

ONLINE LEARNING AND BLENDED LEARNING: EXPERIENCE FROM A FIRST-YEAR UNDERGRADUATE PROPERTY VALUATION COURSE

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ABSTRACT

With the growth of the world-wide web and e-learning some programs are now fully online but blended learning has also become popular, offering various combinations of internal classes and online content. This paper reports the results of delivering an introductory first-year property course using both online and blended learning. The paper investigates the effectiveness of blended and online learning based on the thesis that blended learning is more effective as students have the advantages of both face-to-face learning and the online environment. A case study approach was adopted that involved two recent cohorts of students. Course statistics from the newly introduced Moodle software were used to analyse how these two groups of students used the online material and how these activities were correlated with their learning outcomes. This paper contributes to higher education pedagogy in online learning by providing insights into the use of a project-based learning approach in engaging students.

Keywords: online learning, blended learning, face-to-face learning, property education, higher education

INTRODUCTION

There have been considerable transformations in property education in Australia in recent years. The areas that have changed range from programme content, teaching and learning strategies, delivery modes, diverse student backgrounds and increases in student numbers (Baxter 2007, Boyd 2010, Cornish, Reed and Wilkinson 2009, Hefferan and Ross 2010, Mak, Sher and Williams 2010, Newell and Eves 2000). The changing student profile, such as the increasing number of mature-age students, part-time students, postgraduate enrolments and international students, means that today's educators need to embrace flexible teaching strategies to better engage these non-conventional groups of students (Department of Education, Employment and Workplace Relations (DEEWR) 2008).

In order to satisfy the growing expectation of learning experiences, online learning is becoming popular in higher education to fulfil the connectivity demands of students (Garrison and Kanuka 2004). The literature reveals that the use of technology, particularly computer based learning in property education, is rewarding for both students and academics (Cornish et al 2009, Mak et al 2010, Wolverson and Wolverson 2003). Further, Cornish et al (2009) suggests that e-learning should be refined continuously to improve its efficiency and effectiveness.

In the property programme at University of South Australia, both internal and external courses cater for the distinct demands of diverse students groups. The internal students are provided with both face-to-face contact and online material whilst the external students study solely online. In January 2010, the University moved to a Moodle based online environment and this exploratory project was designed to examine how effective the new platform was for these two groups of students. The two cohorts were compared in terms of their use of the online materials and how these activities correlated with summative learning outcomes. We also examined the effectiveness of a project-based learning approach between internal and external students and considered how the online items, including discussion board, quizzes and weekly workshops, were useful in assisting students in scaffolding the major project.

The main reasons why the property course was chosen were first, the authors were directly involved in the course and therefore had a good understanding of the course design and second, this was one of the first courses using the Moodle based system in the university and hence provided a good opportunity to explore its efficacy. As well, with the findings the authors would be able to refine the delivery of other courses in future.

This paper is structured as follows. First, the literature review will focus on the issues of online and blended learning highlighting the effectiveness of these two teaching mediums. A review of literature on online discussion and quizzes will be conducted. Then, background information on the course, online facilities and the project will be discussed and followed by the research methodology. Then, the discussion will be presented with the results followed by a conclusion.

LITERATURE REVIEW

Although the focus of this paper is on property education, our review of literature includes papers from other disciplines in higher education in order to complement the limited publications in education research in property.

Online Learning

With the growing demand of the diverse student population, online learning has become popular as it provides students with flexible access to course content and instructions at any time and from anywhere with unlimited educational discussion opportunities (Centre for Technology in Learning 2009, Garrison and Kanuka 2004). Also, there are other benefits associated with online learning as identified in the literature: media variety and unbounded web explorations; increasing the availability of learning experiences for learners who cannot or choose not to attend traditional face-to-face offerings; assembling and disseminating instructional content more cost-efficiently; enabling instructors to handle more students while maintaining learning outcome quality that is equivalent to that of comparable face-to-face instruction; and as a medium to encourage deeper processing as the students have more time for reflection (Arbaugh 2005, Centre for Technology in Learning 2009, Spiro and Jehng 1990).

