

# Weblectures: Enhancing The Webct Experience For External Students

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## ABSTRACT

This paper discusses a project conducted at Massey University, New Zealand using WebCT to deliver 'Weblectures' with audio, animation and interactivity.

The results of research conducted to determine student motivation to complete, attitudes towards, and the impact of this form of online instruction on learning outcomes are presented.

## INTRODUCTION

Massey University, like many tertiary institutions worldwide, has adopted WebCT as its online teaching platform. WebCT is "an integrated Web publishing environment specifically tailored for the design and development of teaching and learning materials" (Volery, pg. 82). WebCT requires minimal technical expertise from either the lecturer or the student, and is readily accessible via standard web browsers.

Massey's use of WebCT as an instructional medium has centred primarily on uploading textual material (administrative guides, lecture notes, readings, and PowerPoint presentations) and facilitating lecturer or student initiated communication through bulletin boards, chat rooms and email.

This project sought to explore alternative instructional opportunities available within Massey's existing WebCT platform. Standard PowerPoint presentations of instructional materials were enhanced into 'Weblectures' with lecturer audio, animation, hyperlinks, and interactivity, including online surveys and simulations. For external students, Weblectures were intended to add value to traditional text-based distance materials, seeking to replicate aspects of the in-class lecturing experience of internal students. For internal students, Weblectures were intended as a substitute for traditional face-to-face lectures.

Research was undertaken to determine the effectiveness of Weblectures by investigating student motivation to complete, student attitudes towards, and the impact of this form of online instruction on learning outcomes. Students' online

activity was tracked and student opinions solicited at the end of the semester. The results presented in this paper focus primarily on external students' experiences and opinions.

As this was an exploratory project into untested technical and institutional waters, two Weblectures were delivered via WebCT during the second semester in 2003, representing the equivalent of four hours classroom instruction. Weblectures were developed for a combined postgraduate & undergraduate/ external & internal Electronic Marketing class. A condition of enrolment in Electronic Marketing is that both external and internal students have access to the Internet, making it appropriate for a project of this type. It was also hoped that students who chose to study Electronic Marketing as an elective would have a higher level of computer knowledge/facility and interest in exploring the use of the Internet for teaching purposes.

## **LITERATURE REVIEW**

"The rapid growth of end-user computing, low-cost communication, and the development of the Internet has lead to a surge of online courses. In light of this, many educators still await the promise of technology's power to improve teaching effectiveness." (Volery (2001), pg. 77)

Adoption of Internet-based instruction has been steadily increasing in the tertiary education sector, both as a supplement of, and alternative to, traditional classroom and distance-based instruction (Alavi, Yoo & Vogel, 1997; Rahm & Reed, 1997; Arbaugh, 2000). Webster and Hackley (1997) suggest that technology-mediated learning (such as use of the Internet) facilitates cost, information and expertise sharing amongst multiple sites, and provides potential strategic advantages in accessing new market segments. It also exposes students to the current technologies used by businesses to gain competitive advantage.

Educators are particularly interested in determining whether such technology-mediated learning and the variety of applications used in distance or in-class applications are effective and what measures to use to determine its effectiveness. Phipps & Merisotis (1999) identified three broad effectiveness measures for online delivery: student learning outcomes such as grades; student attitudes towards learning through distance (or technology-mediated) education; and overall student satisfaction with online delivery.

Webster and Hackley (1997) suggested the following measures of effectiveness: student involvement/participation; cognitive engagement; technology self-efficacy (belief in one's own technological capabilities); perceived usefulness of the technology; and the relative advantage of online delivery.

Dillon and Gunawardena (1995) and Leidner and Jarvenpaa (1993) identified three main variables affecting online delivery effectiveness: technology (such as reliability, quality of the interface and medium richness), instructor characteristics (such as teaching style and facility with technology) and student characteristics (such as prior experience and facility with technology).

