.flexible-Learning.net.au/knowledge/tree/edition03/html/int\\_peterCoyne.html](http://www.flexible-Learning.net.au/knowledge/tree/edition03/html/int_peterCoyne.html)

Harper, Hedberg, Bennett and Lockyer, in a 2000 study entitled 'The Online Experience: The State of Online Education and Training Practices', provided a useful snapshot of e-Learning practice in VET. One insight from this work includes a reference to the relationship between e-Learning and knowledge management:

In reviewing the development of an industry site, Hedberg et al [in press at the time of publication] demonstrated that it is possible to use an on-line site for collaboration between the trainers and the trainees. Using this approach, the site becomes the repository of resources and the organizational memory of past, present and future staff. The concept of employing the site to provide training alone was shown to have limited appeal in organizational renewal.

(Harper, Hedberg, Bennett and Lockyer, 2000:19)

At a time where VET is looking to adopt e-Learning approaches as a mechanism to engage with industry, it is useful to remember that some large corporations may view e-Learning as part of a broader knowledge management agenda where long term sustainability is integrally related to organisational renewal. As Laurence Prusak, CEO of IBM in 2001 put it:

The only thing that gives an organization a competitive edge...is what it knows, how it uses what it knows, and how fast it can know something new.

(cited in Rosenberg, 2001:9)

Kaye Schofield's 2003 study of e-Learning initiatives in four large Australian companies echoes Prusak's view on organizational learning. In three of the four case studies (Ford, ANZ and Qantas), participants viewed e-Learning as essential in dealing with competitive pressures. The other company in her case studies (Theiss) was in the process of developing a new business strategy that included e-Learning. Schofield suggests that there are two enablers of sustainable and successful e-Learning:

First, there needs to be a demand for high-performance/high-skills work organisation and this needs to be reflected in an explicit corporate strategy which is widely understood throughout the company. Second, there needs to be a high level of sensitivity amongst human resource development people to that strategy.

Guthrie (2003) Online learning: Research readings (executive summary). Accessed 6 December 2003. <http://www.ncver.edu.au/cgi-bin/gda.pl?id=2357>

The implications of the corporate sector's appetite for e-Learning are significant for the design of educational materials in VET. Schofield's case studies suggest that:

... a more holistic view of e-Learning is required, a view which is able to blend the more traditional educational interests with new insights about business processes and competitive strategy in both companies and institutions.

(Schofield, 2003:181)

A recent paper by Eklund, Kay and Lynch (2003) entitled 'e-Learning: emerging issues and key trends', urges the AFL Framework to support:

Initiatives that engage businesses and promote ROI for e-Learning so that business can recognise its benefit.

(Eklund, Kay and Lynch, 2003: 39)

In future, learning designs may need to be tailored to meet the needs of multiple client groups. For example, designs for business may need to be cast in a broader knowledge management framework so that ROI goals are fully understood. However, there is a tension between engaging with business on these terms and pursuing more idealistic goals providing a strong constructivist foundation to e-Learning. Exploring this tension is the crux of this research.

This short review shows that there are several incentives that promote the use of e-Learning to individuals and the corporate sector. In the case of an individual looking for professional development or change the major incentive may well be flexibility and accessibility of learning. For other individual learners, they may be better served by the use of e-Learning in a face-to-face facilitated environment. Whilst the corporate sector may also be interested in flexibility and accessibility they are likely to show concern for ROI, knowledge management and the place of e-Learning in organisational development. On this basis, we should not be surprised that 'one size does not fit all', that there is a need to ensure that the e-Learning solution is customised to both the learner and the context, or more specifically, the learner in context.

# Hypothesis and research questions

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## Premise

The research is premised on the notion that students have particular learning needs and preferences, and that it is possible to design to suit to these needs and preferences. The problem is that as a system, and as individuals, there are difficulties in discerning patterns and applying appropriate designs. The result, in many cases, is that trainers and learners work with inappropriate models and become frustrated with flexible learning and return to more traditional teaching and learning relationships.

Educational design is complex. What may be designed as a constructivist e-Learning product can be implemented in quite directed ways. Conversely, an e-learning product that may be inherently “lock-step”, can be taken by a teacher and mediated to learners in a way, which constructs deep level knowledge and understanding. Acknowledging the complexities of learning, the research has chosen to adopt a qualitative approach, examining educational designs from a perspective that explores content, delivery style, and communicative options available to learners.

The research explores e-Learning in four VET market niches: VET in Schools, corporate training, accredited training through Registered Training Organisations, and English language learning for students from a non-English speaking background. A range of products is examined in these contexts to provide insights into learning experiences and preferences.

## Research questions

The primary research question that guided this study was:

1. Do e-Learning products in VET use appropriate educational designs to optimise the chances of students achieving their learning objectives?

Secondary research questions include:

2. What are the learner’s e-Learning preferences in identified VET cohorts? Do they prefer to be directed, limiting freedom to construct meaning or self-directed, optimising such freedom?
3. What level of learning takes place in identified VET cohorts using educational designs that limit and promote learner freedom in constructing meaning?
4. Is there a relationship between constructivist design and AQF levels? Should there be?
5. On the basis of this study, is it possible to make informed judgements and generalisations about the design of e-Learning products for other VET contexts?

# Methodology

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The research adopts a descriptive and interpretive stance, seeking to use qualitative methods to draw out key learner and teacher perceptions for further analysis and discussion.

The methodology reflects an acceptance that there are no absolutes; no “correct” designs for the range of VET contexts. However, the research adopts a critical perspective in that it seeks to improve practice by identifying principles that will help e-Learning developers to adopt appropriate educational approaches that are in tune with these learning cohorts.

To assist in the development of these principles, the research identifies, examines and de-constructs eight case studies to tease out key themes and practices. Case study sites are identified in Table 4.

**Table 4: Case study sites**

| Site                           | Area of Study                          | Size of cohort | Product  | Characteristics  |
|--------------------------------|--|----------------|--|--|
| Bendigo Community College      | IT<br>AQF level 1                      | 30             | Heinemann  | CD based materials designed to complement a text book. Classroom-based delivery supported by email.                        |
| Box Hill Institute of TAFE     | Business Administration<br>AQF level 3 | 11             | Hamilton Air   | Simulated airline company (online) supported by print-based learning materials. Classroom-based.                           |
| Edith Cowan University/ ITEC   | English language                       | 7              | Rosebud Resort   | Simulated health resort (online) supported by the Janison Learning Management System. Classroom-based.                     |
| Joondalup Baptist College      | IT<br>AQF level 1                      | 9              | TruVision/<br>International Computer Driver's Licence (ICDL) | TruVision - simulated IT help desk; ICDL - directed e-Learning product. Both classroom-based.                              |
| Curtin University (Kalgoorlie) | Management<br>AQF level 3              | 8              | In-house development   | “Content Free” Web CT Shell. Distance education supported by face-to-face workshops.                                       |
| Riverina Institute of TAFE     | Business Administration<br>AQF level 4 | 11             | Flexible Learning Framework<br>Toolbox                       | Flexible Learning Toolbox using a simulated business setting. Distance education.  |
| Spherion Melbourne and Perth   | IT<br>AQF level 3                      | 12             | In-house development   | Electronically mediated project-based approach. Classroom-based supported by email.  |
| South West TAFE                | Business Administration<br>AQF level 4 | 0              | Flexible Learning Framework<br>Toolbox                       | Flexible Learning Toolbox using a simulated business setting; uses an upfront assessment approach to identify skills gaps. |

Each case study comprised:

- a teacher/trainer; and
- a cohort of learners.