The result of a meta-analysis on web-based and classroom instruction studies from 1996 to 2005 suggests that online learning is more effective than classroom instruction for teaching declarative knowledge; however, the two mediums are equally effective when the same instructional methods were used (Sitzmann, Kraiger, Stewart and Wisher 2006). Their argument supports Clark's (1983) proposition that 'unique instructional methods or learning conditions are driving observed differences in the effectiveness of online learning relative to classroom instruction' (Sitzmann et al 2006).

Notwithstanding the myriad of advantages of online learning, the conclusions of the meta-analysis of the literature concerning online learning from 1996 to 2005 does not demonstrate that online learning is superior as a medium (Centre for Technology in Learning 2009). This is because in "many of the studies showing an advantage from online learning, the online and classroom conditions differed in terms of time spent, curriculum and pedagogy; it was the combination of elements in the treatment conditions (which was likely to have included additional learning time and materials as well as additional opportunities for collaboration) that produced the observed advantage" (Centre for Technology in Learning 2009, p. xvii). Nevertheless, one should also note that online learning is much more conducive to the expansion of learning time than face-to-face instruction (Centre for Technology in Learning 2009, p. xvii).

Although online education has been practised in some property programmes in Australia for the last decade, issues involving online learning in property education have been under researched. At the

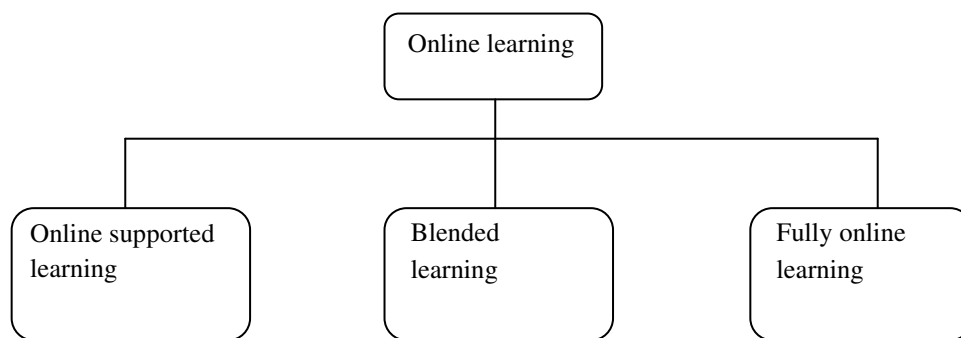
international level, there have however been articles published relating internet and technology to property education. For example, Cannon (1997) and Redman (2001) have reviewed the use of internet in teaching property courses. Research on a real estate principles course conducted by Wolverton and Wolverton (2003) revealed that there was a mixture of positive and negative feedback from students regarding online learning; it appears that the favourable comments outweigh the negative ones. The favourable comments include: more freedom with study schedule; being able to keep up with readings and concentrate on lectures, more effective use of time, and being able to spend more time on study. On the other hand, the unfavourable remarks indicate more self-discipline is required, such as more reading, and students had to study longer.

In the context of Australian higher education, a recent study on a property course at Deakin University shows that there has been positive feedback from the students on the use of technology in the course delivery which confirms the needs to continually evolve our delivery of education to enhance students' learning outcomes (Cornish et al 2009). As well, a study on a postgraduate programme at University of Newcastle indicates that majority of the students were satisfied with their experience of using Blackboard (online learning software) particularly in facilitating their learning process (Mak et al 2010).

In short, online learning not only benefits the students and other stakeholders it also help to make property education delivery more efficient and available to today's diverse student populations (Cornish et al 2009). Considering these constructive comments from property students, our project was designed to investigate how students used the online materials to enhance their learning outcomes.

