Electronic course content at The University of Western Australia

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Literature suggests that electronic course content helps current students learn and helps recruit potential students. This comprehensive study reviewed all units, over one thousand, on offer at The University of Western Australia (UWA) in May 2004 to determine online presence, added value to students and marketing implications. The diffusion of innovations theory helped explain the results such as that 61% of all available units at UWA had an online presence, or 80% of all undergraduate units and only 37% of all postgraduate units.

Given the marketing implications of publicly accessible Web sites over password protected sites or a central database of all unit information, this study suggests public unit Web sites are an effective marketing tool, particularly towards international and postgraduate students. Based on the annual income of UWA, marketing initiatives should focus on these prospective students.

Keywords: eLearning, diffusion of innovations, marketing, unit homepages.

Online course content

Internet technologies, valuable for information intensive services, have become central to the success of educational institutions (Mazzarol, Soutar & Seng, 2003; Gomes & Murphy, 2003). Australian universities use Internet technologies to improve the quality of, and access to education. Integrating online learning in the education process offers flexibility for students (Sweeney & Ingram, 2001), enabling them to access online content "independent of time, place and circumstances" (DEST, 2002; p. 1). As a marketing tool, Web based technologies can attract new students, retain existing students, and increase a university's competitiveness as a service provider (Murphy & Gomes, 2003; Tsichritzis, 1999). There is little research, on the extent to which universities actually provide online course content.

The present study focuses on an Australian university's use of Web technologies for education. Specifically, this study evaluates the level of online presence of all units in all departments, a census, at The University of Western Australia (UWA) in the first semester in 2004. Underpinning this research is the belief that publicly accessible educational Web sites must contain useful content to contribute to the functioning of present day universities. There is little value in adopting technological innovations if not implemented correctly.

Online learning in Australia

Australian Universities are world leaders in online education, adopting and investing in Internet technologies for research, teaching, learning and administration (DEST, 2002). In 2002, all Universities enhanced their teaching and learning by employing the Web (DEST, 2002). Australia's high level of Internet penetration supports these developments. In June 2003, 58% of Australians above the age of two had Internet access, with 18% of all Internet users taking part in online education (National Office of the Information Economy, 2003). In addition, effectively applying these technologies helps market a university in the global education market.

Internet technologies as a marketing tool

In the global market for education, Australian universities provide expert and excellent education, attracting high calibre students. Each year, at least 180 000 international students contribute to the

economic and social well being of Australia (Department of Foreign Affairs and Trade, 2004). At UWA, international students contributed 65% of university fees in 2002 (DEST, 2003).

Universities today use Internet technologies as a marketing tool for attracting and recruiting new students, retaining existing students from local and international markets, and leveraging the university's brand. Information such as an online course description is crucial for prospective students, many of whom use the Web to evaluate and compare Australian universities (Murphy & Gomes, 2003). Internet marketing strategies are especially appealing to the current markets of students born since 1982. The "Millennials" have grown up with technology and expect education providers to utilise a variety of technology in their teaching (Howe & Strauss, 2000).

Part of a student's demand for online learning stems from the recognition of distinct, individual learning styles. Granitz and Greene (2003) suggest looking at education from a business perspective where "instructors … are suppliers of e-commerce content, [and] students … are consumers" (p. 17). Teaching with methods that match individual learning styles promotes effective learning and a positive attitude towards education (Felder, 2003).

Online learning

Online learning can improve the quality of learning, improve access to education, and improves education's cost effectiveness (Gunasekaran, McNeal & Shaul, 2002). It fundamentally changes the delivery of education and training along with how people learn. Flexibility lets students access learning material at any time, place and pace (Sweeney & Ingram, 2001; DEST, 2002). Class time is more efficient when transferring administrative aspects such as tutorial registrations to the Web (Martins & Kellermanns, 2004). Computer mediated interaction aids the accelerated adoption of information and new programs (Gunasekaran, McNeal & Shaul, 2002), enabling students to develop technological and communications skills widely used in the workplace (Meisel & Marx, 1999).