Cohorts of learners varied in size from 7-30. At South West TAFE no learners responded to the questionnaire.

Sites identified on the basis that they were already using existing e-Learning content.

Data collected from each of the case study sites included:

- taped responses from interviews with teachers (at least one teacher from each case study site);
- responses to a 32 item online questionnaire (all learners that took part in the study were asked to complete the online questionnaire); and
- taped responses from interviews with learners (typically, two to three learners from each case study site).

The questionnaire was available for learners to complete online at <http://www.elearn.wa.edu.au/questionnaires/students.htm>.

Learners from each of the case study sites were encouraged to complete the online questionnaire. In all, 88 responses were received.

The questionnaire collected base data on age, gender, access to the Internet, experience in using the Internet and computers and technical problems. It also made 18 statements according to six themes:

- structure of the e-Learning resource;
- content;
- motivation;
- learner support;
- interaction; and
- learning strategies.

Perceptions from learners were gathered according to the extent to which learners agreed or disagreed with the 18 statements. Each statement offered learners five choices:

- SD Strongly Disagree
- D Disagree
- U Uncertain
- A Agree
- SA Strongly Agree

In analysing the responses to the questionnaire, a value was ascribed to each response where 1=SD, 2=D, 3=U, 4=A and 5=SA. A mean response was then calculated as an overall indicator of the extent to which a particular cohort agreed or disagreed with each of the statements. The results are presented in Tables 5-10.

The following three open ended questions were also asked in the questionnaire:

- Please comment on the worst things about e-Learning
- Please comment on the best things about e-Learning
- Please make any other comments you wish to make including suggestions for change

The results of these open-ended questions, along with data collected from interviews with learners and teachers at each of the sites are included in the Discussion that follows each one of Tables 5-10.

It should be noted that the numbers of responses to the questionnaire are sometimes quite low, and therefore only tentative generalisations are drawn.

## Research findings

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### Overview

In attempting to understand the level of learner freedom at each of the case study sites, the researchers considered both the e-Learning content and the way in which this content was presented to learners. As expected, each case study site was different in its e-Learning design, but also the level of teacher intervention and support. The characteristics of each site, derived primarily from teacher/trainer interviews, are described in Appendix 1.

An arithmetic analysis of learner perceptions of the e-Learning experience is presented below, along with a meta-analysis drawing out key themes from the research.



**Table 5: Learner Perceptions (Structure of e-Learning Resources)**

| Question   | VET in Schools (IT)                     |                                       | TAFE (Business)                          |                                  |                              | Corporate Training (Frontline Management) | Private Provider (IT)         | Migrant English (Business English)  |
|--|---|---------------------------------------|--|----------------------------------|------------------------------|---|-------------------------------|-------------------------------------|
|  | Bendigo Secondary College (Vic)<br>N=30 | Joondalup Baptist College (WA)<br>N=9 | Box Hill Institute of TAFE (Vic)<br>N=11 | Riverina Institute (NSW)<br>N=11 | South West TAFE (Vic)<br>N=0 | Curtin University Kalgoorlie (WA)<br>N=8  | Spherion (Vic and WA)<br>N=12 | Edith Cowan University/ ITEC<br>N=7 |
| The e-Learning resource was easy to use  | 3.6                                     | 3.8                                   | 3.6                                      | 4.0                              | N/A                          | 3.8                                       | 3.8                           | 4.2                                 |
| The screens were crowded with too much information   | 2.7                                     | 2.6                                   | 3.0                                      | 2.0                              | N/A                          | 2.0                                       | 2.0                           | 2.5                                 |
| I needed instructions from my lecturer/tutor/teacher to understand what I was supposed to do | 2.8                                     | 2.7                                   | 3.9                                      | 3.2                              | N/A                          | 3.0                                       | 2.6                           | 2.3                                 |
| I had control over the sequence of the learning resource                                     | 3.5                                     | 3.3                                   | 2.3                                      | 3.6                              | N/A                          | 3.7                                       | 3.4                           | 4.0                                 |

## Discussion (Structure of the e-Learning Resources)

Learners from Riverina Institute of TAFE and Edith Cowan University/ITEC seemed to be most satisfied with the ease in which they were able to use the e-Learning resource.

The general design of all eight e-Learning resources was good with most learners disagreeing with the statement that screens were crowded with too much information. Learners from Box Hill Institute of TAFE were most critical on this aspect. One comment indicated that the design, which was targeted at younger people, was inappropriate for adult learners:

*“I felt as if the program was for little children and not for adults.”*

The Edith Cowan University/ITEC cohort indicated a particularly intuitive e-Learning environment, and one that encouraged a high level of self-direction. Perhaps this was because the Rosebud Resort environment was purpose built to be “stand alone” without assuming the existence of a facilitator.

Learner comments on the overall layout included:

*“Very nice, it wasn’t crowded, and very simple. So you could find things easily, and you weren’t confused.”*

*“Very well done. Do not think it needs to be improved.”*

Learners in this cohort also liked the notion of integrating audio files with text. In this way they could listen and read at the same time.

Learners that interacted with the Hamilton Air e-Learning environment at Box Hill Institute of TAFE indicated a relatively low level of control over the sequence of the learning resource, and this is consistent with the way in which the teacher viewed the resource as being structured, with the delivery being formal and classroom-based.