Blended Learning

Blended learning or hybrid learning has become increasingly important in higher education as it has the advantages of both online and “traditional instructions” (Horton 2000, Kerres and deWitt 2003, Pratt 2002). Commonly, blended learning means those programmes that provide some combination of online and face-to-face learning (Owston, Wideman, Murphy and Lupshenyuk 2008, Singh 2003, Voci and Young 2001, Wall, Ahmed and Smit 2006). However, to make it meaningful, blended learning should be the result of a thoughtful integration of classroom face-to-face learning and online learning experience (Garrison and Kanuka 2004). Therefore it is important to distinguish blended learning from online supported learning and online learning (see Figure 1). The real test of blended learning is that “we are not just adding on to the existing dominant approach or method” (Garrison and Kanuka 2004, p. 97).



A Continuum of Online Learning

Source: Authors, adopted from Garrison and Kanuka 2004, p. 97

Figure 1

As explained by Krause (2008):

“Blended learning is realized in teaching and learning environments where there is an effective integration of different modes of delivery, models of teaching and styles of learning as a result of adopting a strategic and systematic approach to the use of technology combined with the best features of face to face interaction.” (p.2)

Therefore, academics have to decide “which content will be transferred to the online environment and how it will be presented, and this requires technical competence in uploading the content and or creating new web documents” (Gulbahar and Madran 2009, p.2). It has also been argued that learning outcomes will be enhanced when the rich dynamics of fast-paced communication technologies are thoughtfully integrated with traditional classroom instruction (Garrison and Kanuka 2004).

As argued by Steinberg (2004), online learning is not just a technological advancement in teaching delivery, it is a new business model to be more competitive for higher education. In accommodating students’ different learning requirements, more and more higher education institutions are incorporating web-sites in their programmes by providing study materials, having podcasts for students who chose to listen at their own convenience, using emails and discussion board for in-depth communication, as well as using the internet for assignment submission and return of feedback (Cornish et al 2009, Johnstone 2002, Mak et al 2010, Singh 2003).

The meta-analysis conducted by the US Centre for Technology in Learning (2009) found that on average blended learning had a larger advantage relative to pure face-to-face instruction; however, blended and pure online learning generally result in similar student learning outcomes. To justify blended learning, Garrison and Kanuka (2004, p. 97) argued that the combination of face-to-face and online learning facilitates “a simultaneous independent and collaborative learning experience, in other words the students can be independent of space and time, yet together”. It is the face-to-face element of blended learning that maintains the students’ high level of commitment and removes the sense of isolation that online students normally face (Wall et al 2006).

This notion is further confirmed by a study conducted by Menchaca and Bekele (2008) that the inclusion of some face-to-face interaction in distance education was found as significant in building community among students. Also, besides fostering the learning community, blended learning extends the total length of learning that results in greater reflection and better learning outcomes (Bonk, Kim, and Zeng 2005).

Asynchronous Online Discussion

Educational scaffolding has been recognised as important in improving student learning; it is proposed that the online scaffolding provides resources to promote student self-directed learning (Deimann and Keller 2006). Many researchers agree that one of the factors influencing the completion rate of online courses is motivational design which uses educational scaffolding to provide clear instructions to students in enhancing student engagement (Keller 1999, Martens, Gulikers and Bastiaens 2004, Sakaran and Bui 2001). Educational scaffolding items often discussed in the literature include the well-organised structure of a course, weekly email prompts, and active learning activities (Pittenger and Doering 2010).

Social interaction is suggested to be pivotal to effective learning process (Green, Edwards, Wolodko, Stewart, Brooks and Littledyke 2010). The research performed by Beckett, Amaro-Jiménez and Beckett (2010) shows that participants found asynchronous online discussion to be

useful and appropriate for academic discourse and enjoyed the peer interactions. Although online discussion was acknowledged as useful by the majority of students, more than a third of them did not use this element in their study (Hilton III, Graham, Rich, and Wiley 2010).