Despite these benefits, online learning in higher education often lacks richness and innovation. Furthermore, technical problems, a lack of relevant online course materials as well as a reduced level of traditional face to face contact and instructional intimacy hinder effective online learning (Zhao, 2003). The benefits of online learning, though, can outweigh the limitations when implemented appropriately. The extent to which these benefits eventuate depend in part on the level of online delivery that a higher education course decides to adopt.

Online delivery

The delivery of educational material through Internet technologies occurs on multiple levels. Many groups have attempted to describe the levels of delivery, including The Curtin University of Technology (2001) and the Australian National University (2001); later the Department of Education, Science and Training (DEST, 2002) compressed the description to three levels. This study recognises a five level model of online delivery in regards to student usage. The first two levels are important for prospective students who are heavily influenced by specific course offerings when searching for and evaluating universities (Moogan, Baron, & Bainbridge, 2001). The main beneficiaries of the upper three levels of online delivery are current students enrolled in that particular unit.

1. A simple informational site with minimal course content such as a unit title and short outline.
2. Sites which supplement and enhance traditional instruction. These sites include a course description and additional features such as a study guide, lecture notes, links to useful Web sites, key dates, names and contact details of teaching staff, learning objectives, assessment overview and assignments.
3. Sites which substantially contribute to the unit by providing a high level of online resources. Students depend on online course material and regular Web site use is essential for successfully completing the unit. These units may include information resources, lecture notes and tutorial readings.
4. Supports learning in a highly informational and interactive way, integrating all level three components with communication tools such as email lists, chat, discussion boards and online assessment tasks.
5. Fully integrates Internet technologies into the course, often replacing face to face interaction.

Diffusion of innovations

One theoretical avenue for explaining the possible adoption and implementation process that leads Universities to offer higher levels of online learning is the "Diffusion of Innovations". This theory has a longstanding tradition in explaining how new technologies can be communicated through, and adopted by, society over time (Murphy & Gomes 2003; Rogers, 1995; Baptista, 1999). The ability to adopt, and effectively implement new innovations is vital to the existence of a business (Rogers, 1995). In organisations, the adoption of an innovation ranges from simply purchasing it to successfully implementing the innovation throughout the organisation (Fichman, 2000). The decision to implement may remain optional to individuals, result from a general consensus among the system's members, or be imposed by an authority (Rogers, 1995).

Differing organisational characteristics help explain the varying degree in which innovations are implemented across organisations (Fichman 2000). Characteristics that positively relate to organisational innovativeness include the size of the organisation, whereby larger organisations are more efficient adopters and implementers of innovations (Rogers, 1995). Other factors showing a positive relationship to an innovation's diffusion include decentralised systems, complex levels of knowledge and expertise within the organisation, and formalised rules and procedures (Fichman, 2000; Damanpour, 1991).

Hypotheses

The theory of innovation diffusion helps explain the adoption and implementation of educational Web sites (Gomes & Murphy, 2003). Adoption of an innovation is shown by employment of Web technologies at most universities to a certain extent (DEST, 2002). This study examines the extent to which UWA has implemented Web technologies. Online content is one of the most important aspects of a Web site for educational service providers (Poock & Lefond, 2003), providing students with flexible learning options and enhances the quality and depth of their education.

This online content can include publicly accessible course information as well as password protected Web based course management systems (Martins and Kellermanns, 2004; Zhao, 2003). The formation of "The Unit Outline Online Working Party", responsible for promoting the implementation of Internet technologies across UWA, demonstrates a commitment to provide a high level of publicly accessible online course content.

UWA's organisational structure is a model of nine faculties and 33 schools. In this structure, all faculties act as individual and largely independent organisations with separate budgets, responsibilities, and formal procedures relating to the adoption of Internet technologies. The hypothesis to determine differences is based on expectations that organisations implement innovations to varying degrees.