Budd (2002) asserted that implementation of technology in education has preceded research into its effectiveness, agreeing with Miller & Miller (2000) and Motiwalla & Tello (2000) that the effectiveness of specific instructional tools has not been thoroughly evaluated. According to Beller & Or (2003), the constant and rapid state of change in the field of online learning has meant that, while there exist case studies and examples of 'best practice', there are limited quantitative studies, limiting generalisability. That being said, research continues and results are emerging.

Russel's extensive 1999 literature review (reported in Volery (2001)) supports the argument that distance students using technology achieve similar learning outcomes to students receiving conventional in-class instruction, suggesting a reasonable degree of effectiveness.

Kekkonen-Moneta & Moneta (2002) reported on findings that using email and newsgroups for communication, online quizzes and participation in bulletin board discussions, and supplementing lectures with online practice quizzes have resulted in improved learning outcomes. Their study confirmed the findings in studies by McFarland (1996), Herrington & Oliver (1999) and Hirschbul (1999) that "carefully designed e-learning modules facilitate engaging interactions with the content materials and, in turn, foster higher-order learning outcomes" (pg. 432).

While the debate continues as to the merits of online versus offline education, technology advances, competitive pressures both on and off shore, increased class sizes and resource constraints appear likely to continue as significant drivers of online instruction (Arbaugh, 2000; Inayatullah & Gidley, 2000; Volery, 2001; Gardner, Sheridan & White, 2002; Beller & Or, 2003).

## **METHODOLOGY**

For this project, the lecturer initially created the skeletal structure of the Weblectures as enhanced PowerPoint presentations using standard Microsoft PowerPoint software. Lecturer audio commentary was then embedded into each frame, seeking to replicate the audio experience of an in-class lecture. According to Budd (2000), audio stimulates interest and connects with different learning styles.

One challenge identified by the researcher when teaching complex conceptual models in traditional lecture and written formats is to direct student focus to selected model components and illustrate interconnectivity between components, while still

maintaining the integrity of the entire model. For the Weblectures, interactive animated conceptual models were created that allowed components being discussed to move to the foreground while the overall model remained intact in the background.

Computer technicians activated surveys, hyperlinks to government and corporate websites, and links to online simulations and self-evaluation testing instruments before uploading to Massey's WebCT platform.

Hyperlinks allowed for in-depth exploration of selected websites, following both lecturer directions and the student's own curiosity. Students were also able to participate in simulations, surveys and self-evaluations in a highly personalised interactive fashion. For example, in simulations, students were able to develop multiple marketing strategies and compare the results of each implementation. Students provided their own opinions or personal information in surveys and self-evaluations and were then able to see how they compared to their colleagues or standard profiles in a self-diagnostic fashion. Kekkonen-Moneta & Moneta (2002) report that researchers such as Herrington & Oliver (1999), Frear & Hirschbuhl (1999) and Kettanurak, Ramamurthy & Haseman (2001) found that online interactivity, especially personalised interaction, enhanced learner performance and problem solving skills, and lead to higher-order learning outcomes.

By exploring websites and participating in simulations and self-evaluation, students were able to create their own understanding, consistent with the constructivist view of education that students create knowledge via their own experiences (Budd, 2000).

When creating the Weblectures, only publicly available free software programs were used to ensure usability on as wide a range of computer systems as possible. Hyperlinks to programs such as Flash and Adobe PDF were provided for students to download as needed on home or work systems. To ensure maximum functionality, care was taken to minimize download times and bandwidth requirements, keeping animation and embedded audio to a minimum. Weblectures were tested on a variety of home and institutional computer systems in consideration of the multitude of systems used by external students. A database was created to capture logon and survey data and track student activity while logged into the Weblectures.