Learners from Spherion also noted a high level of structure to the e-Learning experience, sometimes at the expense of common sense. As one learner put it:

*“There are many ways to do the same thing, but if I did not do it your way then the answer was marked as wrong (even though it was right!)”*

**Table 6: Learner Perceptions (Content)**

| Question   | VET in Schools (IT)                     |                                       | TAFE (Business)                          |                                  |                              | Corporate Training (Frontline Management) | Private Provider (IT)         | Migrant English (Business English)  |
|--|---|---------------------------------------|--|----------------------------------|------------------------------|---|-------------------------------|-------------------------------------|
|  | Bendigo Secondary College (Vic)<br>N=30 | Joondalup Baptist College (WA)<br>N=9 | Box Hill Institute of TAFE (Vic)<br>N=11 | Riverina Institute (NSW)<br>N=11 | South West TAFE (Vic)<br>N=0 | Curtin University Kalgoorlie (WA)<br>N=8  | Spherion (Vic and WA)<br>N=12 | Edith Cowan University/ ITEC<br>N=7 |
| The content was organised in sequence                  | 3.8                                     | 3.9                                   | 3.2                                      | 3.9                              | N/A                          | 3.7                                       | 4.1                           | 4.0                                 |
| I understood what I was expected to learn              | 3.9                                     | 4.1                                   | 3.1                                      | 3.0                              | N/A                          | 3.6                                       | 3.7                           | 4.0                                 |
| I was encouraged to explore and find extra information | 3.6                                     | 4.1                                   | 3.5                                      | 4.4                              | N/A                          | 4.1                                       | 3.0                           | 3.6                                 |

## Discussion (Content)

Learners were generally satisfied with the sequencing of the e-Learning content. The cohort from the Box Hill Institute of TAFE indicated a higher level of dissatisfaction on this item, although qualitative data suggests that the resource was worthwhile:

*“The e-Learning resource looks really good. You need an index to find things - I had trouble finding some things on customer service. A teacher is definitely needed to fill out the course.”*

Most learners understood what they were expected to learn. The schools cohort was particularly strong on this item.

The distance education cohorts (Curtin University of Technology, Kalgoorlie, and Riverina Institute of TAFE) scored particularly highly on the extent to which learners were encouraged to explore and find extra information. Joondalup Baptist College also scored highly on this item. Some learners from the Joondalup Baptist College considered TruVision in comparison with the ICDL:

*“TruVision gives you more freedom to learn. The ICDL is set out so you can’t move ahead and do other things, whereas in TruVision you had the option to move into different areas.”*

*“You probably learn more in TruVision than in the ICDL. TruVision is pretty confusing when you first go into it, but once you get the hang of it, it’s pretty easy. ICDL is pretty boring; straight forward, that’s why it’s probably easier for most people, but TruVision is probably better.”*

These comments indicate that although learners from the Year 11 cohort found the notion of a simulated environment challenging, they also could see the benefits of interacting with semi-structured content that was grounded in an authentic context.

Learners from the Edith Cowan University/ITEC program were supportive of the way the content was presented and particularly liked the rate at which feedback was provided. One learner commented:

*“I found it very good to have my answers promptly checked.”*

Learners from Spherion generally supported the project-based approach to the learning design:

*“On occasion an activity would come before the specific learning required to complete the activity efficiently. This caused me to experiment with reasoned approaches, while this took extra time it also causes the learning to be re-enforced when you continue through the learning resource.”*

*“I was encouraged to explore for further information only in the sense that if I couldn't answer the question I used my own initiative to get an answer.”*

The flexible entry-exit model seemed to be appropriate for most learners at Spherion:

*“I’m pleased with the learning approach and outcomes I am achieving. It is right for my circumstance.”*

**Table 7: Learner Perceptions (Motivation)**

| Question  | VET in Schools (IT)                     |                                       | TAFE (Business)                          |                                  |                              | Corporate Training (Frontline Management) | Private Provider (IT) | Migrant English (Business English)  |
|---|---|---------------------------------------|--|----------------------------------|------------------------------|---|-----------------------|-------------------------------------|
|   | Bendigo Secondary College (Vic)<br>N=30 | Joondalup Baptist College (WA)<br>N=9 | Box Hill Institute of TAFE (Vic)<br>N=11 | Riverina Institute (NSW)<br>N=11 | South West TAFE (Vic)<br>N=0 | Curtin University Kalgoorlie (WA)<br>N=8  | Spherion (Vic and WA) | Edith Cowan University/ ITEC<br>N=7 |
| The materials presented were challenging                | 3.4                                     | 3.3                                   | 2.8                                      | 4.1                              | N/A                          | 3.7                                       | 3.6                   | 3.8                                 |
| This unit built confidence with the use of the internet | 3.9                                     | 3.2                                   | 2.5                                      | 3.6                              | N/A                          | 3.5                                       | 3.2                   | 3.8                                 |
| Questions were too easy                                 | 2.3                                     | 3.1                                   | 2.3                                      | 2.1                              | N/A                          | 2.1                                       | 2.5                   | 2.7                                 |

## Discussion (Motivation)

Learners from Riverina Institute of TAFE, Curtin University of Technology, Kalgoorlie, and Edith Cowan University/ITEC were most challenged by the e-Learning materials.

Learners from Bendigo Secondary College were in most agreement about the e-Learning experience developing their confidence with the use of the Internet. However, the qualitative data suggests that learners were less than impressed with the overall motivational qualities of the e-Learning design:

- *“Needs to be more colourful and exciting to keep people interested.”*
- *“Make writing a bit bigger.”*
- *“Same format each session – boring.”*
- *“Show us interesting things about computers.”*
- *“Make things that are interesting.”*

- *“More practical work than answering questions.”*
- *“Make the pages more appealing and so it draws you to click on the site things.”*

This tends to indicate that younger cohorts of IT literate learners are seeking higher levels of interactivity from their e-Learning resources.

The distance education cohorts (Curtin University of Technology, Kalgoorlie, and Riverina Institute of TAFE) found questions most difficult. Learners from Joondalup Baptist College found questions relatively easy. This may have been because they had already undertaken some learning in the ICDL.

**Table 8: Learner Perceptions (Learner Support)**

| Question   | VET in Schools (IT)                     |                                       | TAFE (Business)                          |                                  |                              | Corporate Training (Frontline Management) | Private Provider (IT)         | Migrant English (Business English)  |
|--|---|---------------------------------------|--|----------------------------------|------------------------------|---|-------------------------------|-------------------------------------|
|  | Bendigo Secondary College (Vic)<br>N=11 | Joondalup Baptist College (WA)<br>N=9 | Box Hill Institute of TAFE (Vic)<br>N=11 | Riverina Institute (NSW)<br>N=11 | South West TAFE (Vic)<br>N=0 | Curtin University Kalgoorlie (WA)<br>N=8  | Spherion (Vic and WA)<br>N=12 | Edith Cowan University/ ITEC<br>N=7 |
| There was adequate help provided within the e-Learning resource from my lecturer/tutor/teacher | 3.8                                     | 3.8                                   | 3.8                                      | 3.6                              | N/A                          | 4.2                                       | 3.9                           | 3.1                                 |
| The feedback that I received was useful  | 3.6                                     | 3.4                                   | 3.2                                      | 4.0                              | N/A                          | 3.6                                       | 3.9                           | 3.4                                 |

## Discussion (Learner Support)

All cohorts were relatively satisfied with the level of teacher support. Learners from Curtin University of Technology, Kalgoorlie, were particularly satisfied with the level of support provided.

