Pacific Rim Real Estate Society Conference

21 - 23 January 2002

Christchurch, New Zealand

Virtual property: an interactive computer-based learning experience

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Abstract: Interactivity lies at the heart of the learning process. At Massey University the challenge for academics is to deliver interactive education to students across multiple campuses and to those undertaking extramural studies (distance education).   In this regard there is a growing emphasis at Massey on the development and integration of computer-based learning into courses.

Recently a small team of innovators within the Department of Finance, Banking and Property has been developing a multimedia property studies teaching resource, primarily focusing on the valuation inspection process.   This paper describes the multimedia application: the software system, the teaching content, and how the resource is being integrated into courses.

1. Introduction and background

Massey University is one of New Zealand's largest providers of post-secondary or higher-level distance education. For many courses it has been and still remains the sole provider in the distance delivery mode. However, things are changing. With an abundance of new technologies, demand for cost effective education and a growing number of non-traditional students; institutions of higher learning, internationally, are turning to the development and provision of distance learning courses.

Massey University's distance education programs are facing new challenges, greater competition for students. Ultimately the strongest competition is unlikely to be from within New Zealand; rather it is likely to come from global education providers. A quick browse of the Internet reveals numerous overseas institutions offering on-line degree and diploma courses. Massey University was quick to recognise the challenge and has invested/continues to invest significant capital into new technologies and enhancements to both distance and on-campus courses.

Some three years ago the Department of Finance, Banking and Property made the move to Web-enhance all its' paper offerings. The Department hired a full-time computer consultant and during ensuing times it has WebCT'd all papers (60). The process started simply and added advanced features over time:

- Year 1 – introduction of basic WebCT sites, discussion forums and posting of paper administration guides.
- Year 2 – introduction of more advanced WebCT sites, discussion forums, posting of paper administration guides, lecture notes, on-line quizzes etc.
- Year 3 – introduction of interactive WebCT sites, discussion forums, posting of paper administration guides, lecture notes, on-line quizzes, on-line mastery tests, assignment material, assignment results, use of multimedia etc.

Staff now "own" their WebCT sites, they update, change material etc. The Department has actively pushed WebCT training and encourages staff to apply for research funding to develop new technologies.

For property academics one of the hurdles has been how to WebCT the practical parts of their courses. Teaching duties include property management, development, investment, real estate, and valuation. In 2000 we obtained a College of Business Advanced Technology Teaching Research Unit (ATTRU) grant to develop an interactive multimedia application. Our early intention was to provide case studies to distance students that are normally only available to on-campus students. The key issues for us were not to reproduce classroom or study guide and textbook reference material, but rather to replicate property profession field and work environment practices.

We have developed an interactive computer-based case study for the core second year Applied Valuation I paper, which is run in both internal (on multiple campuses) and extramural modes in the University's second semester. In short, we have produced a multimedia CD-ROM that takes all modes of students through the process of inspecting a residential property.

This paper outlines the development and use of the CD-ROM. The structure of the paper is as follows; the next section provides a brief overview of previous research into the use of computer technologies in education. Section 3 explores the development of the CD-ROM for the second year valuation paper at Massey. Section 4 contains an outline of its features, and Section 5 notes how it is being integrated with course material to enhance the property education experience.

2. Literature review

Early research into the effectiveness of computer-based learning resources has been mixed. Er and Ng (1989) conclude that computerized instruction yields little benefits in teaching accounting concepts; while Kachelmeier, Jones and Keller (1992) find that similar learning aids helped the teaching of pension accounting.

Recent research has focused on the effectiveness of computer-based testing. Computer-based testing can be implemented as an academic tool in two ways:

- Practice and feedback.

- Assessment.

Gretes and Green (2000) find a significant one-half letter grade difference between students using computer-based practice tests and those who did not. They found there was a positive relationship between the number of practice tests taken by students and their course grades. Marks (1998) found that classes with access to computer software containing true/false and multiple choice questions achieve higher test grades than those in other classes. While, Thelwell (2000) on the impact of randomly generated open access tests finds evidence of improved student motivation and modified student study behaviour, through increased revision.

