



Using the Internet to Add Value to Tertiary Education: A Comparison between the Use of IT in Business and Education

Paul Darbyshire¹ and Stephen Burgess²

School of Information Systems, Victoria University, PO Box 14428, Melbourne City MC, Melbourne, Victoria, Australia

¹Tel: 61 3 9688 4393, ²Tel: 61 3 9688 4353, ^{1,2}Fax: 61 3 9688 5024, {Paul.Darbyshire, Stephen.Burgess}@vu.edu.au

ABSTRACT

Since the mid 1990's, there have been many claims that the Web has become the new paradigm for teaching. However, most academics don't use the Web as a replacement for teaching, but to provide extra benefits for their students. There is a strong parallel between this use of the Internet for teaching, and the use of IT in business for providing added value products or administrative efficiencies. This paper discusses the similarities between the use of IT in business and education, and explores the categorization of aspects of Web use in education using standard business categories relating to savings and quality. The results are obtained from a survey of academics conducted internationally using the Web, and surveys perceptions of benefits gained from supplementing teaching with Web based services. The results revealed similar usage levels of Administrative and Educational Features to aid tertiary education on the Internet. The Administrative uses showed slightly more benefits for the institution than for students and vice-versa for Educational uses. In both types of uses, their adoption seemed to be based upon how difficult the feature was to set up as well as the added value benefits it provided.

INTRODUCTION

For many years, information technology (IT) has been used to find ways to 'add value' for customers to entice them to purchase the products and services of a business. This paper examines the possibility of translating the benefits of 'added value' to the use of the Internet by tertiary educators for subject and course delivery. Many educators use the Internet to supplement existing modes of delivery. Importantly, the Internet is providing a number of 'added value' supplemental benefits for subjects and courses delivered using this new, hybrid teaching mode. There are two aspects to subject delivery to where 'added value' benefits may be applied, and that is in the *administrative tasks* associated with a subject and the *educational tasks*. In both instances, IT solutions can be employed to either fully or partially process some of these tasks. Given the complex and often fluid nature of the education process, it is rare that a fully integrated solution can be found to adequately service both aspects of subject delivery. Most solutions are partial in that key components are targeted by IT solutions to assist the subject coordinator in the process. If we examine closely the underlying benefits gained in the application of IT to these tasks, there is a strong parallel to the benefits to be gained by business organizations with similar applications of IT. While the actual benefits actually sought by academics depend on the motivation for the IT solution, the perceived benefits can be classified using standard categories used to gauge similar commercial applications.

BACKGROUND

In order to investigate the benefits of using Web-based techniques to supplement traditional teaching in terms of business efficiencies, the reasons commercial organizations use IT are examined. The different aspects of subject delivery also need to be considered in order to draw a parallel with the ultimate benefits to be gained.

Information Technology: Efficiency and Added Value

There are a number of reasons for using IT in organisations today (O'Brien, 1999):

- *For the support of business operations.* This is usually to make the business operation more efficient (by making it faster, cheaper and more accurate).
- *For the support of managerial decision making,* by allowing more sophisticated cost benefit analyses, providing decision support tools and so forth.

- *For the support of strategic advantage.* This refers to the use of Porter's (1985) three generic strategies as a means of using information technology to improve competitiveness by adding value to products and services.

It has been recognised for a number of decades that the use of computers can provide cost savings and improvements in efficiencies in many organisations. Porter and Millar (1985) have generally been credited with recognising that the capabilities of information technology can extend further to providing organisations with the opportunity to add value to their goods. Value is measured by the amount that buyers are willing to pay for a product or service. Porter and Millar (1985) identify three ways that organisations can add value to their commodities or services (known as *generic strategies for improving competitiveness*):

- Be the lowest cost producer.
- Produce a unique or differentiated good (providing value in a product or service that a competitor cannot provide or match, at least for a period of time). If an organisation is the first to introduce a particular feature, it may gain a competitive advantage over its rivals for a period. Some ways in which information technology can be used to differentiate between products and/or services are (Sandy and Burgess, 1999):
 - Quality
 - Product Support
 - Time
 - Provide a good that meets the requirements of a specialised market.