In terms of feedback from the lecturer/tutor/teacher, Riverina Institute of TAFE scored highly. This may be related to the experience of the teachers and Riverina Institute of TAFE and quality of the online teaching provided. As one learner put it:

*“I feel there were a couple of great teachers/people at the end of the emails/chats and teachers were understanding of life and problems which can occur in the real world. I thank them for their understanding.”*

An examination of the qualitative data from Joondalup Baptist College revealed that although some learners preferred to be “told what to do”, there was an acknowledgment that they could learn more effectively by interacting with an e-Learning environment:

*“I definitely learnt more about databases by doing activities on the computer.”*

The Box Hill Institute of TAFE cohort was satisfied with the level of help provided by the teacher, but there seemed some confusion over what the learners were being asked to do:

*“The instructions should have been explained a bit more clearly as there were many people in the class, including myself, who found it difficult to understand exactly what they had to do.”*

This is consistent with the teacher concern over the introduction of another metaphor into a Practice Firm environment.

For learners at Spherion, the self-paced nature of the resource was one of its primary advantages:

*“[I was] not held back in the pace of learning by slower students or finding topics moving too fast because of consensus.”*

*“Can do it in your own time.”*

*“You can work at your own pace.”*

*“Self pace.”*

**Table 9: Learner Perceptions (Interaction)**

| Question  | VET in Schools (IT)                     |                                       | TAFE (Business)                          |                                  |                              | Corporate Training (Frontline Management) | Private Provider (IT) | Migrant English (Business English)  |
|---|---|---------------------------------------|--|----------------------------------|------------------------------|---|-----------------------|-------------------------------------|
|   | Bendigo Secondary College (Vic)<br>N=30 | Joondalup Baptist College (WA)<br>N=9 | Box Hill Institute of TAFE (Vic)<br>N=11 | Riverina Institute (NSW)<br>N=11 | South West TAFE (Vic)<br>N=0 | Curtin University Kalgoorlie (WA)<br>N=8  | Spherion (Vic and WA) | Edith Cowan University/ ITEC<br>N=7 |
| I worked with other students using electronic communication devices | 3.8                                     | 2.8                                   | 1.9                                      | 4.1                              | N/A                          | 3.8                                       | 2.7                   | 3.6                                 |
| I found electronic interaction socially enjoyable                   | 3.8                                     | 3.7                                   | 2.2                                      | 3.8                              | N/A                          | 4.0                                       | 3.2                   | 4.0                                 |
| I found electronic interaction was useful for my learning           | 4.1                                     | 3.2                                   | 2.8                                      | 4.4                              | N/A                          | 4.5                                       | 3.6                   | 4.1                                 |

## Discussion (Interaction)

The items on collaborative learning using electronic communication devices caused the most variation in responses. This is not surprising as some cohorts did not use electronic communication tools (e.g. Box Hill Institute of TAFE and Joondalup Baptist College used the e-Learning resources as support for classroom delivery).

Learners from Box Hill Institute of TAFE supported the notion of e-Learning resources being used in a classroom setting, but seemed unaware of the possibilities of electronic forms of communication:

*“e-Learning is too isolating. It would work well in correlation with a teacher.”*

At other case study sites, like Riverina Institute of TAFE and Curtin University of Technology, Kalgoorlie, electronic communication and team-based activities were critical to the success of the course. The use of online collaboration tools was a feature at Riverina Institute of TAFE:

*“I have found e-Learning to be an excellent way of completing a course. The teachers have been incredibly supportive and it was great that I do not have to attend a college after work and then find my way home late at night. I have not felt at all disadvantaged. There are strict deadlines and continual support (including email communication and chat sessions), so self-discipline was not an issue.”*

*“You can use it at your own leisure which is a great advantage and you always have something to refer back to. Particularly knowing who is online, if you are*

*having difficulties and need assistance you can ask anyone who is online.”*

Qualitative responses from learners at Curtin University of Technology, Kalgoorlie, were particularly supportive of the level of group interaction that was achieved. Examples of learner feedback to the best aspects of the course were:

*“Getting proper group interaction.”*

*“Getting the group together as we all worked different times and at different places.”*

One of the respondents suggested that the level of interactivity was a key factor in both the learning, and the extent to which the learner found the experience enjoyable:

*“I found that this project enhanced my learning and communication skills. I found the project, the team and the facilitator always interesting and enjoyable. The project was challenging yet fun.”*

Bendigo Secondary College scored particularly highly in the area of online collaboration and this could also be related to the project-based work that is embedded into the IT program.

The flexible entry-exit nature of the Spherion learning design sometimes meant that interactivity was a function of numbers enrolled at any particular point in time:

*“I think interactivity is OK for those students doing the same course at around the same timing. I’m the only student doing a relatively new program.”*

*“It can get boring because of not much interaction.”*

*“Not enough interaction.”*

**Table 10: Learner Perceptions (Learning Strategies)**

| Question  | VET in Schools (IT)             |                                       | TAFE (Business)                          |                                  |                              | Corporate Training (Frontline Management) | Private Provider (IT)         | Migrant English (Business English)  |
|---|---------------------------------|---------------------------------------|--|----------------------------------|------------------------------|---|-------------------------------|-------------------------------------|
|   | Bendigo Secondary College (Vic) | Joondalup Baptist College (WA)<br>N=9 | Box Hill Institute of TAFE (Vic)<br>N=11 | Riverina Institute (NSW)<br>N=11 | South West TAFE (Vic)<br>N=0 | Curtin University Kalgoorlie (WA)<br>N=8  | Spherion (Vic and WA)<br>N=12 | Edith Cowan University/ ITEC<br>N=7 |
| I took more responsibility for my own learning working with an e-Learning component | 3.6                             | 3.8                                   | 2.1                                      | 4.5                              | N/A                          | 3.1                                       | 3.7                           | 3.9                                 |
| I enjoyed learning through my own experiences and exploration                       | 3.7                             | 3.7                                   | 3.0                                      | 3.3                              | N/A                          | 3.7                                       | 3.9                           | 4.0                                 |
| The course information was presented in a variety of ways to help my learning       | 3.7                             | 3.6                                   | 3.7                                      | 4.1                              | N/A                          | 4.0                                       | 3.1                           | 4.3                                 |

## Discussion (Learning Strategies)

Riverina Institute of TAFE scored very highly on the extent to which learners took responsibility for their own learning. Learners were clearly supportive of the self-paced and flexible characteristics of the online program. In answering the question about the best aspects of the course, some responses were:

*“Flexibility with regards to time and location.”*

*“Self paced - if you are disciplined enough you can put in your own hours, any time you want.”*

*“Ability to be in class at home and learn. Ability to contact on-line facilitators for assistance. Working at*

*my own pace and organising my own timetable (according to facilitator's instructions of course). This form of learning suited me because it was flexible.”*

The Edith Cowan University/ITEC cohort seemed to create a learning environment that was more conducive to exploratory learning.