H1: Faculties will differ in their:

a) percentage of online presence;
b) amount of added value to students by using protected or publicly accessible sites; and
c) amount of publicly accessible content

Web enhanced education services benefit both current and prospective students in undergraduate and postgraduate education. Undergraduate students expect Internet technologies as a part of their education, while postgraduate students benefit from the flexible access to educational resources. Universities treat these students as two markets and acknowledge the importance of high fee paying postgraduate students who contribute to a university's research agenda. In 2002, 25% of all UWA enrolments were postgraduate students (DEST, 2002), and are an important market to target. The hypothesis to determine differences is based on expectations that there are economic and categorical differences in postgraduate and undergraduate study.

H2: Compared to undergraduate units, postgraduate units will differ in their

a) percentage of online presence;
b) amount of added value to students by using protected or publicly accessible sites; and
c) amount of publicly accessible content.

Methodology

This study was a census of the level of online presence of all 1130 units offered by the nine faculties of UWA, available or "active" in the first semester of 2004. This study relied upon the UWA handbook, available at http://www.handbooks.uwa.edu.au/, as the definitive source of all units on offer. The UWA Faculties include the Faculty of Architecture, Landscape and Visual Arts (FALVA), Faculty of Arts, Humanities and Social Science (FAHSS), Faculty of Economics and Commerce (E-C), Faculty of Education (Edu), Faculty of Engineering, Computing and Mathematics (FECM), Faculty of Law (Law), Faculty of Life and Physical Sciences (FLAPS), Faculty of Medicine and Dentistry (Med-Dent), Faculty of Natural and Agriculture Sciences (FNAS).

The census involved a content analysis of the online component of all active units. The analysis was completed by two coders with random cross checking to check reliability of the data. The Faculty and School Web site search provided links to units via a link to the UWA handbook, a password protected site, or a publicly accessible Web site. This analysis determined a unit's level of online presence, as shown in Table 1, and then subdivided into "no added value" and "added value" from a student perspective. These categories also consider the importance of Web technologies as a marketing tool. Both current and prospective students benefit from online content.

Table 1: Categorisation criteria of added value

Level of presence	No added value	No Presence (none) UWA Handbook (handbook)
	Value added	Password Protected (password) Web site (public)

No added value

Units without an online component had "no presence" and were excluded from further analysis. Similarly, units that linked to the UWA Handbook were perceived as having minimal benefit and therefore 'no added value'. Students may not benefit from a link to the UWA Handbook because it currently provides only basic course information and this level of online presence represents a common shortcoming among adopters of information technology. While adopting Web technologies by linking a unit to the UWA Handbook, poor implementation does not enable their potential benefits to be realised.

Added value

Units that include additional components such as a Learning Management System, which is "computer software that provides academic staff with a coursework shell to manage an online learning environment" (CATL, 2004), had "added value". Units that require a password to access an online Learning Management System such as WebCT and FlyingFish are 'password protected'. The label 'Web site' refers to units that provide public access to a Web site. To avoid double counting, instances where units contained both counted as 'Web site' only. A belief underpinning these classifications is that publicly accessible educational Web sites add the most value to the educational process.

For those units that had independent unit Web sites, the content analysis measured their level of publicly accessible content. Evaluation and scoring of the homepages was conducted against six indicators (see Table 2) that the literature review identified as important. These indicators are highly important to prospective students, who are interested in information about a unit such as the outline, contact details of lecturers and tutors, and continuous updating of the data shown by the last date updated; these all fall under the first level of online delivery. Additional information such as readings, links and course content allow enhancement of instruction and places the unit in the second level of online delivery.

Excluded from the analysis of independent unit Web sites were Medicine and Dentistry, Natural and Agricultural Sciences, and Education as they had less than 5% of active units with unit Web sites. All unit results are an analysis of the homepage only. The homepage is an important aspect of any Web site and is an ideal unit of analysis because "most visitors to a Web site decide whether they will continue to browse a site based on their impressions of the home page" (Ha & James, 1998; p. 467), it also takes into consideration the scope of the study as well as coding consistency.

Table 2: The six indicators of level of publicly accessible content

Unit outline	Course content	Additional pages	Contact information	External links	Last date updated

SPSS was used to edit and code the data obtained from the census for statistical analysis. A chi-square test determined the amount of difference in the findings to test the stated hypotheses, as this analysis lends itself to nominal data (Francis, 2001). Each comparison used the *p* value to determine (< or > 5%) whether or not to reject the null hypotheses.