The next sections examine the possibility of translating the benefits of 'added value' to a particular application of IT, the use of the Internet by tertiary educators to assist with subject and course delivery.

Aspects of Course and Subject Delivery

There are two overall aspects to course and subject delivery, the educational and administrative components (Darbyshire & Wenn, 2000). Delivery of the educational component of a subject to students is the primary responsibility of the subject coordinator, and this task is the most visible from a student's perspective. However, the administration tasks associated with a subject form a major component of subject coordination, but these responsibilities are not immediately obvious or visible to the students.

It is essential that all aspects of subject delivery be carried out as efficiently as possible. To this end, IT, and in particular, Web-based solutions can be applied to both aspects of subject delivery. That Web-based solutions are a suitable vehicle to use has been almost universally accepted by students, teachers and academic administrators (Scott Tillett, 2000). Other advantages are the ease with which information can be disseminated, its interactivity, its use as a real-time communication medium and the ability to use text, graphics, audio and video (Kaynama and Keesling, 2000).

There are a number of administrative tasks associated with subject coordination for which IT solutions can be applied in the application. These include (Byrnes & Lo :1996, Darbyshire & Wenn :2000):

- *Student enrolment.* While most Universities have a student enrolment system administered at the institute level, there are often local tasks associated with enrolment such as user account creation and compilation of mail lists etc. Some of these tasks can be automated (Darbyshire & Wenn, 2000).
- *Assignment distribution, collection and grading.* The written assignment remains the basic unit of assessment for the vast majority of educators, and there have been many initiatives to computerize aspects of this task. Some of these include *Submit* (Hassan, 1991), *NetFace* (Thompson, 1988), *ClassNet* (Boysen & Van Gorp, 1997) and *TRIX* (Byrnes & Lo, 1996).
- *Grades distribution and reporting.* Techniques for this range from email, to password protected Web-based database lookup.
- *Informing all students of important notices.* Notice boards and sophisticated managed discussion facilities can be found in many systems. Examples include products such as *TopClass*, *Learning Space*, *Virtual-U*, *WebCT*, and *First Class*, (Landon, 1998)

Many of the tasks viewed as educational can also employ IT solutions in order to gain perceived benefits. Some of these include: *Online class discussions; Learning; Course outline distribution; Seminar notes distribution; Answering student queries.* Just how many of these are actually implemented will relate to a number of factors, such as the amount of face-to-face contact between lecturers and students. However, using the Internet for many of these can address the traditional problems of students misplacing handouts, and staff running out of available copies.

Discussion management systems are being integrated into many Web-based solutions. These are usually implemented as threaded discussions, which are easily implemented as a series of Web pages. Other tools can include chat rooms or listserv facilities. Answering student queries can take place in two forums, either as part of a class discussion or privately. Private discussions on-line are usually best handled via an email facility, or in some instances, store and forward messaging systems may replace email.

Implementing IT solutions to aid in the actual learning process is difficult. These can range from Intelligent Tutoring Systems (Ritter & Koedinger :1995, Cheikes :1995), to facilitated on-line learning (Bedore et. al. 1998). However the major use of IT solutions in the learning process is usually a simple and straight forward use of the Web to present hypertext based structured material as a supplement to traditional learning.

Using Internet Technologies to Improve Efficiency and Add Value

With the recent explosion in Internet usage, educators have been turning to the Internet in attempts to gain benefits by the introduction of IT into the educational process. In this paper, subject delivery at the University level is only considered. The benefits sought from such activity depend on the driving motivation of the IT solution being implemented. While many may not perceive a university as a business (and it is not advocated here), it is nonetheless possible to match the current uses of the Internet in tertiary education with traditional theory related to the reasons why firms use IT.

Internet technologies in education, which are used for the learning process itself, target the student as the main stakeholder. While

the motivation may be the enhancement of the learning process to achieve a higher quality outcome, we can loosely map this to the 'support of managerial decision making' concept identified earlier. Such technologies allow educators to obtain a far more sophisticated analysis of individual student's learning progress, and thus provide them with decision support tools on courses of action to take to influence this process.

