The Effects of Blended Learning Approach on Students' Performance: Evidence from a Computerized Accounting Course

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Abstract

A blended learning approach is being used in on-campus courses which include hard copy study materials, face-to-face contact and a variety of online resources. This study concentrates on providing course materials through a combination of a teaching approach where a variety of online resources are provided in addition to face-to-face classroom sessions. A prior research suggests that the online provision of course materials can have a positive impact on students' performance. This study adds to the existing literature through investigating the link between the students' use of online provision of course and students' performance in an undergraduate computerized accounting course. The findings have indicated a positive association between the number of online files viewed by students, the number of online discussion messages posted by them, and their performance. A significant relationship was not found between students' performance and the amount of time spent on the subject's website, the viewing of links to websites that were not of utmost importance core to the course being studied, or the passive reading of discussion messages. These findings support the benefits to be gained by providing course materials online and encouraging both faculty members to use online in providing course materials and students to access the materials posted and to actively participate in online discussion.

Keywords: Blended Learning, Students' Performance, Computerized Accounting, Accounting Courses, Online Resources.

1. Introduction

A blended learning approach is being used in on-campus courses which include hard copy study materials, face-to-face sessions and communication via email, coupled with the more recent internet based message boards and other online resources. Therefore, this study concentrates on students who have access to face-to-face classroom sessions in the form of lectures and tutorials and also have access to written materials such as textbooks and summaries of topics, and may also have access to resources provided online through, for example, subject specific websites. Definitions of exactly what this blended learning entails varies depending on different views (Whitelock and Jeffs, 2003), but the common elements include a combination of face-to-face sessions and the use of technology with an emphasis on the use of the internet (Kerres and Witt, 2003). Also, this combination of teaching approach according to Stacey and Gerbic (2007), where a variety of online resources are provided in addition to face-to-face contact, has been referred to as representing a blended learning approach. Therefore, this study argues that using a combination of teaching approach will enhance students' performance.

A review of the existing literature shows that there have been many studies of online learning environment and their relationship to students' performance (for example: Bawaneh, 2011; Becker and Dwyer, 1994; Dowling et al., 2003; Kubey et al., 2001). These studies examine a range of issues and, in some cases, generate conflicting results. However, the extent to which these studies have assessed the link between the use of online resources and students' performance has been restricted to examining the amount of time students spend online, rather than considering the extent to which students use specific, alternative online resources. The contribution of the present study is to study the combination of teaching approach and to examine the different types of online resources such as lecture materials, discussion forums and web links provided to students and establish which resources are positively associated with improved students' performance.
The paper proceeds as follows: Theoretical background and prior research related to students' performance and the provision of online learning resources are firstly presented. This allows the development of the study's three research hypotheses. And then outline of the study's research methodology and results and discussion follow. Finally, conclusions and limitations of the study are discussed.

2. Theoretical Background

According to Stacey and Gerbic (2007), students' learning experience and performance can be improved when online resources are integrated with traditional forms of course delivery, such as face-to-face lectures and tutorials (also see, Ituma, 2011). However, if the online space is used merely and is not clearly linked to lectures and tutorials, there is a risk that students will become disenchanted and any potential benefits will be lost (Love and Fry, 2006). This is particularly the case if internet users have become accustomed to accessing high quality websites and the online learning environment falls below their quality expectations (Stapleton et al., 2007). The extent to which new technology is employed in courses needs to be carefully considered to ensure that it meets the needs of users (Deed and Edwards, 2011). It is important to understand the aspects of online learning environments that are related to improvements in students' performance so that limited resources can be applied where they are most effective. Some studies (for example: Bawaneh, 2011; Mayes, 2002; Love and Fry, 2006) have shown that improvements can be achieved if online resources are introduced, if they complement the existing course delivery methods, and where possible to make improvements without a significant application of resources (Greenwald et al., 1996).