All of the case study sites were supportive of the notion that course information was presented in a variety of ways. The Edith Cowan University/ITEC cohort was particularly satisfied with this item.

# Conclusions

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## Key themes

The research was inconclusive in relation to the primary research question:

*Do e-Learning products in VET use appropriate educational designs to optimise the chances of students achieving their learning objectives?*

There are a number of reasons for this. Firstly, drawing generalisations from eight case studies involving a relatively small number of learners is dangerous. A more significant study, incorporating case studies from the corporate sector would ensure a higher level of confidence in the data collected.

Secondly, the role of the teacher in each of the eight case studies appeared to be *the* critical success factor in determining levels of learner satisfaction. The skills of the teacher in putting together environments with appropriate combinations of engaging activities, resources and learner support mechanisms, would seem to outweigh the importance of the educational design of learning materials. For instance, designs that were set in authentic contexts with engaging activity-based content were sometimes used in quite structured settings. Conversely, designs that were heavily structured were sometimes used in innovative ways.

The pivotal role of the teacher has also been recognised in the Le@rning Federation initiative. Recommendation 1 in 'An Assessment of the Learning Objects, Models and Frameworks Developed by the Le@rning Federation Schools Online Curriculum Content Initiative Australia' authored by Muirhead and Haughey (2003) suggests that:

The Le@rning Federation should take immediate steps to expand its current mandate to develop communities of practice among learners and instructors involved with the content development initiative.

Muirhead and Haughey (2003:iii)

Thirdly, the impact of learner-to-learner communication and collaborative problem solving seemed to be associated with high levels of learner motivation.

In summary, it is difficult to gauge the design of learning materials outside of the context in which this design was implemented. Educational design is not just about content; it is about the way in which teachers combine learner support, on- and off-line activities and resources, and ideas to stimulate peer-to-peer communication.

On the question of learner's e-Learning preferences in identified VET cohorts, whether they prefer to be directed, limiting freedom to construct meaning or self-directed, optimising such freedom, again the research indicates a level of complexity that is difficult to unravel.

The outcomes of the research suggest that learning experiences can be shaped using a range of educational designs in a range of educational contexts. It is not an either/or in relation to when to use directed e-Learning materials

(e.g. presentation of textual content followed by multiple choice and true/false questioning techniques) and when to create an environment that requires active construction of knowledge (e.g. posing ill-defined problems and providing learners with tools in which to solve these problems). Teachers that have the sensitivity and skills to provide highly tailored solutions that can blend degrees of direction and self-direction will be of most value to learners.

In acknowledging that teachers provide blends of direction and self-direction to their learners, the study suggests learners were more engaged with environments that provided an authentic context. A cohort that was in a position to compare a design based upon an authentic context, with one that focused primarily on understanding content (Joondalup Baptist College), was unanimous in its support for the authentic setting. Other cohorts like Curtin University of Technology, Kalgoorlie, seemed to be motivated by the application of problems to workplaces, and the opportunities for community building via sharing common problems.

The literature on Toolboxes, particularly evaluations of Series 2 and 3 conducted by Eklund (2001, 2003), in addition to anecdotal evidence, suggests that Toolboxes are primarily used as a resource to support classroom-based delivery. This study confirms that the integration of e-Learning content into face-to-face contexts is a legitimate teaching practice. The move to presenting smaller chunks of e-Learning content (e.g. learning objects through a repository) may have the potential to support the integration of e-Learning content with face-to-face delivery.

It may be timely to review the policy of developing online content for the Internet in an environment where it is used primarily in localised non-Internet settings. This would open up opportunities for the development of some media-rich content development specifically targeted as enhancement materials.

Two further findings emerge from the research. The notion that time-poor clients do not necessarily want deep learning experiences was not supported by the research. Those who were employed and/or had other priorities still sought to be engaged by the e-Learning environment. Scarcity of time did not necessarily equate to a desire to access small chunks of just-in-time information.

The study also suggests that there is no relationship between a desire for active and meaningful engagement with learning materials, and AQF levels. It seemed that learners at Certificate I and Diploma levels equally benefit from undertaking authentic tasks that generate high levels of engagement (e.g. problem-solving, application of learning to real life situations). Activities and resources may be presented differently at various AQF levels, but the objective of actively engaging the learner remains constant, and constructivist pedagogy appears to be the best way of achieving this.

# Recommendations

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The conclusions discussed above suggest some actions that would lead to improved quality of e-Learning. Five recommendations are proposed.

## 1. Professional development

The research suggests that *the* critical success factor in successful e-Learning is the skill of the teacher in creating environments that combine learner support, on- and off-line activities and resources, and ideas to stimulate peer to peer communication. If this is the case, then professional development focusing on teacher design and tailoring of on- and off-line learning environments is most crucial.

*Encourage professional development that looks at means of integrating e-Learning into existing practices. This might include tailoring of e-Learning content and promotion of communication between learners. This may mean building onto the existing guidelines of national and state professional development initiatives to ensure that guidelines support such activities. It may also be appropriate to engage experienced e-Learning practitioners who focus on pedagogic strategies (e.g. Flexible Learning Leaders) to act as mentors.*

## 2. e-Learning content development

e-Learning content in VET seems to be of more use to practitioners if it is delivered in small manageable chunks. This is particularly important when considering the ways in which the corporate and small business sectors may apply e-Learning content (e.g. within a broader knowledge management framework). Design guidelines may need to be re-visited to consider the learning object approach to content development.

*Develop e-Learning content design specifications to reflect the need for small chunks of highly customisable and interoperable learning.*

## 3. Target audience for e-Learning content development

The research indicates that e-Learning content in VET is primarily used in non-Internet environments (e.g. in classrooms, on CD and local area networks). Currently, design guidelines promote an approach of development only for Internet settings. This tends to limit the use of media-rich solutions in educational design and enslaves e-Learning to operate within tight bandwidth limitations.

*Develop e-Learning content design specifications to recognise the non-Internet contexts in which e-Learning content is delivered.*

## 4. Case studies

The practitioners contacted as part of this study were hungry for stories about how different models of e-Learning had been implemented. This curiosity stemmed from an interest in applying good practices to their teaching, and building on their own e-Learning pedagogy.

*Disseminate the results of innovative learning designs at conferences, in the Australian Flexible Learning Community, and in journals/e-journals.*

## **5. Promotion of e-Learning content**

It was evident from the research that some organisations were not aware of the options available to them in terms of e-Learning content. Over the last four years, the AFL Framework has overseen the development of world-class content in the VET sector. Contacts developed through this project, particularly in the schools and corporate sectors, revealed that this e-Learning content was not widely acknowledged or understood.