Findings

Total active units in each faculty

The census examined 1130 active units across nine faculties. Of the nine faculties, FAHSS had the highest number of units at 212 (19%), followed by FLAPS, Med-Dent, FECM, Econ-Comm, FNAS, FALVA, and Law. Education had the lowest number of active units at 41 (4%). Table 3 summarises the active units in each faculty.

Table 3: Total active units of each Faculty in UWA

Faculty	Total number of Active Units	Percent of Total UWA Active Units
Arts Humanities and Social Sciences (FAHSS)	212	19%
Life and Physical Sciences (FLAPS)	206	18%
Medicine and Dentistry (Med-Dent)	156	14%
Engineering Computing and Mathematics (FECM)	152	13%
Economics and Commerce (E-C)	116	10%
Natural and Agricultural Sciences (FNAS)	101	9%
Architecture, Landscape and Visual Arts (FALVA)	84	7%
Law (Law)	62	6%
Education (Edu)	41	4%
Total	1130	100%

Hypothesis 1

Table 4 breaks down each Faculty's active units on levels of presence. Online presence ranged from 'no presence', 'a link to the UWA handbook', 'a password protected site', through to 'a publicly accessible unit Web site'. FLAPS, Med-Dent, FALVA and Law had a low level of online presence. FECM, FNAS, and Education mainly linked to the handbook. FAHSS had the highest percentage of password protected units due to their high use of WebCT, whereas Econ-Comm had the highest percentage of publicly accessible Web sites.

Level of online presence
Examining the faculties in terms of 'no presence' and 'some presence' (link to the UWA handbook, password protected site and a publicly accessible unit Web site) showed a significant difference (chi^2=203.84, d.f.=8, p<0.001) in presence. This supports the hypothesis that faculties differ in their percentage of online presence. Table 5 shows the percentage of units with 'no presence' and 'some presence'.

Added value
Added value from a student's perspective pertains to unit information beyond the unit outline. Units with 'no presence' and those with 'a link to the UWA handbook' had '*no added value'*. Units with '*added value*' had a 'password protected site' or a 'publicly accessible unit Web site'. The relationship between faculties in UWA and the amount of value added had a significant difference (chi^2=134.241, d.f.=8,

p<0.001). This result supports the hypothesis that faculties differ in added value to students through protected or publicly available sites. Table 6 shows the detailed findings.

Table 4: Level of online presence, in percentages, across Faculties at UWA

		Faculty								
		FAHSS	FLAPS	Med-Dent	FECM	E-C	FNAS	FALVA	Law	Edu
Level of online presence	None	13	58	56	34	36	13	73	68	24
	Handbook	24	18	0	43	2	46	0	0	64
	Password	55	12	43	12	1	41	2	10	12
	Public	8	12	1	11	61	0	25	22	0
Total		100	100	100	100	100	100	100	100	100

Table 5: Level of online presence as a percentage of active units

		Faculty								
		FAHSS	FLAPS	Med-Dent	FECM	E-C	FNAS	FALVA	Law	Edu
Level of online presence	No Presence	13	58	56	34	36	13	73	68	24
	Some Presence	87	42	44	66	64	87	27	32	76
Total		100	100	100	100	100	100	100	100	100

Table 6: Value added content in terms of percentage of active units

		Faculty								
		FAHSS	FLAPS	Med-Dent	FECM	E-C	FNAS	FALVA	Law	Edu
Value	No added Value	36	76	56	77	38	60	73	68	88
	Value Added	64	24	44	23	62	40	27	32	12
Total		100	100	100	100	100	100	100	100	100

Amount of publicly accessible content

Based on a summation of the six indicators as mentioned in the methodology, Table 7 lists the unit Web sites scores. Excluded from the analysis of independent unit Web sites were Medicine and Dentistry, Natural and Agricultural Sciences, and Education as they had less than 5% of active units with unit Web sites. Units that scored between 1 and 3 have low publicly accessible content and those scoring between 4 and 6 are high. The relationship between faculties in UWA and the amount of publicly accessible content was significantly different (chi^2=134.241, d.f.=8, p<0.001), which supports the hypothesis that faculties differ in the amount of publicly accessible content.