Students were advised when Weblectures would be available online in hard copy Administration Guides as well as via notices on the WebCT home page. Weblectures 1 and 2 were available online for two weeks each during semester. At the end of semester, both Weblectures were again available online as was a Weblecture Evaluation form. Measures of online delivery effectiveness identified in the literature were incorporated into the Weblecture Evaluation completed by students. After reviewing student login data and to ensure that students provided feedback, two bonus marks were offered for completing the Weblecture Evaluation form. To gain access to the Weblecture Evaluation form however, students were required to complete both Weblectures. Seventy four completed Weblecture Evaluations were

analysed (34 undergraduate internal; 16 undergraduate external; 10 postgraduate internal; 14 postgraduate external).

## RESULTS AND DISCUSSION

This research sought to answer three core questions:

1. what are students' attitudes towards online offerings such as Weblectures?
2. will students actively engage with the Weblectures?
3. do Weblectures make any difference in terms of learning outcomes?

### Computer Comfort Survey

Motiwalla & Tello (2000) and Nakos, Deis & Jourdan (2001) suggest the importance of student competency relative to both computers and the Internet in terms of learner success in technology-mediated instruction.

Prior to beginning Weblecture 1, students completed an online survey to determine their current knowledge of both computers and WebCT as well as an assessment of their own computer and Internet skills. Data was analysed to determine if additional instruction was needed relative to using the Weblectures.

Computer/WebCT Knowledge	Have you received any formal instruction in using computers?		Have you studied a paper that used WebCT?	
	Yes	No	Yes	No
External undergraduate (n=28)	75%	25%	68%	32%
External postgraduate (n=22)	73%	27%	59%	41%
External total (n=50)	74%	26%	64%	36%

Perceived Computer/Internet Facility	Rate your overall skills with computers.			Rate your overall skills using the Internet.		
	Beginner	Intermediate	Advanced	Beginner	Intermediate	Advanced
External undergraduate	0%	57%	43%	4%	53%	43%
External postgraduate	4%	55%	41%	5%	59%	36%
External total	2%	56%	42%	4%	56%	40%

Overall, most students had previous experience with the WebCT platform and assessed their own online and computer skills at high levels, consistent with expectations and satisfying Webster & Hackley's (1997) 'technology self-efficacy' effectiveness measure. No statistically significant differences were found between external and internal students relative to computer experience and perceived facility (at alpha = 0.05). As such, it was judged that they possessed the requisite skill set needed for the Weblectures and no additional instruction was needed.

### Attitudes towards Weblectures

In the Weblecture Evaluation, students were asked to rate specific Weblecture features on a scale of 1 to 5 (1 = very good and 5 = very bad).

Selected Weblecture features	External students Mean (SD)	Internal students Mean (SD)
Ease of access (home or computer lab)	2.12 (1.27)	2.22 (1.07)
Colour	1.90 (0.93)	2.17 (0.98)
Audio	2.56 (1.05)	2.95 (1.15)
Animation of models	2.30 (0.87)	2.38 (1.10)
Hyperlinks	2.93 (1.20)	1.89 (1.00)
Online surveys/questionnaires	2.37 (0.96)	2.50 (0.98)
Ability to go at own pace	1.73 (0.94)	1.90 (0.85)
Ability to access when/where want	2.00 (1.20)	2.03 (1.12)
Ability to revisit sections as desire	2.24 (1.54)	2.00 (1.17)

Opinions about Weblecture features were generally positive, satisfying Webster & Hackley's (1997) perceived usefulness of technology effectiveness measure. Problems experienced by students with frequent slow audio and hyperlink downloads however were evident in the evaluation. Hyperlinks proved to be the only statistically significant variable at alpha = 0.05 (p-value = 0.000), consistent with the particular problems reported by external students.

Positive opinions expressed by external students concerning the learner flexibility offered by asynchronous aspects of the Weblectures (access, pace and revision) were consistent with the time/place barrier-reducing nature of distance education in general and specific online findings such as those of Motiwalla & Tello (2000). Internal students also appreciated these features, not surprising given that pace and content sequencing in lectures are generally lecturer controlled.