Further, the use of the internet can provide a range of functions for learners and teachers to give some real benefits to traditional learning environments, such as reducing the time-lag between production and utilisation of materials and the free sharing of information (Floridi, 1995). When properly designed and implemented, the use of online learning technologies empowers students by giving them the freedom and responsibility to control their learning environment (Becker and Dwyer, 1994). Further, faculty members are becoming facilitators who work on the advancement of the learning process rather than being merely a *conduit* for content delivery (Huynh, 2005). Improvements in students' performance can be achieved with only a moderate increase in the expenditure of time and other resources (Greenwald et al., 1996), but it is important to recognise that investing money and time will not automatically lead to improved students' performance.

In order for technology to improve learning outcomes, it must be shown to be doing more than merely developing flexibility in the delivery of course materials. Flexible material delivery can improve results in certain forms of assessment, such as examinations, but cannot be relied upon to improve all learning outcomes (Dowling et al., 2003). What is really needed is an environment which will provide students with an environment that enhances learning and enables students to control their learning space and develop a variety of learning styles (Follows, 1999). It should be noted that some on-campus students will have selected this mode of study for the precise reason that they require face-to-face interaction. In these circumstances, technology may be accepted as part of the overall package that makes up the learning experience, but there can remain reluctance by some to embrace online delivery (Marriott et al., 2004). The above- mentioned studies resulted in identifying a range of factors that are related to student performance, therefore, the objectives of this study are to identify the relationships between students' performance and students' use of online learning resources being: firstly the time spent online, secondly the extent of access course materials within the online resources, and thirdly the extent of student interactions with each other and with academic staff, and form the basis of the study hypotheses.

3. Hypotheses Development

Some researchers like Bryant and Hunton (2000) argue that the introduction of online resources into an on-campus course merely changes the vehicle that delivers information to students rather than influencing student achievement, but this view is not supported by De Lange et al. (2003) who argue that interactive online learning will motivate students, leading to improvements in student satisfaction and study outcomes. Whilst some researchers argue that the total time spent using online tools is positively related to final grades but the types of resources developed need to be carefully considered (Minaei-Bidgoli et al., 2003). These studies allow this research to consider whether increasing the amount of time spent within the online website, which is directly connected to face-to-face lectures and tutorials, is related to improve students' performance and formulate the following hypothesis as follows:

Hypothesis 1: *The amount of time spent on the online resources is positively related to students' performance.*

Regarding the number of times the individual accesses the specific course materials, Davies and Graff (2005) found that students who failed their courses tended to participate less frequently. Also, Stapleton et al. (2007) argued that students who are regular internet users will be familiar with high quality websites that are produced by commercial organisations and these students will be disinclined to continue with web based learning environments where the site is not well planned and organised. According to Love and Fry (2006), online resources should be used as a support for, and integrated with, the more traditional methods of delivery rather than being used as a replacement in order to be successful with on-campus students (also see, Mayes, 2002).

The provision of online learning resources can be of considerable benefit to on-campus students, but the specific resources provided and how they are integrated with more traditional aspects of the learning environment need to be carefully considered to ensure students remain engaged. Our primary focus is on on-campus students and the extent to which their performance is related to the frequency of accessing to online learning resources. These studies allow this research to consider whether the frequency of accessing course materials within the online website is related to improved students' performance and formulate the second of the study's hypotheses as follows:

Hypothesis 2: *The frequency of accessing course materials within the online website is positively related to students' performance.*

Some elements of an online environment will be designed not to improve access to course materials, as discussed above, but to improve interaction among students and between students and academic staff. The effectiveness and importance of engaging students and encouraging active participation have been shown to be related to improved learning outcomes and student satisfaction (for example: Alavi et al., 1995; Bawaneh, 2011; Becker and Dwyer, 1994; Davidson, 2002). Engaging students can improve the interactions among learners, learners and materials, and learners and teachers (Northrup, 2002; Sabry and Baldwin, 2003). It has been suggested that the real time interaction available from synchronous applications, such as chat rooms, are more likely to assist students, whereas asynchronous applications, such as email, which do not have a real time capability, tend to be detrimental to students' academic achievements (Kubey et al., 2001). Where a student fails to embrace the online environment and where there is a reduction in interaction among students, and more particularly between students and teachers, in such case, a detrimental effect on the learning experience can arise (Sherry 1995; Gagne and Shepherd, 2001; Ryan, 2000). It has been argued that the possibility of disengagement risks alienating students and that the immediate available feedback in a tutorial is difficult to beat (Love and Fry, 2006). The use of online discussion forums by students to enhance communication between each other and also with academic staff should allow students to remain engaged with their course. This leads to the study's third hypothesis which considers student performance and its relationship with online forum activity as follows:

