# The Use of the Internet in Vocational Tertiary Education

Submitted in partial fulfilment of the requirements for the degree of Master of Communications, Victoria University of Wellington

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# Abstract

Education, as a fundamental communication process, can be viewed as the interaction between a learner, a teacher, knowledge and a problem that the learner is trying to solve (Tiffin & Rajasingham, 1995, p24). This paper attempts to look at the issues surrounding each of these factors when applied to vocational education using the Internet.

# Introduction

## The Learner

On the face of it, the use of the Internet for vocational education makes sense. Learners who are expected to upskill themselves while maintaining their existing productivity are suited to a flexible education system that they can attend when and where they want to. The Internet allows education to go to the learner rather than the learner to their education. The concept of workplace learning and just-in-time learning are becoming more widespread, allowing students to access their learning and still practice in their own environment. As society evolves there are more and more learners needing this kind of education (Brooks, 1997, p32). The Internet is making this learning possible.

An example from UCOL<sup>®</sup> (The Universal College of Learning) is an online Growsafe<sup>®</sup> course that teaches application, knowledge and safety for using agricultural chemicals. Students attempting this course, in the past, were expected to attend a one to two day block session or weekly training at a local polytechnic. Often this meant travelling considerable distances at times that were not suitable for the learner. As recent Growsafe<sup>®</sup> certification is a prerequisite for crop export, agricultural farmers have little choice but to attend the course no matter how inconvenient it is. By offering the Growsafe<sup>®</sup> course on the internet, students are able to start when they like, spend as much or as little time as they can spare, and take as long as they need to complete.

Not only is a Web based course more accessible in many cases it is more successful. Research shows that hypermedia, like web based hypertext, allows users to feel they have control over their learning and appear to have more motivation to learn (Jaffe, 1995). Other research claims that learners using the web, as a learning tool, even learn better. (Schutte, 1997). The whole point of hypertext is that it enables students actively to construct knowledge and their own learning paths to that knowledge (Zepke, 1997). There are some weaknesses for students using the web for learning that have to be overcome. Distance education issues and concerns have remained, although the technology has changed (Stenerson, 1998). Difficulties associated with delivery in traditional classroom settings are transferred from the teacher to the student, encouraging a high dropout rate (Phipps, 1999). Much of this dropout rate can be attributed the loss of the classroom dynamic. In learning situations communication between students, and with a teacher are essential ingredients in a successful learning environment. To create a feeling of this classroom dynamic in the Growsafe<sup>®</sup> course, discussion lists and regular email have been used to provide the necessary communication. Where there are students having difficulty they are tracked and encouraged throughout the course.

Another weakness is that the web appears to be more suited to those who learn effectively without much teaching or imposed structure, in other words, students considered to be good self regulators. The WWW is an ideal place for self regulators but deadly place for poor self regulators (Brooks, 1997). By having small, but regular, activities through the course it becomes obvious when a student is not coping or falling too far behind by viewing their activity. The level of activity not only alerts the lecturer of issues but also causes improved learning. It is the activity that is important in the learning process.

"The notion of having students actively engaged while learning (as opposed to passively listening or reading) is emerging with substantial research support ... Teachers who demand active learning are likely to bring about substantially greater learning success than those who do not" (Brooks, 1997).

It becomes the responsibility of the teacher to design the learning to be active for the learner, to ensure the learner has the best chance possible to succeed.

#### The Teacher

The Internet is seen by many as a huge step forward in distance and just-in-time learning. The opportunities for teachers are exciting. "The Web is one of the most accessible tools available for academics to use. It allows an easy means of publishing material, it has a low learning-curve, the majority of its browsers are graphical and user-friendly, and above all it is free to most people in Higher Education." (Lee, 1996)

An institutional library does not provide education and neither does the technology of the Internet on its own. The key to any learning environment is still the teacher behind it - good or bad. "If teachers merely add on technology to ineffective instructional methods ... there will be no improvement in student learning" (Clark, 1983).

To provide a successful course requires more than a set and forget, textbook type, approach to learning. "It falls upon the teacher to constantly recreate the instructional process and offer a variety of choices for approaching information and tasks in order to meet the learner's ever changing, individual needs" (Smith, 1997).

When a course is totally web based, the lack of face to face communication means the teacher needs to compensate by wise use of other communication. The role of teacher, rather than being less interactive, needs to be more interactive. They need to be actively involved in "creating a learning environment, shaping web-based activities and hands on facilitation while the students are in the learning process" (March, 1997). In a study of experienced post secondary online teachers the majority reflected a concern "for personally encouraging students, fostering personal discovery and growth, or in some other way creating an affective component in their online environment" (Berge, 1996). This relationship with the students is important in breaking down the barriers created by the Internet based teaching approach.

Even with the email and discussion lists or chat sessions the teacher's role is vital. Like a class discussion, chat sessions need to be planned in advance. Students should be given prior reading assignments and discussion questions. "All the tricks used to stimulate discussion in a classroom need to be used in a web chat area" (Downes, 1996). Another essential communication component for successful learning is the amount of feedback given to the learners. Phil Race (1997) outlines three things in best quality teaching that feedback to students provides. "Explaining to learners what to do when they can't yet answer a question, helping learners to feel a glow when they do something correctly and helping learners find out exactly what went wrong when they make mistakes." With the teacher in tune with the learner the stage is now set for the next component that is required for the learning – the content or knowledge that will need to be applied.