Lewis (2002) suggests that in order to achieve effective learning, the online discussion activities must reach a certain level of activity to enhance student engagement. The author argues that higher frequency of participation in online discussion tends to lead to a 'deep learning' process and thus enhances student learning outcome. This supports Beckett, Amaro-Jiménez and Beckett's (2010) assertion that asynchronous online discussion can be a worthwhile extension of face-to-face discussion and be fully utilized by students and academics. On the contrary, research conducted at the University of Newcastle found that the property students did not find online discussion to be useful for their learning but no explanation was provided (Mak et al 2010).

Online Quiz

It is worth noting that there are mixed findings on whether online quizzes are effective in improving learning outcomes. There was no significant difference found between the online group that had online quizzes and the other group that did not (Maag 2004). Also, there was no significant advantage found for students who took online quizzes compared to the group who did assignments (Stanley 2006).

Nevertheless, Lewis (2002) and Tselios, Avouris, Dimitracopoulou and Daskalaki (2001) suggest that the effectiveness of online quizzes may depend on the influence of other variables. Lewis (2002) puts forward that online quizzes may enhance student learning outcomes, however an active online discussion can be as effective as online quizzes in engaging student. Also, research conducted by Tselios et al (2001) proposes that the software platform used for online quizzes may also affect student performance.

Given that there are inconsistent findings on the effectiveness of online discussions and quizzes, our project examined how frequently our students used these facilities and how this correlated with their learning outcomes. This is particularly useful as the online discussions and weekly tutorials were used to scaffold students in completing their major project at the end of the course.

Research Question

In line with the literature (see Dziuban, Hartman, Juge, Moskal, and Sorg 2006, Horton 2000, Kerres and deWitt 2003, Owston, Garrison, and Cook 2006, Pratt 2002), we therefore hypothesized that blended learning is more effective than pure online learning due to better support through the benefit of both face-to-face contact and the online environment. So, in this project, the effectiveness of online learning materials to internal and external students was examined. These included online textual and graphical resources, discussion forums and a variety of quizzes. Also, the frequency of access to study materials, such as the study guide and power-point slides, was considered as well as how the use of different online items may be correlated to the students' summative mark outcomes. The effectiveness of the project-based learning approach for external students was also examined. We looked at how useful the educational scaffolding items, the online discussion board, and weekly tutorials were in assisting students in completing their major project.

