

Computer-Mediated Education: The Relationship between Computer Access, Tutorial Attendance and Student Grades

Arabella Volkov

School of Accounting and Law, College of Business, RMIT University, Australia

Tel: (61) 3 9925 5395

E-Mail: arabella.volkov@rmit.edu.au

Michael Volkov

School of Management and Marketing, Faculty of Business and Law,
Deakin University, Australia

Tel: (61) 3 5227 2553

Fax: (61) 3 5227 2151

E-Mail: michael.volkov@deakin.edu.au

Abstract

One of the problems faced by Australian academics in the 21st century is to facilitate learning with a changing profile of students, in bigger and bigger classes. As educators at tertiary institutions, our environment is undergoing major changes as increasingly business and commerce programs are offering courses either partially (Web enabled) or totally (Web exclusive) online. This study has developed an important model allowing the prediction of students' overall results and indicates that a student's final grade is dependant, in part, on accessing the study materials and study tools available to them via WebCT and attending face-to-face tutorials.

Key words: *Education technology; Student engagement; On-line learning.*

Introduction

Enrolments in the Australian higher education sector have increased over the past twenty years. Indeed, at any one time more than one in three Australians is a student, with increasing numbers of them being mature age and working full- or part-time (Perry, Harker & Volkov 2003; Harker, Slade & Harker 2001). One of the problems faced by Australian academics in the 21st century is to facilitate learning with a changing profile of students, in bigger and bigger classes (Perry, Harker & Volkov 2003). That is, designing and conducting teaching to facilitate learning (Light and Cox 2001), is a challenge in this context of busy, critical students, ready to brand-switch between classes and universities (Perry, Harker & Volkov 2003).

As educators at tertiary institutions, our environment is undergoing major changes as increasingly, institutions are offering business and commerce programs either partially (Web enabled) or totally (Web exclusive) online (Eastman & Swift 2001). From an institutional perspective these changes have been brought upon us due to rising costs of service provision in education, enrolment management issues such as ever increasing class numbers and sizes coupled with an increasing student to staff ratio and the evolution, particularly in Australia, of distance education (Eastman & Swift 2001). From a consumer perspective these changes are driven by the rise in student expectations (Smart, Kelley & Conant 2003). As Australian universities progress towards a user-pays system of education, pressure on lecturers is mounting to ensure that students are provided with all the tools to enable them to be successful in their studies (Pettigrew & Henley 2000).

This research aims to explore whether the use of web-enabled teaching of business and commerce courses in universities at the undergraduate level improves students' results. This paper has three objectives; first, to bring together established research in the field of web enabled teaching, second, to contextualise this research into the area of an undergraduate business and commerce course taught at an Australian university and, third, to empirically test the proposition posited by the authors that high levels of tutorial attendance rates, together with the effective utilisation of web enabled technology by both lecturers and students, assists students in achieving a higher grade in their studies.

WebCT

WebCT was developed in the Department of Computer Sciences at the University of British Columbia (Morss 1999). According to the company website, WebCT is a leading provider of computer-based, electronic learning solutions for higher education providing a flexible, integrated environment (WebCT 2003). It provides a secure environment for the housing of course material such as syllabi, assignments, lectures, presentations and provides a variety of tools and features that can be added to a course at the discretion of the lecturer (Morss 1999). WebCT integrates communication tools including a bulletin board, chat room, private and group e-mail facilities and a calendar all contained within a course web site. The course web site also provides faculty management tools such as grading, the ability to track individual students, their interactions within the class group and monitor student progress. These features facilitate greater interaction between faculty and students (Morss 1999). This software application has provided an easy-to-use environment for the creation of sophisticated Internet-based courses that would otherwise be out of the reach of those lecturers who are unable to program the software themselves (Morss 1999).

Hypothesis Development

Previous research about education has indicated that tertiary institutions need to increase student exposure to technology (Basile & D'Aquila 2002; Hallock, Satava & LeSage 2003; Reisman, Dear & Edge 2001; Lim 1998). In fact, the ability to use technology is a graduate attribute that many Australian universities expect students to possess upon completion of a business degree (for example, USQ 2003). From a learning perspective, there are clear indications that web-enabled courses can measurably increase student retention and comprehension (Matthew 1997; Picciano 2002; Waschull 2001; Neuhauser 2002; Lipman et al 2001). Students now anticipate and expect more multi-media based instruction in their courses of study (Neuhauser 2002). This led to the first hypothesis of this study:

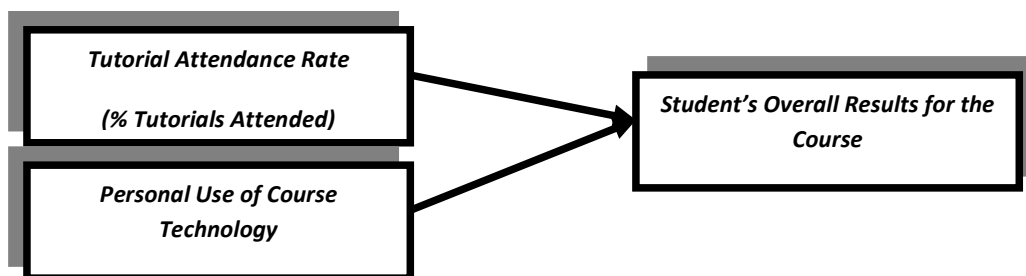
H₁: A student's overall performance in a course will be positively correlated with increased personal use of course technology (WebCT)