A WebCT e-Learning Poll (2001) shows that 66% of respondents rate Web-enhanced (combination) courses as either above average or excellent in overall quality, versus 52% for classroom only courses and 44% for distance courses. 67% deem combination courses above average or excellent in terms of student learning achievement, ahead of 47% for classroom only courses and 37% for distance courses.

Marks (1998) concludes that the success of computerised learning aids ultimately depends upon the learning style preferences of the students.

Whatever the education delivery mode, it should provide a teaching and learning environment that support: interactivity (teacher-learner, learner-learner, and learner-content); student centred control of pertinent information; mechanisms for the learner to discuss the ongoing shaping of their knowledge (Wells, 2001). The literature on theories of learning, educational instructional design, and software selection that purportedly enhances learning is extensive (see Semple, 2000 for a review). Semple suggests that the terms computer-assisted and computer-based learning indicate a positive change in emphasis to teaching and learning, with more flexible approaches to facilities creating student centred learning environments.

3. Developing the multimedia CD-ROM

Dyrli and Kinnaman (1995) define multimedia as the *"seamless digital integration of text, graphics, animation, audio, still images, and motion video in a way that provides individual users with high levels of control and interaction"*. The ability to integrate all these features is what sold us on multimedia. It allows teachers to create interactive presentations through integration of text, images, audio etc. and it can facilitate critical thinking, problem solving, group and networked learning communities' etc.

The Applied Valuation I course prescription reads: "An introduction to valuation examining the duties of a valuer, code of ethics and report writing as well as the principles and methods of valuation and the application of these to the valuation of residential and rural property. The paper has a practical orientation containing a substantial fieldwork and case studies component".

Currently students undertake property inspections as part of the fieldwork practical requirements of the paper. For internal students the inspections are set-up by the course lecturers; for the most part extramural students have to find their own properties to inspect, within guidelines as set by the lecturer. Weaknesses of the current practice include:

- Restricted number of inspections (for both modes of student) and chances to view different property types and substructures.
- Limited opportunities for lecturers to monitor how and what extramural students view.

Valuation is commonly described as an art not a science. Many valuation students find that they can follow the logic of a worked process or solution in the classroom or in study guides and textbooks. However, they become bemused when faced with a live valuation task. In order to proceed with the task the valuer needs knowledge of the processes involved in their realm of work, and a great deal of experience and judgement.

The goal of the multimedia project was to remedy the aforementioned weaknesses and shortcomings of the paper/students. The challenge was to develop a multimedia case study that would deliver substantial practical valuation content to extramural and internal students alike. To help students rehearse the core concepts, procedures and skills that they have to be able to use to see the world as property people do.

Our design team:

- Garry Dowse – created the case study and hardcopy pathways, coordinated efforts.
- Raewyn Fortes – proofed hardcopy pathways and computer version of the case study.
- Allan Smee – created computer pathways and computer version of the case study.

Key points for design:

- Encouragement of active student centred learning.
- Extent of existing and allied course materials.
- Advancement of post-teaching reinforcement.
- The case study had to be interesting.
- The case study had to be real.
- Selection of material that meet Web "usability" standards (see Section 4).
- Efficient use of staff resources.
- Capabilities of the electronic medium (flexibility).

What we did:

- Identified the most suitable case study.
- Applied for an ATTRU grant.
- Developed hardcopy then computer versions of the case study.
- We used motion video, still images, audio etc.
- We incorporated legal extracts, links to property information etc.
- We have had the product progressively evaluated by selected undergraduate and postgraduate students, and property industry experts.
- "Covering all bases" was the key.

The software:

The authoring software is Macromedia Director 7 and QuickTime for incorporating movies and still images. Macromedia Director is the industry standard for creating multimedia CD-ROM's. Director allows programmers to make interactive applications that can incorporate

Web-based material, full motion video, still images etc. It allows the creation of one executable file, which can be run on multiple platforms i.e. Windows and McIntosh computers and has portability. End users of the application do not have to download or store any software on their machines, they have a choice whether to run it directly from the CD-ROM or copy it to their computer's hard drive.