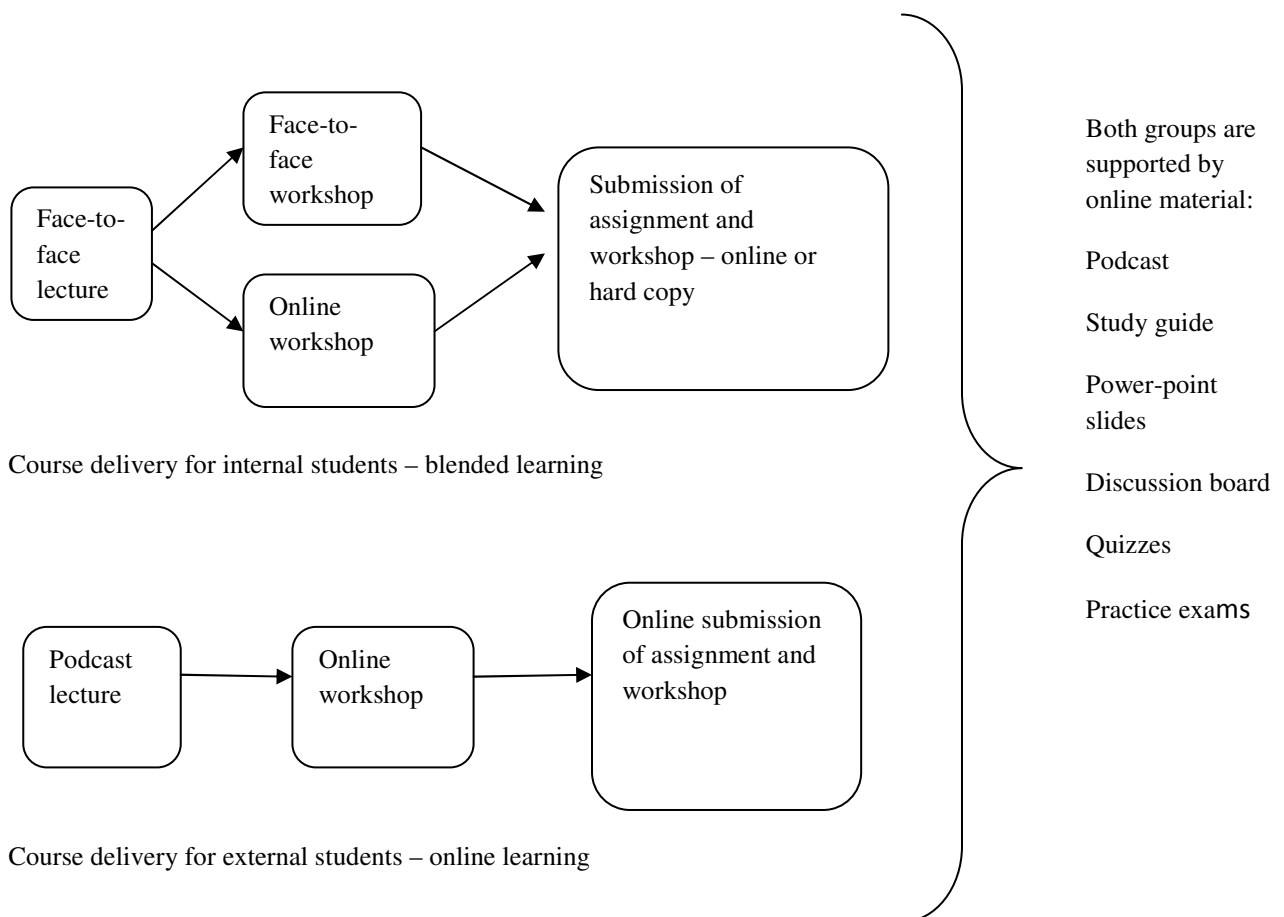
Project Background

Moodle is an open source learning management system now widely used by higher education institutions in Australia and overseas (University of South Australia (UniSA) 2010). At the time of writing Moodle was in use or being considered for use in 13 Universities in Australia including ANU, Monash, University of Western Australia, Macquarie and UniSA. It is a highly sophisticated learning management system designed to help academics create online courses in a robust and

flexible environment and replaces commercial products such as Blackboard. The University of South Australia has been offering online courses since 1995 but Moodle was not adopted until January 2010, and the property programme was one of the first in the university to fully adopt the platform.

The case study involved a first semester first year property course, Introduction to Property and Valuation, and examines the pattern of usage of this new platform split by study mode and then examines how using internet items was correlated to the major project marks, examination marks, and overall course marks. The two study modes considered were internal students who were exposed to blended learning, and external students who were fully online.

The same set of instructional materials and assessment were used for both student groups but with variable methods of delivery. For internal students, a face-to-face lecture and workshop were held weekly while the external students were provided with podcasts and online workshops. Materials such as the study guide, power-point slides, workshop instructions and assignment details were available online so that students could access them from any location with internet access at any time. All students were encouraged to participate in the online discussion forums and a variety of formative online quizzes and practice exams were provided to reinforce their understanding. As well, Moodle was used for submission of assignments and return of feedback. The course delivery of these two student groups is illustrated in Figure 2.