Pettigrew and Henley (2000) discuss the issue that there has been little research regarding performance of Australian business and commerce students and that there is a dearth of research discussing performance of students in the tertiary education system specific to Business faculties. Further, an improved awareness on the effects of attendance on performance will assist lecturers to structuring their courses effectively to enhance student performance (Pettigrew & Henley 2000). Previous findings have positively supported the effect of attendance on student performance (Gump 2004; Mckenzie & Schweitzer 2001; Lipman et al 2001; O'Malley & McCraw 2007). This led to the second hypothesis of this study:

H₂: A student's overall performance in a course will be positively correlated with increased class attendance

The relationship between the dependant and independent variables investigated in this study can be depicted schematically (Figure 1):

Figure 1:
Relationship between Variables under Investigation



Methodology

In order to investigate the effects of use of WebCT and attendance on students' successful performance 94 student records, from three separate classes, were accessed from a 2nd year, undergraduate marketing course at an Australian university thereby increasing the generalisability of the results of the study to other

undergraduate university units. The course selected was e-Marketing and the students involved were technically proficient with the web enabling technology as it had been a requirement in pre-requisite courses and a stated requirement in the course specifications. The same lecturer taught all of the classes utilised, thereby reducing lecturer biases from affecting the study. The raw data itself was obtained from the lecturer and the WebCT tracking mechanism built into the software package as part of its faculty management suite of tools.

Results

Of the 94 student records analysed the average tutorial attendance rate across the census was 75%, the average personal use of WebCT was 56 page visitations during the 13-week semester and the average final grade was 62%.

The relationship between *Student's Overall Results for the Course* (Final Grade) as the dependant variable and Tutorial Attendance Rate (% Tutorials Attended) and Personal Use of Course Technology (Total WebCT Hits for Course) as the independent variables was examined using regression analysis to allow the formation of a predictive model.

The assumptions underpinning the use of regression were all met (ratio of cases to independent variables, outliers, multicollinearity and singularity, normality, linearity, homoscedasticity and independence of residuals) (Coakes & Steed 2001). The data was input into SPSS and the regression equation for predicting Student's Overall Results for the Course from their Tutorial Attendance Rate (X1) and Personal Use of Technology (X2) was found to be:

$$Y = 46.064 + 0.081 X_1 + 0.158 X_2 \text{ where } R^2 = 0.128, F(2, 93) = 6.670, p = 0.002.$$

The first hypothesis concerned the investigation as to whether there is a significant difference in an individual student's overall results for the course with differing personal use of course technology (WebCT). From Table 1 it can be seen that WebCT use has a positive influence on a student's final grade ($t = 2.250$, $p = 0.027$). Therefore, hypothesis one is supported by the results.

The second hypothesis concerned the investigation as to whether there is a significant difference in an individual student's overall results for the course with differing individual attendance rates. Table 1 indicates that the student attendance rate has a positive influence on a student's final grade ($t = 2.654$, $p = 0.009$). Therefore, hypothesis two is supported by the results.

Table 1:
Coefficients

Model		Unstandardised Coefficients		Standardised Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	46.064	4.857		9.485	.000
	Total WebCT hits for course	.081	.036	.221	2.250	.027
	% tutorials attended	.158	.059	.261	2.654	.009

Conclusion and Avenues for Further Study

This study has presented an important model allowing the prediction of students' overall results. The results indicate that a student's final grade is dependent, in part, on the student accessing the study materials and study tools available to them via WebCT and attending tutorials.

The limitations of this study include not offering explanations as to how WebCT access by the students increases their overall performance. It is possible that increased access to WebCT by students is merely indicative of the student's underlying dedication to their studies and that high achieving students have a higher propensity to access these resources. The authors believe that further investigation of the relationship between WebCT access and student attributes could provide valuable insights into student behaviours and appropriate online material design. There is limited generalisability of the results to other courses that utilise WebCT as the WebCT environments may not be similar to the WebCT environment accessed by students in this study. Further, this study did not investigate other factors that may impact positively or negatively on student performance such as a student's employment status or English proficiency.

The results of this study pave the way for further debate in universities as the results support the assertions from previous research which indicate that web-enabled courses can measurably increase student retention and comprehension (Matthew 1997; Picciano 2002; Waschull 2001; Neuhauser 2002; Lipman et al 2001). Further research is required to identify the type, amount and the nature of teaching material placed online in a WebCT platform to ascertain whether this has any impact on student learning, understanding and comprehension. From both institutional and consumer perspectives, if this method of teaching is to be followed, there will be implications for staff at all levels, resources, cost, training, and the like, which requires further investigation as well.

The arguments of Chan, Shum and Wright (1997), Devadoss and Foltz (1996), Page and Mukherjee (1999) and Pettigrew & Henley (2000) are also provided with support from this research where it would seem that class attendance needs to be encouraged if students are to perform well in university courses. The higher levels of performance amongst the students who had higher attendance rates support the emphasis placed on improving class attendance rates. However, this too is an area for further research as there are many other variables at play here such as a student's innate ability, motivation, interaction and involvement in class. There are also implications when considering students who study via off-campus modes such as online and distance education.

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