Hypothesis 3: *The frequency of online forum interactions by students is positively related to students' performance.*

4. Methodology

4.1 Data Collection

The research involved the post event analysis of students' online participation, collected through the university's student tracking system. Students enrolled in a computerized accounting course at a state university over the two semesters of 2010 which formed the research sample with a size of 208 students.

The data were collected from two sources: (1) through the data recording tool of the online environment (WebCT), where the extent to which students use particular elements of the learning environment were automatically recorded, and (2) through the university's student database where the mode of study and the final exam mark were obtained. Instances where students were repeating the course, accounted 8 students, who were removed from the observations to ensure that all students in the analysis were undertaking the unit for the first time. There were 200 semi-anonymous observations, with only the student number being directly identified in order to match the student grades.

4.2 Research Model

The following multiple regression model is used to test the research three hypotheses:

$$\text{FINAL}_i = \alpha + \beta_1 \text{ VISITS}_i + \beta_2 \text{ HOURS}_i + \beta_3 \text{ FILEVIEW}_i + \beta_4 \text{ FILELINK}_i + \beta_5 \text{ MsgREAD}_i + \beta_6 \text{ MsgPOST}_i + \varepsilon$$

Therefore, data were analysed using this multiple regression model with students' final course exam mark labelled "FINAL" as the dependent variable; a continuous variable from 0 – 100, and six independent variables were used in the regression to test the research hypotheses. The first independent variable labelled "VISITS", indicates the total number of times the students logged onto the course website while the second independent variable labelled "HOURS", indicates the total time in hours spent within the online website which are directly connected to face-to-face lectures and tutorials. These variables will assist in testing the first hypothesis. The variables labelled "FILEVIEW" and labelled "FILELINK" are related to the testing of the second hypothesis. FILEVIEW is related to the number of times available files on the site were used by students. These files are related to PowerPoint slides, documents and spreadsheets used during lectures and tutorials, as well as assignment materials which are key materials used in the course.

FILELINK assessed the number of times linked to websites which are central to the course and which are directly connected to face-to-face lectures and tutorials that were used by students. The last two variables labelled "MsgREAD" and labelled "MsgPOST" test the third hypothesis. MsgREAD is related to the total number of times a student accessed messages that someone else had posted onto the discussion board and MsgPOST refers to the number of times a student made a posting onto the message board. These variables are related to the website's discussion board and measure the extent to which students are interacting with one another and with academic staff to remain engaged with their course.

5. Results

Table (1) provides a correlation matrix for the variables used in the regression analysis.

Table (1): Correlations Matrix (Pearson's Correlation)

		Visits	Hours	Msg Read	Msg Post	File View	File Link
Visits	Pearson	1					
	Sig.						
	N	200					
Hours	Pearson	.390**	1				
	Sig.	.000					
	N	200	200				
MsgRead	Pearson	.523**	.190**	1			
	Sig.	.000	.000				
	N	200	200	200			
MsgPost	Pearson	.437**	.123**	.460**	1		
	Sig.	.000	.001	.000			
	N	200	200	200	200		
FileView	Pearson	.688**	.289**	.218**	.167**	1	
	Sig.	.000	.000	.000	.000		
	N	200	200	200	200	200	
FileLink	Pearson	.430**	.288**	.293**	.165**	.444**	1
	Sig.	.000	.000	.000	.000	.000	
	N	200	200	200	200	200	200
Final	Pearson	.380**	.159**	.294**	.287**	.243**	.089*
	Sig.	.000	.000	.000	.000	.000	.033
	N	200	200	200	200	200	200

** Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).

In relation to Table (1), the dependent variable FINAL is significantly correlated at P<0.01 with VISITS, HOURS, MsgREAD, MsgPOST and FILEVIEW; while there is a correlation at P<0.05 with FILELINK. Table (2) provides descriptive statistics for the variables used in the regression analysis. This table shows that students accessed and visited the course website on an average of 80 occasions and spent an average of 20 hours logged on over the semester. As far as specific resources are concerned, students, on average, viewed 335 files but accessed only 14 web links. The means indicate that a student, on average, read 436 messages during the semester.