Course Delivery of Blended Learning and Online Learning

Source: Authors

Figure 2

Assessment Structure

Introduction to Property and Valuation had three assessment items within a project based learning environment:

- (1) A project (assignment) was submitted at the end of the study period and involved each student valuing a different residential property (usually the house they live in) involving all stages of primary and secondary research. The project was broken down into a series of smaller tasks to make the overall project more manageable but the final output was one client focused project which was reported at professional standards and assessed as such. This involved the application of nearly all the teaching material from the course.
- (2) The key element of the course was weekly workshops which required students to apply the principles and concepts covered in lectures to a series of simple problems that they tackled in groups (internally) or via discussion forums (externally). Collectively each of these simple problems addressed some aspect of their individual assignment. One of the greatest advantages of the workshop assessment was that it provided almost immediate feedback where students were informed of their mistakes and provided with ways to improve. The workshops were also an environment for students to seek advice on their personal projects.
Workshops were the primary mechanism used to scaffold the assignment. Internal students submitted work from the workshops on a fortnightly basis in groups and had a short (five minute) test on an individual basis each week. External students submitted individual workshop work on a fortnightly basis. There were also formative workshops designed to scaffold students in completing their major project.
- (3) A final examination contributed 50% of the assessment and as required by professional standards students need to pass this examination. This was structured as three separately marked sections; multiple-choice questions, calculation-decision-making questions and an essay.

In a nutshell, the weekly workshops, both summative and formative, together with the online discussion board were used to scaffold students in assisting them to complete their major valuation project. Also, to enhance student learning outcomes, formative weekly online quizzes and practice exam were provided for self-testing purpose.

RESEARCH METHODOLOGY

Although both internal and external students were provided with the same sets of educational materials, the internal students had an edge over their counterparts as they benefited from the combination of face-to face and online learning which can enhance their learning experience (Garisson, and Kanuka 2004). The weekly workshops were particularly useful where internal students could interact face-to-face with their peers in building community among themselves (Menchaca, and Bekele 2008). While the external students could interact with other students using the online discussion forum, the face-to-face contact element was lacking. Thus we believed that internal students who were exposed to blended learning mode should outperform the external students.

This was an exploratory research study designed to compare the effectiveness of blended learning and online learning. There were three primary objectives in analysing data for this paper:

- (1) To examine how students interacted with the Moodle based system by examining which resources and activities were most prevalent and at what stage in the study period these were accessed. “Course statistics” in the form of hit counts (Lowe, Lin, and Wang 2007) were used in our analysis.
- (2) By looking for relationships between the indicators of student utilisation of the Moodle based system and summative outcomes from the course.
- (3) To investigate how effective the online scaffolding items were for external students as opposed to internal students who had access to both online materials and face-to-face contact.

In order to perform the analysis data was required to be matched across three different databases. This included:

- (1) Logs of access to the Moodle based learnonline site. Each access to each activity on the Moodle site was logged against the student who used it. Analysis of these logs showed what activities students used, who used them and when.
- (2) Results of online activities such as online quizzes. While the logs from learnonline showed how many times students access the quizzes and for what purpose, the results database shows what their performance was in each quiz.
- (3) Examination of student names and characteristics together with marks from all assessment which is held as an Excel database.

This study was based only on students who attempted the examination in the main examination period and excluded students who had decided to change programmes or courses and therefore withdrew from the course. Also excluded were students who took (or would take) the examination at a later period due to study disruption at the time of the main examination. This meant that the final sample of data used in this study was based on 81 (74% of 109 starters) internal students and 17 (40% of 43 starters) external students. This resulted in 53,768 total Moodle logs and 3,422 completed quiz results for students who completed the course. Student usage was shown through pie charts and time series plots of weekly usage. The relationship between online items and summative marks was explored using correlation and regression models.