Technology solutions which target the academic as the stakeholder (Darbyshire & Wenn :2000, Central Point), implement improvements or efficiencies that can be mapped to the 'support of the business operation' previously identified. Improvements or efficiencies gained from such implementations are usually in the form of automated record keeping and faster processing time, ultimately resulting in lower costs in terms of academic time, and added value to the students.

By default, the university also becomes a stakeholder in the implementation of either of the above types of technology enhancements. Benefits gained by students and staff by such uses of technology translates ultimately to lower costs for the institution or the provision of more and/or better quality information. The benefits of such systems can be mapped onto the 'support of strategic advantage' concept (as Porter's low cost and differentiation strategies), previously identified as a reason for using technology in business. If these institutions are to regard themselves as a business, then the successful use of IT in subject delivery could give the university a strategic advantage over other universities, which it would regard as its business competitors. Most of the reported advantages gained from online supplementation of teaching relate to cost savings in terms of efficiency, flexibility and/or convenience. These represent the traditional added value benefits of lower cost and faster access to goods in the commercial world. Thus, we can use the measures of *Money Savings, Time Savings, Improved Quality* and better *Product Information* as categories to measure the benefits gained from the introduction of IT to supplement teaching.

ISWORLD SURVEY DETAILS

The authors were interested to investigate the extent of appreciation of the 'value added' benefits that the Internet can offer to tertiary educators, institutions and their students. In the first instance, a simple survey was conducted through the IS World discussion list to gain an initial idea of the level of appreciation that existed.

IS World is a web-based resource which has been set up for the benefit of information systems academics and researchers around the world. The following description of the community served by the resource comes from the IS World web site:

"...our core population are information systems researchers and educators working in colleges and universities throughout the world. We believe that our worldwide community consists of approximately 5,000 of whom many are accessible through our faculty directory. Approximately 2,000 of them also monitor ISWorld, our discussion list."

(<http://www.isworld.org/isworld/mission.html>
IS World, 2000)

A general email was posted to the IS World discussion list on 29 January, 2001. A request was made for tertiary educators to respond, outlining their uses of the Internet in tertiary education and how the uses 'added' value for the institution and for students. The survey was targeted towards educators rather than administrators as it was felt that they would have a greater appreciation of the 'added value' for both the institution and students. It was not specifically aimed at IT educators, but at any tertiary educator using the Internet to assist with course/subject delivery. It is understood, however, that most respondents would be IT educators due to the list membership. The survey consisted of a matrix where users selected various options by clicking on them. The rows of the matrix indicated six administrative and five educational uses of the Internet. The columns of the matrix allowed respondents to indicate if they used the feature, and then identify the 'added value' benefits the feature provided to the educational institu-

tion and to students. The ‘added value’ benefits described were: Save money; Save time; Improve quality; and (provide) More information. A sample screen from the online survey can be viewed in Figure 1. Respondents were not requested to indicate the level of usage of each feature. The items within the categories of ‘administrative uses’ and ‘educational uses’ were developed by the authors, based on their combined tertiary teaching experience of more than thirty years and use of the Internet to assist with course and subject delivery since the mid 1990’s.

Figure 1: Sample screen from the IS world online survey



Upon filling out the survey and clicking the ‘Submit’ button, the results were emailed to the authors. They were then cut and pasted from the email into a Microsoft Excel spreadsheet. There were 43 responses to the survey between 29 January and 4 February, 2001. Most of these (33) were within one day of the initial email. Whilst there was not an overwhelming response from the list, the authors feel that there were enough responses to make some preliminary observations.

Results

The administrative uses of the Internet were adopted, on average, by 72% of respondents, whilst educational uses were adopted by 69%. Table 1 shows the results of the ISWorld survey, divided into Administrative and Educational uses. Note that figures have been shaded

where 50% or more of respondents suggested a particular added value benefit.