These messages are from either the staff or students. It appears that the students did tend to read messages more than actually posting messages, where the maximum number of messages posted by a student was 41 and the mean being about 3 postings during the semester per student. It is worthnoting that large differences between the minimum and maximum indicate that some students interacted extensively with the resources while others did not.

Table (2): Descriptive Statistics

Independent Variables	Sample Size	Mean	Std. Deviation	Min	Max
VISITS	200	79.84	38.71	11	415
HOURS	200	20.44	6.14	10	34
FILEVIEW	200	334.50	112.05	5	939
FILELINK	200	13.90	5.56	3	51
MsgREAD	200	436.27	462.14	10	2838
MsgPOST	200	2.67	3.9	2	41

As noted earlier, data from 200 students were used in the regression analysis. The model was significant with an F value of 37.7 and was highly significant with an adjusted R^2 of 40.3%; the Durbin-Watson statistic is 1.984 and therefore indicates that the errors are uncorrelated. There are also a number of correlations among the independent variables and therefore, a Variance Inflation Factor (VIF) test is also performed to test the effect of these correlations among the independent variables as shown in Table (3). The VIF diagnostics quantify the severity in relation to the effect of multicolinearity. The standard interpretation is, if the results for VIF are greater than 5, then the effect of multicolinearity is high. In relation to the results, as there was a correlation between some of the independent variables, as mentioned above, the VIF tests were performed. The VIF diagnostics show that the effect of multicolinearity is minimal as the values are all less than 5, which is considered to be an accepted level. Results indicate that, of the six independent variables, two variables, "FILEVIEW" and "MsgPOST", are significant and are positively related to the students' performance in the exam; of the other variables "HOURS" shows a very weak positive relationship but the remaining variables were not significantly related to students' performance in the final exam.

Table (3): Regression Results

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	VIF
	B	Std. Error	Beta			
(Constant)	-15.947	5.687		-2.484	.007	
VISITS	.046	.032	.075	1.282	.238	2.030
HOURS	.166	.056	.066	1.647	.179	1.170
FILEVIEW	.078	.007	.120	2.612	.007	1.913
FILELINK	.038	.022	.034	.464	.507	1.553
MsgREAD	.020	.031	-.023	-.533	.738	1.699
MsgPOST	.382	.050	.089	2.315	.008	1.534

6. Discussion

The purpose of this research is to investigate the students' use of online resources within the course website which is related to students' performance in the final exam. This study provides three key sets of results, the first considers the amount of time spent on the online resources, the second looks at the frequency of course materials and the third considers how the online environment is used as an interactive tool among students and between students and academic staff. The total number of visits that a student logged onto online and the number of hours spent within the online website was significantly related to students' performance. These results provide a strong support for Minaei-Bidgoli et al. (2003) findings, who suggest that spending more time online improves final grades, but gives greater support for the view of Love and Fry (2006) that the course materials need to be easy to find or students will be wasting their time. Also, the study provides moderate support for the work of Davies and Graff (2005) with findings indicating that students who interact less frequently perform less well. Spending more time online is not necessarily related to improved performance, as noted by Kubey et al. (2001) who indicate that a focused use of resources is needed to improve performance.