*Actively promote e-Learning content developed by the AFL Framework, particularly in the schools and corporate sectors.*

## References

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# Appendix 1: Case Study Sites

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## VET in Schools

### **Bendigo Senior Secondary College (Victoria)**

With over 2000 students, Bendigo Senior Secondary College is one of the largest Victorian Certificate of Education (VCE) providers in Victoria. “A number of Vocational Education & Training programs, apprenticeships and traineeships are also available to students, providing pathways to further study or employment” (from Bendigo Senior Secondary College website, [http://www.bssc.edu.au/public/about\\_bssc/vision\\_profile.shtml](http://www.bssc.edu.au/public/about_bssc/vision_profile.shtml), accessed 21 November 2003).

In recent years, Bendigo Senior Secondary College has strategically focused on technology enhanced flexible learning, and its computer network provides networked television and video and access to the Internet from all rooms in the College.

The cohort selected for this study was a Year 11 Information Technology class of 30 learners undertaking a data base unit. The content was provided on CD by Heinemann, an educational publisher. This CD essentially replaced the text book, and according to the teacher was text intensive and lacking in interactive and challenge activities.

The course is structured through the Heinemann workbook, which provides activities grouped into weekly exercises. These activities were augmented by the teacher who prepared homework activities for learners. The teacher was of the view that the learners responded more positively to a structured environment.

The teacher was selective over the use of the Heinemann materials, but saw great benefit in doing so in a rapidly changing IT industry:

We've actually used the Heinemann material as just resource materials, so we're pulling out the relevant materials from it, and feeding it back into their pre-existing course. IT is subject to massive course changes every three years, so its horrendous. We're looking at something to ease the workload from a writing perspective.

IT Teacher, Bendigo Senior Secondary College

When using the Heinemann materials, the teacher took on the role of a facilitator of learning, primarily in a classroom context although email support was provided. Being on CD meant that learners could access the materials from home if they had a computer with a CD drive.

In terms of the educational design, the teacher found the materials wanting, and sought, where possible, to augment these in order to increase levels of learner engagement:

Some learners found the Heinemann materials boring, repetitive. So we got the learners to play with play dough a fortnight ago to build models of networks. This activity was supported by the Heinemann materials, and was a real winner.

IT Teacher, Bendigo Senior Secondary College

The delivery mode blends workshop style delivery with the content and activities provided in the Heinemann materials in addition to those which the teacher brings in to augment the learning experience. Below is a typical example of how the Heinemann materials were used:

I'd probably spend half an hour at the whiteboard, going through some design issues with them, in terms of how they design a database, and then I would have had students working on one out of three tasks, depending upon their own choice, and where they're up to. A student who'd been away in Queensland, just turned up today, "didn't do any during the holidays" so she's back at square one, but she'll catch up within a week because she can access the Heinemann materials.

IT Teacher, Bendigo Senior Secondary College

The notion of using the e-Learning resource as a "catch up" mechanism was clearly attractive to the teacher and beneficial for the learner.

In summary, the key features of the Heinemann e-Learning resource were:

- used as part of a blended approach to teaching and learning;
- where educational design was lacking, the teacher augmented the materials with other activities;
- provided on CD to allow flexibility and portability of learning; and
- on-line interactivity was generally mediated through email.

A total of 30 learners from Bendigo Senior Secondary College responded to the online questionnaire. Of these 17 were females, 11 were males and 2 did not respond. All respondents but one indicated that their age was between 15 and 29. The one that did not indicate an age between 15 and 29 did not respond to the question. 21 out of the 30 indicated that they had Internet access from home, and 23 of the 30 indicated that they were either knowledgeable or expert in their level of experience with using the computers and the Internet. 28 of the 30 respondents either solved technical problems themselves or did not have any technical problems.

## Joondalup Baptist College (WA)

Joondalup Baptist College is a technology-rich provider of education located in the northern suburbs of Perth. It recently set up a Skills Centre to expand its offerings in the VET sector. "The College aims to provide a Christian education of excellence, one that seeks to develop the spiritual, intellectual, social, emotional and physical potential of its students." From 2cities website, [http://www.2cities.com.au/3/194/4/Lake\\_Joondalup\\_.pm](http://www.2cities.com.au/3/194/4/Lake_Joondalup_.pm) accessed 21 November 2003).

The cohort selected for this research was a group of Year 11 IT learners who were undertaking the Certificate 1 IT. The cohort was particularly interesting because they had the opportunity to compare two e-Learning products, the ICDL provided by NetG and TruVision, a Flexible Learning Toolbox that covered the same content (note that the researcher was also the project manager for TruVision). Learners had completed all but one unit (Database), and were in an ideal position to compare and contrast the educational designs. The focus of the research was on TruVision. However, in interviewing learners inevitable comparisons were drawn.

TruVision is an e-Learning resource owned by the Australian Flexible Learning Framework. It was developed as a simulated IT Help Desk Company and was designed to promote freedom in terms of what content is chosen and the rate at which it is accessed.

The teacher adopted the role of facilitator in a classroom environment:

Basically its self paced, I just said there's the task, get on with it, and just monitored the learners. When they needed help, I stepped in.

IT Teacher, Joondalup Baptist College

The teacher was in a good position to contrast the ICDL design with TruVision. Interestingly the teacher felt that there was more facilitation required with TruVision:

There was probably more facilitation required with TruVision. Because they've got a wider choice of what they can do. Whereas in ICDL, if you click on the wrong spot it immediately provides feedback that you've done something wrong. In TruVision you need to complete the task and discuss this with the teacher or colleagues.

IT Teacher, Joondalup Baptist College

This is an interesting observation reflecting the different designs adopted for this qualification. ICDL is clearly a more directed resource containing instantaneous feedback for correct and incorrect choices made in the courseware. By contrast, TruVision attempts to simulate an industry context and in doing so, presents tasks that are more ill-defined and complex.

The teacher indicated that there was value in using both e-Learning resources in the future, picking the most appropriate content for the learner.

The learners can undertake either resource self-paced, it tends to take a weight off me in terms of trying to teach 30 learners at once, you can talk to two or three learners while the others go onto something else.

IT Teacher, Joondalup Baptist College

This provides an insight into the problem that spawned this research. In this teacher's mind, the question is not whether to use constructivist or instructivist resources, but to use a mix of these resources that are most appropriate for the needs of the learner. The key factor is the way the teacher chooses to use e-Learning resources, not the e-Learning resources themselves.

Nine learners from Joondalup Baptist College responded to the online questionnaire. Of these there were two females, six males and one did not respond. All respondents but one indicated that their age was between 15 and 29. The one that did not indicate an age between 15 and 29 did not respond to the question. Four out of the nine indicated that they had Internet access from home, and eight of the nine indicated that they were either knowledgeable or expert in their level of experience with using the computers and the Internet. Eight of the nine respondents either solved technical problems themselves or did not have any technical problems.