How long did it take?

Two versions of the CD-ROM have been produced to date, the latest produced after rigorous reviews/testing of the initial pilot version. Another update is close incorporating student self-assessment quizzes. To date the project has taken much longer than we expected. The overall issue was complex, we had to find the appropriate software and then learn how to work it. Gathering and collating content was a slow process. Significant time has also be consumed in not only editing text, but also motion video and still images. Other work commitments have also interrupted.

4. Features of the CD-ROM

We have spent significant time and capital to produce a resource that represents best valuation practice (in accord with New Zealand Institute of Valuers standards and guidelines). The CD-ROM sets out the practical and elementary processes involved in carrying out a "single appraisal" residential property valuation. Based on a "real" situation, it explores the sources, collection, recording, analysis, reporting, storage and retrieval of necessary data. Students are able to view an actual property inspection and associated information on building products, design and faults that are commonly encountered in everyday valuation practice. The application also allows students to examine legal documents relating to property and view extracts from online databases.

The CD-ROM breaks down the valuation process into small "learning objects". Attention is variously given to:

- Client instructions.
- Pre-inspection data collection.
- Field inspections.
- Data verification.
- Valuation assessment.
- Report preparation, client communication and recording.

The many positives of the multimedia resource:

- It is student centred.
- It operates without the presence of a lecturer.
- Advances post-teaching reinforcement.
- Gives students new experiences.
- It uses discovery.
- It is suitable for on-line learning.
- It introduces equivalence for internal and extramural students.

Access is direct; organiser pages and navigation tools (i.e. suggestions, links) allow students to go straight to the information they desire. There is "action" in the layout. Fountaine and O'Dea (2001) suggest that since the teacher will not be present when the reader views, the opportunity for showing the reader what information is most important will not present itself unless there is some action in the layout. Information is provided in a clear and concise way, by using bullet points, small paragraphs, colour, bold and italics alerting students to key concepts in an orderly and efficient fashion. Again from Fountaine and O'Dea, who quote KnowledgeNet.com, Inc. reports that since the beginning of Internet-based learning at "Mastering Computers" significantly higher student pass rates have been achieved by breaking content down into small learning objects and enhancing courses with special effects.

Emphasis is on content, speed, interactivity and appearance because we are asking a lot of students to sit and listen, and read and view information.

5. Implementing the resource

From the Second Semester of 2002 our multimedia resource will be used in the core second year Applied Valuation I paper, run in both internal (on multiple campuses) and extramural modes. It will be available to students in a stand-alone environment or within an accompanying WebCT site, both allowing repeated use at little or no cost.

The CD-ROM will overcome some of the problems associated with distributing large amounts of data via the Internet, and it will also permits students without Internet access to view the material in a structured learning environment. Using WebCT discussion forums students will are able to discuss aspects of the valuation process with their fellow students and the lecturer. The site and the CD-ROM will also contain self-assessment quizzes allowing student and lecturer to gauge the student's understanding of core concepts and procedures.

Ultimately it would be our goal to create tutorials, additional case studies (e.g. commercial, rural property) and self-tests, and to present them engagingly. It would be good to further anticipate where students can go wrong and provide extended hints and feedback.

6. Conclusions

There is no one teaching medium that should be applied in preference to another. Teachers well versed in the theories of learning, who are familiar with their students and who have high levels of competence in using and implementing a range of education technology, will create appropriate learning environments (Semple, 2000).

This paper has outlined the development of a multimedia CD-ROM resource for use in a property education setting. Would we develop the resource again? You Bet! Multimedia allows teachers to create interactive presentations through integration of text, images, audio etc. and it can facilitate critical thinking, problem solving, group and networked learning communities' etc. We are currently in the process of adding self-assessment quizzes allowing student and teacher to gauge the student's understanding of core concepts and procedures. On completion of the same, an updated version will be created and distributed to students on their enrolment in the second year Applied Valuation I paper, as a learning aid in addition to the standard study guide and textbook.

Acknowledgements

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