Students were asked to indicate their level of agreement with statements concerning online learning on a scale of 1 - 5 (1 = strongly disagree and 5 = strongly agree).

<b>Student Opinions</b>	<b>External students Mean (SD)</b>	<b>Internal students Mean (SD)</b>
I prefer face-to-face lectures or reading study materials to Weblectures.	3.00 (1.14)	3.07 (1.09)
I believe the Internet provides an efficient way for interactive learning.	3.97 (0.928)	3.97 (0.86)
The Internet does not enhance my interest in learning.	2.17 (0.986)	2.33 (0.88)
I believe the Internet provides a good learning environment.	3.70 (0.952)	3.72 (0.90)

Overall both external and internal students felt that the Internet, in a general sense, provides an efficient learning environment and does enhance learning, consistent with findings such as those of Motiwalla & Tello (2000) and satisfying Webster & Hackley's (1997) relative advantage effectiveness measure.

Both external and internal students however were more ambivalent when comparing Weblectures (a specific Internet application) to traditional distance education materials or face-to-face lectures. No statistically significant differences were found between external and internal students (at alpha = 0.05).

Students were also asked to rate their overall experience with the Weblectures using a scale of 1 - 5 (1 = very positive and 5 = very negative).

<b>Weblecture Experience</b>		<b>Mean (SD)</b>
<b>External</b>	Undergraduate	1.87 (0.61)
	Postgraduate	2.14 (0.77)
	Total	2.00 (0.69)
<b>Internal</b>	Undergraduate	2.16 (0.86)
	Postgraduate	1.89 (0.92)
	Total	2.10 (0.87)

Both external and internal students rated their overall experience with Weblectures as positive, satisfying Phipps & Merisotis' (1999) overall satisfaction effectiveness measure. No statistically significant differences between external and internal students were found (at alpha = 0.05).

Engagement with the Weblectures

Students were advised in advance when Weblectures would be available via notices on the WebCT home page and in-class announcements. Students who completed Weblectures within the first week available (consistent with the sequencing of content in the study schedule) were judged to have unaided engagement. After the Weblectures had been available online for one week, additional notices were placed on the WebCT home page encouraging students to complete and advising when Weblectures would go offline. Students who accessed during this time period were judged to have prompted engagement. Students who completed Weblectures only when bonus marks were offered for completion of the Weblecture Evaluation were judged to have incentivised engagement. Student logon activity was monitored, revealing the following:

		Weblecture 1			Weblecture 2		
		Unaided	Prompted	Incentivised	Unaided	Prompted	Incentivised
<b>External</b>	Undergraduate	25%	35%	40%	28%	21%	51%
	Postgraduate	22%	28%	50%	23%	0%	77%
	Total	24%	32%	44%	26%	12%	62%
<b>Internal</b>	Undergraduate	48%	18%	34%	27%	41%	32%
	Postgraduate	49%	32%	19%	43%	39%	18%
	Total	48%	22%	30%	31%	40%	29%

Statistical significance at alpha = .05 was found between external and internal students (p-value = 0.003 for Weblecture 1 and p-value = 0.000 for Weblecture 2), external and internal undergraduates (p-value = 0.022 for Weblecture 1 and p-value = 0.051 for Weblecture 2) and external and internal postgraduates (p-value = 0.020 for Weblecture 1 and p-value = 0.00 for Weblecture 2).

Approximately one quarter of external students addressed the material in line with the recommended sequence of content suggested in the study schedule. The majority of external students engaged with the Weblectures only in response either to lecturer encouragement, limited availability or, most significantly, bonus mark incentives. Internal students had higher uptake unaided and prompted but approximately one third engaged only after incentives were offered.

Given the level of unprompted engagement, Weblectures would likely not satisfy Webster & Hackley's (1997) student involvement/participation effectiveness measure. Lecturers considering Weblectures as in-class substitutes or in subjects where the sequence of material presented is extremely important should keep in mind the pattern of engagement exhibited by the Electronic Marketing students.