Therefore, the first hypothesis is completely supported on the basis that there is a strong relationship between the number of visits that a student logged onto the website and the number of hours spent online and students' performance. Although the first hypothesis states that the amount of time spent on the online resources is positively related to students' performance which is supported regardless the fact that the total hours logged on over the semester is low, this could arguably be due to the fact that it is not necessarily the number of visits (frequency) but the quality of time spent within the online environment that has a positive effect on students' performance. When looking at the specific types of resources, the most significant impact on students' performance is related to students reviewing files loaded up onto the course website. The FILEVIEW variable was significant at $p = .007$. The types of files loaded on the system included a variety of documents such as topic guides and summaries, as well as PowerPoint presentations that are discussed in the face-to-face lectures. In addition, these files also included tutorial questions and solutions which were further discussed in face-to-face tutorials. These files were the main documents used to convey information to students about the topics covered, so it is not surprising that viewing these is related to improved results. Prior studies indicate that it is the extent to which resources are linked to the on-campus work that is related to improved performance (Sherry, 1995; Gagne and Shepherd, 2001). This, further supports the view that a blended approach, where online resources are linked in some way to face-to-face sessions and assignments is a significant factor to successful study and overall performance outcomes.

The result confirms the views of Mayes (2002) and Love and Fry (2006) that, when online resources are used as a support for, rather than a replacement to, face-to-face sessions, then they can be successful. This result is also supported by the fact that the use of web links, which were connected to, but not directly used in the course, were not significantly related to students' performance.

The second hypothesis is therefore supported, as the use of those resources was specifically designed to enhance face-to-face sessions, which is positively linked to students' performance. To improve performance in a course, the online resources in the form of files must be clearly connected to the other resources available to the student and blended to form a coherent package. Students who spend more time online following web links that are not central to the main aims of the course might find that a waste of time and effort, while other students who access the online resources regularly and use the online material to support the work done face-to-face might find improved results.

The third hypothesis examines how students interact with each other and with academic staff through the messaging system. The number of messages read is not significantly associated with examination performance, but the number of messages posted is positively associated and significant. It would appear that, while students reading messages may reflect student motivation and/or interest in the course, students posting messages perform better in the final exam. Students can post messages on the discussion message boards and these messages will, in some circumstances, be answered by the academic staff, and in other cases will be answered by other students. In the computerized accounting course, the subject of this study, the extent to which staff answered postings was kept to a minimum, and when answers were made, they attempted to facilitate discussion rather than being merely a question and answer forum. This is an attempt to encourage discussions and to learn through communicating with each other.

This is consistent with the findings of Gagne and Shepherd (2001). Also, Ryan (2000) indicated that when interaction is reduced, students can feel disengaged and less connected to the course and their performance can be affected, the findings also support this. What is clear is that active participation in the discussions was positively related to examination performance. This would indicate, contrary to Kubey et al. (2001), that the use of asynchronous online resources can have a beneficial effect when used interactively. Therefore, the third hypothesis is accepted as far as greater interaction is related to better performance. Those students who take a more passive approach by reading, without active participation in the discussions posted by fellow students and academic staff, do not perform well in the exam which further emphasises the strong relationship between posting messages and better exam performance.

7. Conclusions and Limitations

The results of this study show that certain aspects of student interaction with online resources are positively related to students' performance. The findings of this study suggest that the types of resources being provided in an online learning environment need to be carefully considered. It is evident that students who use the material provided online that supports the core aspects of the course being studied perform better in the final examination. Although a variety of resources were made available for students, the data captured in this study did not allow a more detailed review of the different types of resources being viewed due to the limitations of the data capture source structure. What was not possible to determine was whether those students who were using the online materials were also those with high lecture and tutorial attendance.

It is probable that students attending face-to-face lectures and tutorials are more likely to have downloaded the material from the online files in order to bring it with them. On the other hand, it could also be argued that students who missed the lectures or tutorials would be the ones who are more likely to download the online material to compensate for their non-attendance. This suggests that it is not only attendance or just viewing files alone, but the participation that is related to improved results. It was not possible in the current study to trace whether the students accessing the online materials were also those with high attendance in face-to-face sessions; future research could address this issue.

In summary, the results indicate that the provision of online resources can be a valuable addition for students and that the use of these resources can result in improved exam results, but the resources used and how they are integrated into the course need to be carefully considered to ensure that on-campus students do not become disengaged with the course. To conclude, the current study has responded to a call for more research on students' learning experience and performance and has contributed to the emerging studies on blended learning.

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