Total active units in undergraduate and postgraduate studies

The hypothesis to determine differences is based on past research findings that postgraduate and undergraduate units will differ in the online presence of active units. In semester one of 2004, 601 (53%) of the active units were undergraduate units and 529 (47%) were postgraduate units.

Hypothesis 2

Table 8 shows the difference in type of online presence between undergraduate and postgraduate units. Most postgraduate units had no online presence whereas undergraduate units had similar representation in each level.

Table 7: Level of publicly accessible content as a percentage of active unit Web sites

		Faculty					
		FAHSS	FLAPS	FECM	E-C	FALVA	Law
Available content	Low (Score: 1-3)	50	68	18	18	95	43
	High (Score: 4-6)	50	32	82	82	5	57
Total		100	100	100	100	100	100

Table 8: Type of online presence as a percent of active units by graduate level at UWA

		Active Units	
		Undergraduate	Postgraduate
Level of online presence	None	20	63
	Handbook	24	16
	Password	36	12
	Public	20	9
Total		100	100

Level of online presence

The results, as shown in Table 9, show that the majority of undergraduate units have some online presence while the majority of postgraduate units have no presence. This shows a significance difference (chi^2=216.421, d.f.=3, p<0.001) between the level of online presence, supporting the hypothesis that postgraduate and undergraduate units differ in their online presence.

Table 9: Level of online presence as a percent of active units by graduate level at UWA

		Active Units	
		Undergraduate	Postgraduate
Level of online presence	No Presence	20	63
	Some Presence	80	37
Total		100	100

Amount of value added

Table 10 shows the percentage of undergraduate and postgraduate units with value added content for students. Postgraduate units had a high percentage (79%) of no added values while most undergraduate units (57%) included added value for students. This result demonstrates a significant difference (chi^2=150.290, d.f.=1, p<0.001) between postgraduate and undergraduate units and the amount of added value for students, supporting the hypothesis that postgraduate and undergraduate units differ in their level of added value.

Table 10: Value added content as a percent of active units by graduate level at UWA

		Active Units	
		Undergraduate	Postgraduate
Value	No added Value	43	79
	Value added	57	21
Total		100	100

c) Publicly accessible content

Table 11 compares publicly accessible content across undergraduate and postgraduate units. The majority of the undergraduate units fell between 'medium' and 'high' available content, while most postgraduate units fell between the 'low' and 'medium' available content. This result demonstrates a significant difference (chi^2=7.418, d.f.=2, p<0.024) in the relationship between postgraduate and undergraduate units

and the amount of content. This supports the hypothesis that postgraduate and undergraduate units differ in their level of publicly accessible content.

Table 11: Level of publicly accessible content as a percent of active units by graduate level at UWA

		Active Units	
		Undergraduate	Postgraduate
Available content	Low (Score 1-2)	23	44
	Medium (Score 3-4)	43	32
	High (Score 5-6)	34	24
Total		100	100

Discussion

These findings illustrate that many units offered at UWA lie in the second level of online delivery for active units by providing informative online content for prospective and current students. The online handbook contributed the most online presence as it lists all units and contains basic unit and course information. From a marketing perspective, the handbook provides basic information with little added value to prospective students.

UWA has introduced a Content Management System, MySource, which automatically includes the last date updated, links to UWA sites external to the unit, and allows easy development of unit Web sites. The uptake of another centrally supported management system at UWA, WebCT, has increased over 300% between 2002 and 2003. By the second semester 2003, half of all enrolled students were in at least one WebCT supported unit (WebCT Learning Management Group, 2004). An important WebCT feature allows the unit coordinators to generate individual unit welcome pages that are publicly accessible and could include all the information of a regular unit homepage. Both management systems provide a large amount of added value to students. The increased use over twelve months of electronic learning at UWA is encouraging, however without continual implementation and increased quality there is little added value to the university as a whole. One way to promote implementation is through providing central support and university funded initiatives, both of which are now present at UWA.