Table 1 shows the average level of benefits identified for all administrative uses (refer to the row labelled ‘Overall Administrative’). The most common benefit for administrative uses was to save time for the institution and for students. Most of the benefits were perceived as being similar for both groups, except that more than twice the respondents felt that the institution saved money through Administrative uses than felt that students saved money. The row labelled ‘Overall Educational’ shows the average level of benefits identified for all educational uses. In contrast to administrative benefits, the more respondents indicated educational benefits of the Internet for students than for institutions. More respondents saw their use were seen as providing more information and improving quality more on average than the administrative uses.

Administrative Uses

This section discusses the results for the Administrative uses. Table 1 shows the level of Administrative usage of the Internet by respondents. The ‘information provision’ usages were the most commonly used (Important notices, schedules/ timetables, assignment and grade distribution). Less common were the more ‘interactive’ options, assignment collection and student enrolment.

Most of the benefits for each particular administrative use are fairly close for students and the institution, except for instances where the benefits save money. In most of these instances, more respondents saw the benefits flowing to the institution than to students.

Assignment collection is an interesting administrative use of the Internet. Very few respondents saw benefits in relation to more information or the quality of information being provided to institutions or students. This would be expected as the task of submitting an assignment would generally add little useful knowledge to the student or the staff member.

Around 80% of respondents that had implemented these last two features indicated that they saved time. This was the highest recognition of ‘time saved’ benefits of all of the administrative uses.

The key here may be the level of difficulty involved in setting the two features up. It is extremely easy to setup the distribution of assignments and student grades on the Internet.

Educational Uses

This section discusses the results for the Educational uses. As with Administrative usages, the easiest features to set up were the most commonly used (Distribute Course/ Subject Notes, Provide External Links). Less common were the more ‘interactive’ options, discussion

Table 1: Results from IS world survey

Types of Uses	Feature Used	Institution Benefits				Student Benefits			
		Save Money	Save Time	Improve Quality	More Info	Save Money	Save Time	Improve Quality	More Info
Administrative Uses									
Student Enrolment	47%	40%	85%	45%	50%	10%	80%	40%	40%
Assignment distribution	84%	56%	92%	42%	31%	17%	64%	47%	42%
Assignment collection	51%	27%	77%	18%	5%	23%	82%	14%	9%
Distribution of Grades	72%	29%	65%	42%	29%	6%	68%	42%	42%
Schedules/Timetables	91%	49%	74%	54%	38%	23%	67%	46%	46%
Important Notices	88%	37%	82%	47%	53%	13%	71%	47%	55%
Overall Administrative	72%	41%	79%	43%	35%	16%	70%	41%	41%
Educational Uses									
Distribute course/subject notes	98%	60%	74%	50%	40%	31%	79%	60%	50%
Conduct Online Moderated Discussion List	51%	18%	32%	59%	45%	5%	41%	77%	68%
Online Chat Facility	28%	17%	42%	75%	50%	8%	58%	92%	58%
Provide links to additional resources	91%	10%	41%	46%	54%	15%	56%	64%	64%
Answer Student Queries	77%	12%	70%	52%	36%	12%	85%	58%	55%
Overall Educational	69%	26%	55%	53%	45%	17%	67%	66%	58%

lists and online chat groups. About three quarters of respondents used the Internet to answer student queries (probably by email). As with Administrative uses, most of the benefits are similar for students and the institution, with (again) some differences for instances where the benefits save money more for the institution than students.

However, in contrast to administrative benefits, more respondents saw the differences in the benefits of educational uses flowing to students than to institutions. In three of the uses, saving time **was not** the most common benefit identified. These were the provision of external links to additional resources, discussion lists and online chats, where improved quality of information and more information were more commonly identified.

DISCUSSION

All respondents to the survey identified as least one type of Internet usage to assist them. Approximately seven out of ten adopted Administrative uses and roughly the same proportion adopted Educational uses. This supports the notion identified in the literature that the technology would be accepted in the tertiary education field. The following findings support the notion that educators identify the value added uses of the Internet in tertiary education.