## TAFE

### Box Hill Institute of TAFE (Victoria)

Box Hill Institute of TAFE is a medium sized institute located about 20 kilometres to the south east of the Melbourne CBD. It offers just over 400 courses equating to 33,000 student enrolments.

The case study identified at Box Hill Institute of TAFE is a Certificate III in Business class that undertook their training in a practice firm environment called Delightful Lunches, a virtual business that prepared corporate lunches. A practice firm is a virtual business where learners take on roles within a firm and trade with other practice firms. The network exists across Australia, and some practice firms trade with overseas practice firms.

The cohort comprised of a number of learners from a non-English speaking background. These learners required a good deal of support in interacting with e-Learning content.

The idea behind integrating an e-Learning experience with the practice firm was to help fill gaps in the training that the practice firm could simulate and provide a catch up opportunity for learners who had not had the opportunity to work in the practice firm.

[Using Hamilton Air as a back-up resource would] probably be good because often when you have somebody coming, and you are doing an RPL it may be useful where perhaps learners need updates in skills or need to show competence. To have a resource like that will be great.

Business Studies Teacher, Box Hill Institute of TAFE

The content being delivered in this context was a TAFE frontiers product called Hamilton Air, a simulated e-Learning environment based upon a niche-market airline company (note that the Researcher was also the project manager for Hamilton Air). The unit offered was Deliver and Monitor a Service to Customers.

Hamilton Air comprises of an e-Learning environment which holds activities, self-tests, policies and procedures and a glossary. It also includes a set of print-based learning materials that include detailed content to support 12 units of competency at the Certificate III level.

The teacher reported that the learners had some difficulties in balancing two simulated environments, an airline company and a catering firm. This tended to de-motivate the learners somewhat:

The Practice Firm was a catering firm called Delightful Lunches, and the issue that came up was the students didn't really want to embrace another industry. So Hamilton Air, the virtual airline company, was my first hiccup.

Business Studies Teacher, Box Hill Institute of TAFE

The teacher felt that Hamilton Air was structured and resolved to deliver it in a formal way. This was perhaps at odds with the original design intentions of Hamilton Air which were to develop it as a highly flexible and unstructured e-Learning product.

I actually made it quite formal which I don't normally do. We asked the students a question and got them to answer the question and then we discussed the answers or we got the answer from the notes. That's how we did it, question and answer.

Business Studies Teacher, Box Hill Institute of TAFE

The teacher perceived that the needs and priorities of this cohort of learners were minimalist. Whilst it was felt desirable to promote notions of deep learning grounded in exploration and further research, it was suggested that there was no appetite amongst the learners to take this on.

They are at TAFE, if they are interested in higher learning they would go to University. I mean at TAFE our course is very practical, if you look up the competencies it's demonstrate, demonstrate, demonstrate.

Business Studies Teacher, Box Hill Institute of TAFE

The integration between the e-Learning environment and the print-based materials within Hamilton Air was not as smooth as the teacher would have liked. The resource implications of providing learners with a comprehensive set of learning materials, for both the learner and the Institute, were too significant and the teacher decided to print out portions of the print-based learning materials on demand.

Eleven learners from Box Hill Institute of TAFE responded to the online questionnaire. All of these were female. Ten learners were aged between 15-29 and one learner indicated that she was aged between 30 and 39. All respondents but one indicated that their age was between 15 and 29. Four out of 11 learners indicated that they had Internet access from home. All learners regarded themselves as either knowledgeable or expert in their level of experience with using the computers and the Internet. Eight of the 11 respondents either solved technical problems themselves and three did not have any technical problems at all.

### **South West Institute of TAFE (Victoria)**

South West Institute of TAFE is the main provider of training for the south west region of Victoria. The Institute has four sites in Warrnambool and campuses at Hamilton and Portland (from South West Institute of TAFE website, [http://www.swtafe.vic.edu.au/the\\_institute/index.asp](http://www.swtafe.vic.edu.au/the_institute/index.asp) - accessed 23 November 2003).

The South West Institute Case Study covers a cohort that undertook the Diploma of Business Administration. The program was particularly innovative in that the teacher tailors individual learning pathways based upon prior knowledge and experience:

I will first of all get learners to give me as much information up front, in the way of resumes, certificates, references those sorts of things, and I will have a look and see what their path has been both job wise and training wise. That allows me to assess them whether they have had experience in different areas, and are able to handle, or be able to use the on-the-job experience, to be able to prove competence straight away.

Business Administration Teacher, South West Institute of TAFE

The teacher uses Flexible Learning Toolbox content to stimulate either workplace or case study activities:

The [Business Administration] Diploma Toolbox has two streams to its assessment. You can either provide evidence from your workplace from what you are doing to prove your competence, or you can use a case study and supporting questions in the assessment.

Business Administration Teacher, South West Institute of TAFE

Enrolment in the Diploma of Business Administration is dependent on the learner having current employment and a workplace in which to apply skills and knowledge.

The Institute took advantage of the Victorian TAFE Virtual Campus (VC) which provided a Web CT shell that linked to e-Learning content. South West Institute of TAFE embeds the TAFE VC shells in a web-based framework called My Course which provides a personalised and authenticated environment for all student enrolments. One of the drawbacks of the My Course environment was that it didn't support synchronous or asynchronous online communication. However, this was being built into the system in 2004. Learners generally worked independently and used email to maintain contact with the teacher.

The highly tailored environment offered by South West Institute of TAFE is available all year round, and learners can enrol at any time and learn at their own pace, supported by the teacher. The teacher perceives that learners studying online move through a gradual process of initially relying on the teacher but increasingly becoming more independent and self-directed:

[Online learners go through a model of being teacher centred, to student centred in that really, the teacher almost becomes a facilitator/coach if you like, I know that does happen in the classroom, but it's probably more emphasised with online, in that the students' questions are more directed toward the weaknesses that they find in themselves, rather than the strengths because the strengths are what they're self directing themselves with.

Business Administration Teacher, South West Institute of TAFE

Learners that enrol in the Diploma of Business Administration are typically highly motivated, wishing to improve their career prospects. The teacher reported a completion rate of about 70% for the course which is relatively high for distance education delivery.

### **Riverina Institute of TAFE (NSW)**

Riverina Institute of TAFE is a large regional training provider located in New South Wales. The Institute offers just over 500 courses of study over its 18 campuses. The dispersed student and staff population places significant demands on the Institute's ability to deliver programs to small numbers of learners, and it has turned to e-Learning and online learning as a way of dealing with this issue.

The cohort selected for this study was a group of learners who were undertaking the Diploma of Business Administration entirely online. The e-Learning resources provided were developed as a Flexible Learning Toolbox, and these were provided in the Janison LMS.

We use a learning management system called Janison and we've integrated the Flexible Learning Toolbox for the Diploma into that learning management system, plus added our own materials for other modules that weren't there. The Flexible Learning Toolbox material I find quite good, it's chunked into small bits, and it has

got activities that are quite interesting and the students do a variety of different things.