Currently, 80% of undergraduate units at UWA have an online presence whereas almost two thirds of all postgraduate units have no online presence. The ability to research available courses can influence potential postgraduate students, particularly those from outside Australia. Therefore, more of UWA's postgraduate units should utilise the Internet as a marketing tool in order to increase enrolments from these full fee paying students. Unit Web sites should contain, at a minimum, the unit outline including the assessment breakdown, contact information for the unit and Faculty, links to additional information such as registration details, and the last date updated to show timeliness.

Limitations

The data analysis identified the following limitations: units encompassing more than one category such as a unit being offered in more than one faculty or having multiple levels of online presence, and analysis of only unit homepages. Not included in the variables was the quality of content in the online presence.

Forty two units had both a publicly accessible Web site and a password protected site, these are counted in the public Web site category as this has a greater impact on marketing the site. Separately, 42 units were available to students through more than one faculty and therefore are counted in the faculty as listed in the UWA handbook. Additionally, 16 units were not in the online handbook but were active according to UWA timetabling; these units are counted as active in the findings.

In many cases, links to additional pages would increase the level of content on the unit Web site. However, in order to remain objective when using more than one analyst and to work within time constraints, the homepage was the only source of data recorded. From a marketing perspective, information included on the homepage must draw a prospective customer's attention and therefore is the focus of the site.

The quality of unit Web sites was not included in the variables due to the subjective nature of quality. A quality checklist should include the variables from this study as well as other factors such as design, current and topical information inclusion, working links, and interactivity.

Although the individual unit Web sites had the highest online presence there is research supporting the use of password protected sites as adding the highest value in education. This encourages a sense of community through membership (Wilson, 2001).

Implications

This research extends diffusion of innovations research to online systems such as both Learning and Content Management Systems. The use of these two systems in an educational context, particularly at UWA, demonstrates a fairly high rate of adaptation to an innovation in large, centralised organisations.

For Higher Education, and specifically UWA, this project demonstrates some benefits of utilising Web sites as a marketing tool for prospective students. This is of particular importance for recruiting international and postgraduate students who contribute a large percent of a university's income.

Of particular interest to those designing the UWA homepage is the ease of use for prospective students. Currently, unit Web sites are on average six layers deep - six clicks - from the UWA homepage. Only two Schools, Computer Science and Software Engineering along with Economics and Commerce, have a link to unit Web sites from their respective homepages. Unless a prospective student knows the unit code or title, they are unable to obtain information directly off the UWA homepage. To obtain the level of online presence, the links for current students from Faculty and School homepages were easier to navigate than prospective student links. The "prospective students" link is meant to target members of the international, national, local and current student communities and UWA currently fails to provide easily accessible information for these groups.

UWA has a working party reviewing online unit outlines online and what information to include in the UWA handbook (online and in print). This study indicates that the handbook should contain not only the unit outline and contact details for the unit coordinator, but also a link to the unit's Web site for marketing purposes. Currently, most of the few units containing information about the unit Web sites contains broken or incorrect links.

Future research

The amount of active units, though quantifiable, is a mediocre way of differentiating the units. The number of students in each unit would yield more detailed findings and align with past diffusion research that relates size to adoption (Rogers, 1995; Fichman, 2000). This measure of size is particularly important for postgraduate units where the average size is much smaller than in undergraduate units.

On a wider scale, similar research at other universities in Perth, nationally, or internationally would provide a basis for comparison of online content and marketing implications. The findings from other universities could then be developed into a quality guide for educational Web sites. A concise quality guide would also contain a checklist covering multiple management systems.

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Please cite as: Coleman, A. Loh, C.S., Cao, G. & Mallinckrodt, V. (2004). Electronic course content at The University of Western Australia. In R. Atkinson, C. McBeath, D. Jonas-Dwyer & R. Phillips (Eds), *Beyond the comfort zone: Proceedings of the 21st ASCILITE Conference* (pp. 212-221). Perth, 5-8 December. http://www.ascilite.org.au/conferences/perth04/procs/coleman.html