## Learning Outcomes

Of key interest was whether Weblectures make a difference in terms of learning outcomes compared to traditional distance education methods. Student assessment of their own learning outcomes was solicited and final grades were analysed.

In the Weblecture Evaluation, students were asked to assess their learning of the specific content online versus offline on a scale of 1 - 5 (1 = much more than and 5 = much less than).

		<b>Weblecture 1 Mean (SD)</b>	<b>Weblecture 2 Mean (SD)</b>
<b>External</b>	Undergraduate	2.63 (0.80)	2.62 (1.14)
	Postgraduate	3.14 (0.63)	2.79 (1.05)
	Total	2.87 (0.77)	2.70 (1.08)
<b>Internal</b>	Undergraduate	2.68 (0.87)	2.45 (0.99)
	Postgraduate	2.89 (1.05)	1.89 (0.92)
	Total	2.72 (0.90)	2.33 (0.99)

Overall, external and internal students felt they learned slightly more than or the same amount with online versus offline instruction. Interestingly, both external and internal students felt they learned more in Weblecture 2, which contained a comprehensive marketing simulation. Statistical significance at  $\alpha = 0.05$  was found between external and internal postgraduates for Weblecture 2 (at  $\alpha = 0.05$ ;  $p$ -value = 0.049).

The final examination contained two questions, representing a significant proportion of the marks, which loosely tested the content covered in the Weblectures. This material was also covered in hard copy study materials. The two bonus marks did not affect the final grades awarded.

Final grades revealed that external students who completed both Weblectures achieved a mean grade of B while those who did not achieved a mean grade of C+ ( $p$ -value = .038). Internal students who completed both Weblectures fared better than those who did not, achieving a mean grade of B- compared to C ( $p$ -value = .004). Interestingly, a statistically significant difference was found between externals who completed both Weblectures and their internal colleagues who also completed both ( $p$ -value = 0.038). This suggests that Weblectures do add value, enhancing the external student's WebCT experience.

While students may not have judged that they learned more in Weblectures, their final grades demonstrate a higher mastery of the specific content for students who did complete compared to students who did not complete, satisfying Webster and

Hackley's (1997) cognitive engagement effectiveness measure and Phipps & Merisotis' (1999) student learning outcome effectiveness measure.

## **LIMITATIONS AND FUTURE RESEARCH**

Generalisability is limited as this was an exploratory project with a limited number of students, confined to two Weblectures in one class. However, the results indicate that while external and internal students may not express strong preferences for the use of such online instructional techniques, their use does have a positive impact on learning outcomes.

The exploratory research carried out in this study has laid the foundations for more systematic and rigorous testing of the capacity of WebCT as a lecturing tool and both external and internal student interactions with the medium.

## **CONCLUSION**

The purpose of this study was to investigate alternative applications of WebCT as an instructional tool. For external students, it was hoped that Weblectures would "create a learning experience comparable to regular face-to-face instruction" (Beller & Or, pg. 24).

In this study, external students, like their internal colleagues, expressed positive attitudes towards the use of the Internet as a medium for interactive learning, its ability to facilitate a good learning environment, and their experiences with the Weblectures overall. Ability to control pace, access when and where want, and revisit sections were all judged positive features. Overall however, external students did not express strong preferences for Weblectures compared to traditional distance instruction.

In terms of learning outcomes, external students felt they learned slightly more via Weblectures compared to reading textual material. In terms of final grades however, external students who completed both Weblectures, like their internal colleagues, performed significantly better than students who did not.

Using the effectiveness measures identified in the literature, it would appear that Weblectures, for the most part, represent a reasonably effective means of online delivery. The challenge remains, comparable to achieving classroom attendance, getting them to log on.

While Phipps & Merisotis (1999) state that technology cannot replace the human factor in education, Weblectures may offer a valuable instructional opportunity to integrate both human and technological factors and, as such, warrant further investigation.

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