Business Administration Teacher, Riverina Institute of TAFE.

Phone support was provided and synchronous communication tools were used within the LMS:

Within the Janison platform, we used the chat room facilities, forums for the activities, and have a facility that we use to send out announcements. We also log the chat sessions that we run. We have twenty or so in the group and we run two chat sessions for the group, because you can't put twenty people into one chat session, so we repeat the session.

Business Administration Teacher, Riverina Institute of TAFE.

Two teachers facilitated the online environment. They adopted team teaching techniques and used project-based learning for the assessment activities

The learning is sort of activity based and integrated with the assessment. We ran a set of modules that had an integrated project that the learners did in teams, and that project was an assessment that covered about four different modules. The learners actually worked in teams to plan and organise a conference. They held meetings and used project processes and tools and so on to organise the conference. The team based work that we had last semester seemed to work quite well in terms of keeping people on track and engaged as well.

Business Administration Teacher, Riverina Institute of TAFE.

The team teaching style exhibited characteristics of a "guide on the side" rather than a "sage on the stage", and this fitted comfortably with the online environment:

I'm not a teacher that will stand up there and give a twenty minute presentation then say 'go and do this activity'. I'll go 'we have to do this activity, and we need this information, where can we get this information from?' I don't use overheads and I don't tend to stand up to talk at the students, I ask questions. I'll give them the activity and say this is where we've got to get to, how are we going to do it. I suppose it's a teaching style just like a learning style.

Business Administration Teacher, Riverina Institute of TAFE

A level of structure is provided where learners were given a deadline for components of the assessment. In previous occasions that the online course ran, no such structure was provided and the teacher reported that completion rates were lower.

Eleven learners from the Riverina Institute of TAFE responded to the online questionnaire. All of the learners were female. The age profile of learners was variable with three learners aged between 15 and 29, one learner aged between 30-39, three learners aged between 40 and 49 and two learners aged between 50 and 59. One learner did not respond to this question. All 11 learners indicated that they had Internet access from home. All learners regarded themselves as either knowledgeable or expert in their level of experience with using the computers and the Internet. Eight of the 11 respondents solved technical problems themselves and two did not have any technical problems at all.

## **Corporate training**

### **Curtin University, Kalgoorlie (WA)**

Curtin University of Technology, Kalgoorlie, offers higher education and VET courses over campuses in Kalgoorlie and its satellite campus in Esperance. The Kalgoorlie campus services a large geographical area, and like Riverina Institute of TAFE, has sought to implement e-Learning and online learning solutions to serve its geographically dispersed clients.

The case study selected for this study was a cluster of 20 learners enrolled in the Certificate III Frontline Management. The cluster was split into three groups each of which worked as virtual and physical team. The design of the e-Learning environment was innovative, and was underpinned by theoretical perspective largely derived from the work of Herrington and Oliver (2001) which champions authentic project-based work in conjunction with collaborative activities.

The teaching and learning model used for this cluster provides the learners with a complex task that combines the elements of collaborative learning, project-based learning and role-based learning designs.

Frontline Management Teacher, Curtin University, Kalgoorlie

A learning environment was provided under the Web CT Learning Management System (LMS). The design of this environment was largely “content-free”, with the LMS being used to present the project, and provide synchronous and asynchronous collaborative environments.

The teacher adopted an approach to facilitation that mixed theory-based classes with online collaboration and support. The design blends opportunities for directed learning in the classroom setting with a constructivist project-based model in the virtual setting.

Eight learners from Curtin University of Technology, Kalgoorlie, responded to the online questionnaire. Four of these were female, two were male and two did not respond to the question. Two learners were aged between 30-39, three learners were aged between 40 and 49 and three learners did not respond to the question. Six of the eight learners indicated that they had Internet access from home. Four of the eight regarded themselves as either knowledgeable or expert in their level of experience with using the computers and the Internet. Three of the eight learners required assistance in solving technical problems, but at the time of completing the questionnaire, all but one had resolved these technical problems.

## **Private provider**

### **Spherion (Victoria and WA)**

Spherion Corporation is a multi-national organisation that: “Delivers recruitment, outsourcing and technology solutions that measurably enhance workplace performance” (from Spherion website, <http://www.spherion.com/corporate/aboutspherion.jsp> - accessed 23 November 2003).

The organisation has made the link between education and recruitment/workplace performance, and offers a range of courses in a flexible mode.

The Spherion case study focuses on IT learners in Perth and Melbourne undertaking a course in word processing. Spherion offers state-of-the-art facilities to promote flexible learning. Workstations, resources and on-site facilitation support are provided to assist learners work through project-based units at their own pace.

The e-Learning model has the following characteristics:

- content is provided in electronic formats;
- support is provided off-site;
- assignments are submitted electronically; and
- facilitation is provided on- and off-site.

Twelve learners from Spherion (Perth and Melbourne) responded to the online questionnaire. Nine of these were male, two were female and one did not respond to the question. Six learners were aged between 15-29, three learners were aged between 30 and 39 and two learners were aged between 40-49 and one learner was aged between 50-59. All 12 learners indicated that they had Internet access from home. Three of the 12 regarded themselves as novice users of computers and the Internet, nine indicated that they were knowledgeable in this area. Five of the 12 learners required assistance in solving technical problems, but at the time of completing the questionnaire, all but one had resolved these technical problems.

## **Migrant English**

### **Edith Cowan University/ITEC (WA)**

ITEC is a small Registered Training Organisation (RTO) that specialises in the delivery of business studies and information technology training to disadvantaged clients. In 2003, ITEC partnered with Edith Cowan University to deliver a joint English language/business program.

The cohort selected for this study was a class of eight learners that undertook an e-Learning course in Business English Cambridge (BEC). This was a simulated e-Learning environment called Rosebud Resort, developed by Elearn.WA under contract with the Adult Multicultural Education Service (AMES) in Victoria primarily for overseas learners who were looking to develop their English language skills for business purposes (note that the Researcher was also the project manager for Rosebud Resort).

The teacher acted as a facilitator of learning in a classroom context. Activities within Rosebud Resort were set at the beginning of the session and the teacher provided support in the completion of these activities during the session. Learners were able to access the website outside of the scheduled classroom contact times but no formal support was provided to compliment this.

Seven learners from the Edith Cowan University/ITEC program responded to the online questionnaire. Four of these were female, two were male and one did not respond to the question. One learner was aged between 15-29, one was aged between 30-39, four learners were aged between 40 and 49 and one learner did not respond to the question. Three of the 8 learners indicated that they had Internet access from home. Five of the 8 regarded themselves as either knowledgeable or expert in their level of experience with using the computers and the Internet. Seven out of eight either resolved technical problems themselves or did not have problems at all.