The most common benefit for administrative uses was to save time for the institution and for students. Most administrative benefits were similar for both groups, except for 'save money' (where more than twice the respondents felt that the institution saved money than students). The 'information provision' administrative usages were the most commonly used (Important notices, schedules/ timetables, assignment and grade distribution). Less common were the more 'interactive' options, assignment collection and student enrolment. Educational uses of the Internet were seen as providing slightly more benefits for students than institutions. Their use were seen as providing more information and improving quality more on average than the administrative uses. As with Administrative usages, the easiest educational features to set up were the most commonly used (Distribute Course/ Subject Notes, Provide External Links). Less common were the more 'interactive' options, discussion lists and online chat groups. About three quarters of respondents used the Internet to answer student queries (probably by email). As with Administrative uses, most of the benefits are similar for students and the institution, with (again) some differences for instances where the benefits save money more for the institution than students. More respondents saw the differences in the benefits of educational uses flowing to students than to institutions than with administrative uses. In three of the uses, saving time **was not** the most common benefit identified. These were the provision of external links to additional resources, discussion lists and online chats, where improved quality of information and more information were more commonly identified.

CONCLUSION

The majority of tertiary educators use the Internet to supplement existing modes of delivery. Importantly, the Internet is providing a number of 'added value' supplemental benefits for subjects and courses delivered. There are two aspects to subject delivery to where 'added value' benefits may be applied, and that is in the *administrative tasks* associated with a subject and the *educational tasks*. Most of the reported advantages gained from online supplementation of teaching relate to cost savings in terms of efficiency, flexibility and/or convenience. These represent the traditional added value benefits of lower cost and faster access to goods in the commercial world. The measures of *Money Savings, Time Savings, Improved Quality and better Product Information* can be used as categories to measure the benefits gained from the introduction of IT to supplement teaching.

A survey of 43 tertiary educators, conducted through the IS World discussion list, revealed similar usage levels of Administrative and Educational Features to aid tertiary education on the Internet. The Administrative uses showed slightly more benefits for the institution than for students and vice-versa for Educational uses. In both types of uses, their adoption seemed to be based upon how difficult the feature was to set up as well as the added value benefits it provided.