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#### The Knowledge

The Internet is special in vocational learning as students are able to build up links to resources that, unlike a textbook, will continue to be current long after the course has ended. They learn how to get access to experts and resources without being hindered by distance or time. Or as Dede puts it "Virtual classrooms have a wider spectrum of peers with whom learners can communicate than any local region can offer and a broader range of teachers and mentors than any single educational institution can afford....a personal brain trust scattered geographically, but offering answers to immediate questions" (Dede, 1996). Unfortunately, many Internet teachers fall into a trap that causes a less than successful learning environment. According to the June 1998 IEEE Computer magazine, "The web is not yet suitable for learning" (Bork, 1998). One reason mentioned is that "In some Universities administrators pressure the faculty to provide such courses without offering guidelines for how the Internet might best be used". Poor web courses have been the result. One of the stated criticisms is that "Those developing courses on the web often seem to be confused about the difference between delivering information and delivering learning" (Bork, 1998).

Phil Race puts it this way "How easy it is to spend hours with textbooks without any substantial learning payoff ... people don't learn much just by reading the fine words of experts" (Race, 1997). What has happened in a number of cases is that the second element, the teacher, has been left out of the process. The real educational strengths of the Internet with its huge resource base and easy access has been hijacked by poor design. In a number of cases teachers have simply dumped their teaching notes on the Internet and called that a web course. If anything, the Internet removes the need for the knowledge to come solely from a particular teacher. The Internet lets the teacher provide links to resources that someone else is maintaining. Rather than having to keep their own notes and references current, they can refer the student to the source of the data knowing that it is up to date. The teacher's notes could include a page of references to work by other people. In the case of Growsafe<sup>®</sup> the content is not provided by the teachers but by a crown research institute, namely Hort Research. The information on their website (HortNet) is woven into the course without the teacher having to duplicate large portions of information. This establishes a link for the student to the definitive New Zealand resource and means that the issues of copyright and information validity are handled by Hort Research rather than the Growsafe® teachers. The difficulties with copyright are enormous and unlikely to be resolved easily (Whalley, 1995). The Growsafe<sup>®</sup> teachers completely side step the copyright by collaborating with Hort Research.

When teachers do provide the content, it needs to be quality material that helps and doesn't hinder the learning process. Students should be able to concentrate on the learning and not spend their time struggling with the technology.

Learning material needs to be user friendly for both content and navigation. Although hypermedia can help the learning process, it also can have the opposite effect. Various studies show that even small amounts of information in a hypertext format can cause disorientation and a restriction to the learning process (Lee, 1996). "If your readers are lost or have to spend time thinking about where to go next, they are not focussing on the learning material" (Downes, 1996).

There are some important practical issues with any web page, which make it learner friendly. The added knowledge in the Growsafe<sup>®</sup> course followed principles outlined by the 'Yale Center for Advanced Instructional Media' (Lynch, 1997) and a more light hearted but equally valuable document 'The Art and Zen of Web design' (Karp, 1998). The following points summarise some of the elements of those principles.

As mentioned already, easy navigation of the content is crucial. Using default link colours and consistent look and feel give readers as little to learn about navigating the site as possible. Although hypertext is effective for motivation, most readers prefer to be led through material and they like to know where they are, to have some sense of how much they've read and know how far they have to go.

If a learner arrives at the site looking for a specific piece of information, it should be easy to locate and be no more than three clicks away. Even the way the content is laid out is important for readability. It is suggested that the maximum any paragraph should be about six lines or around four sentences with lines only 10 to 12 words wide. It is also important to keep in mind that current computer screens result in reading that is approximately 25% more difficult than reading from paper (Nielson, 1996).

Although the courses are in an electronic format, students still like to print out pages. This means that the full width of an 800 x 600 pixel screen is too wide. Pages wider than 600 pixels will not fit on an A4 page. The other issue for the students who like to print is that when linking to an external site the full URL needs to be included so that the full link appears on the paper.

Even if all aspects of the quality of materials is exceptional, the support for resource based learning is a crucial element of successful learning. Support mechanisms must be carefully planned and in fact these often form a more rigorously investigated part of validation than the actual quality of the materials (Robertson, 1996).

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#### The Problem

The last component of learning involves the application of the knowledge to the problem domain. The web can facilitate this in relation to the discussing findings, formal and summative assessment, hunting for answers and communication of understanding. In traditional classroom environment, the teacher can tell how a student is progressing by discussion and even student body language. In the web environment the same needs can be met using short email messages to see how well the student is applying the knowledge, and providing, regular positive feedback on progress. A reasonable level of communication would also allow the teacher to track the students progress though the course and make suggestions of learning strategies that match the learner to the material. The student should feel they have all the experience and support they need to be successful. The teacher on the other hand is receiving valuable feedback to make sure that the learner has the best possible chance of success.

There are difficulties with the more practical problems. In the Growsafe<sup>®</sup> course there is a need to provide both experience and assessment on the likely faults of a backpack sprayer. With standards set by the Horticulture Training Organisation, the training and assessment has to be seen to be transferable to actual equipment. In this case, a Java programme was written that simulates a backpack sprayer and allows the students to identify the parts of the sprayer and find any faults. Another assessable skill was the correct measurement of liquids for mixing spray doses. Again, a fully interactive Java applet was written that allows the starting and stopping of a liquid being put into a container and calculations from that are used in the assessments that are different from what we have been used to in the past.

#### **Final Comments**

In all education, to teach well, we need to be creative and treat technology like any other resource - with lateral thinking, imagination and ingenuity. As March (1997) says about web based teaching "It's a lot like what you are already doing, It's unlike anything you've ever done before ... In other words, educators will recognise old friends like references, resources and lessons, but the breadth, depth, immediacy, passion and interactivity available in the web based system open up an entirely new way to educate"

Now that more information is disseminated, we are putting more emphasis on learning by doing and applying rather than only reading and listening. "Online education might not be easier, and it might not cost less ... it does open up a universe of learning possibilities" (Smith, 1997).

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