REFERENCES

- Alexander, S., (1995), Teaching and Learning on the World Wide Web, Proceedings of AusWeb'95, [22/5/1999], <http://www.scu.edu.au/sponsored/ausweb/ausweb95/papers/education2/alexander/>
- Bedore, G.L., Bedore, M.R., Bedore, G.L. Jr, (1998), **Online Education: The Future is Now**, Socrates Distance Learning Technologies Group, Academic Research and Technologies 1998,
- Boysen, P., & Van Gorp, M. J. (1997). 'ClassNet : Automated Support of Web Classes'. Paper presented at the **25th ACM SIGUCCS Conference for University and College Computing Services**, Monterey, California USA.
- Byrnes, R. and Lo, B. (1996), **A Computer-Aided Assignment Management System: Improving the Teaching-Learning Feedback Cycle**, <http://www.opennet.net.au/cmluga/byrnesw2.htm>, 12/2/99
- Cheikes, B. A. (1995). 'GIA: An Agent-Based Architecture for Intelligent Tutoring Systems'. Paper presented at the **Proceedings of the CIKM'95 Workshop on Intelligent Information Agents**.
- Darbyshire, P., (1999), 'Distributed Web Based Assignment Submission and Access', **Proceedings- International Resource Management Association, IRMA '99**, Hershey, USA.
- Darbyshire, P., Lowry, G., (2000), 'An Overview of Agent Technology and its application to Subject Management', **Proceedings International Resource Management Association, IRMA '2000**, Alaska, USA.
- Darbyshire, P., Wenn, A. (2000). 'A Matter of Necessity: Implementing Web-based Subject Administration'. Chapter in **Managing Web Enabled Technologies in Organizations**, Idea Group Publishing, Hershey.
- Earl, Michael, J, (1989), **Management Strategies for Information Technology**, Prentice Hall, Cambridge.
- Hassan, H. (1991). 'The Paperless Classroom'. Paper presented at **ASCILITE '91**, University of Tasmania, Launceston, Australia.
- IS World, (2001), 'Mission and Objectives', <http://www.isworld.org/isworld/mission.html> [2001, 11/3/2001]
- Kaynama, S.A. and Keesling, G, 2000, 'Development of a Web-based Internet Marketing Course', **Journal of Marketing Education**, Vol.22, Iss.2, August, pp.84-89.
- Landon, B. (1998, 10/4/98). **On-line Educational Delivery Applications: A Web Tool for Comparative Analysis**, [Web Page]. Centre for Curriculum, Transfer and Technology, Canada. Available: <http://www.ctt.bc.ca/landonline/> [1998, 10/10/98].
- O'Brien J. A., (1999), **Management Information Systems, Managing Information Technology in the Interneted Enterprise**, 4th Ed. Irwin McGraw Hill
- Parker, M. M., & Benson, R. J. (1988). **Information Economics: Linking Business Performance to Information Technology**, Prentice-Hall.
- Porter, M.E. and Millar, V E., (1985), 'How Information Gives You Competitive Advantage', **Harvard Business Review**, Vol.63, No.4, July-August, pp.149-160
- Ritter, S., & Koedinger, K. R. (1995). 'Towards lightweight tutoring agents'. Paper presented at the **AI-ED 95—World Conference on Artificial Intelligence in Education**, Washington, D.C.
- Sandy, Geoff and Burgess, Stephen, (1999), 'Adding Value to Consumer Goods Via Marketing Channels through the Use of the Internet', **COLLECTeR'99: 3rd Annual COLLECTeR Conference on Electronic Commerce**, Wellington, New Zealand, November.
- Scott Tillett, L, (2000), 'Educators Begin to Reach Out – The Net Cuts Costs, Simplifies Management and Could Make Distance Learning a Winner', **InternetWeek**, Manhasset, Iss.835, October 30, pp.49-56.
- Thompson, D. (1988, 14/3/98). **WebFace Overview and History**, [Web page]. Monash University. Available: <http://mugca.cc.monash.edu.au/~webface/history.html> [1999, 2/1/99].
- WBT Systems, (1997), **Guided Learning – Using the TopClass Server as an Effective Web-Based Training System**, WBT Systems White Paper, <http://www.wbtstystems.com>.

0 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the publisher's webpage:
www.igi-global.com/proceeding-paper/using-internet-add-value-tertiary/31737

Related Content

The Institutional Dimensions of Information Systems Evaluation

Vassilis Serafeimidis (2001). *Information Technology Evaluation Methods and Management* (pp. 99-110).
www.irma-international.org/chapter/institutional-dimensions-information-systems-evaluation/23670

Weighted SVMBoost based Hybrid Rule Extraction Methods for Software Defect Prediction

Jhansi Lakshmi Potharlanka and Maruthi Padmaja Turumella (2019). *International Journal of Rough Sets and Data Analysis* (pp. 51-60).
www.irma-international.org/article/weighted-svmboost-based-hybrid-rule-extraction-methods-for-software-defect-prediction/233597

A Comparative Analysis of a Novel Anomaly Detection Algorithm with Neural Networks

Srijan Das, Arpita Dutta, Saurav Sharma and Sangharatna Godbole (2017). *International Journal of Rough Sets and Data Analysis* (pp. 1-16).
www.irma-international.org/article/a-comparative-analysis-of-a-novel-anomaly-detection-algorithm-with-neural-networks/186855

Tradeoffs Between Forensics and Anti-Forensics of Digital Images

Priya Makarand Shelke and Rajesh Shardanand Prasad (2017). *International Journal of Rough Sets and Data Analysis* (pp. 92-105).
www.irma-international.org/article/tradeoffs-between-forensics-and-anti-forensics-of-digital-images/178165

EEG Analysis of Imagined Speech

Sadaf Iqbal, Muhammed Shanir P.P., Yusuf Uzzaman Khan and Omar Farooq (2016). *International Journal of Rough Sets and Data Analysis* (pp. 32-44).
www.irma-international.org/article/eeg-analysis-of-imagined-speech/150463