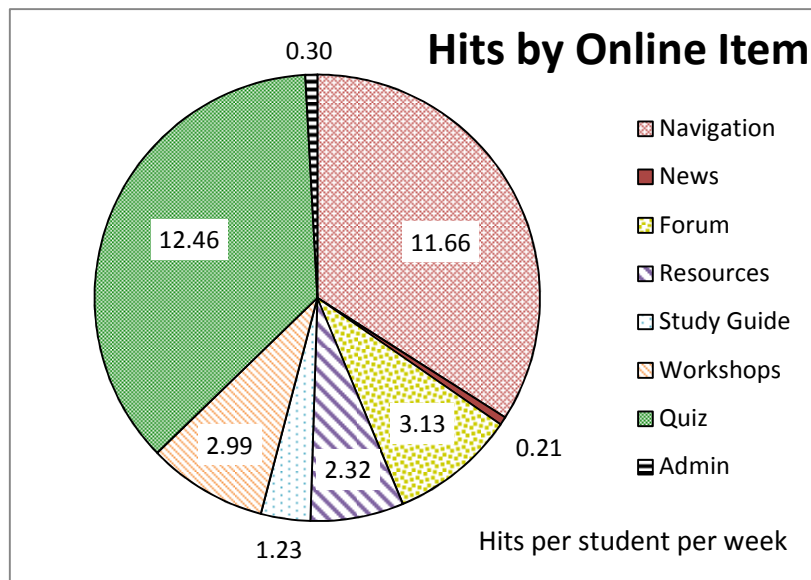
“Hit count” was used by Lowe et al (2007) in their research in studying the effectiveness of discussion forum. However, as argued by the authors, “hit data” may be misleading as it says nothing about what the student was doing, which could range from active contributing to just passing through quickly. Though “hit data” may not be telling the whole story, with the data provided by Moodle, we believed it was still useful in indicating frequency of access and how that was correlated with their learning outcomes. To supplement this, we examined the content of the online discussions in order to provide a more meaningful analysis.

RESULTS AND DISCUSSION

The results are discussed in three sections: student usage, correlations and regression modelling.

Student Usage

The total average hits per student per week are indicated in Figure 3.

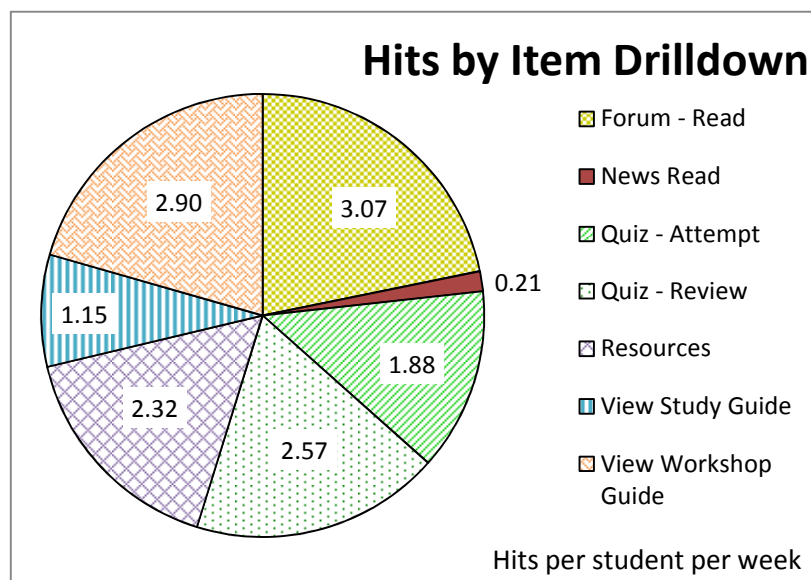


Average Hits Per Student Per Week by Primary Item

Source: Authors

Figure 3

On average each student accessed the site just over 34 times each week however much of this activity was made up of navigation around the site (over 1/3rd) and activity on the quizzes (over 1/3rd); some of these involved navigation within the quiz system or continuing existing quizzes. To get a clear pattern of effective access on the site further drill down is required to more discrete activities which are the major learning tools. On average, each student made roughly 14 accesses per week on these major tools (see Figure 4).



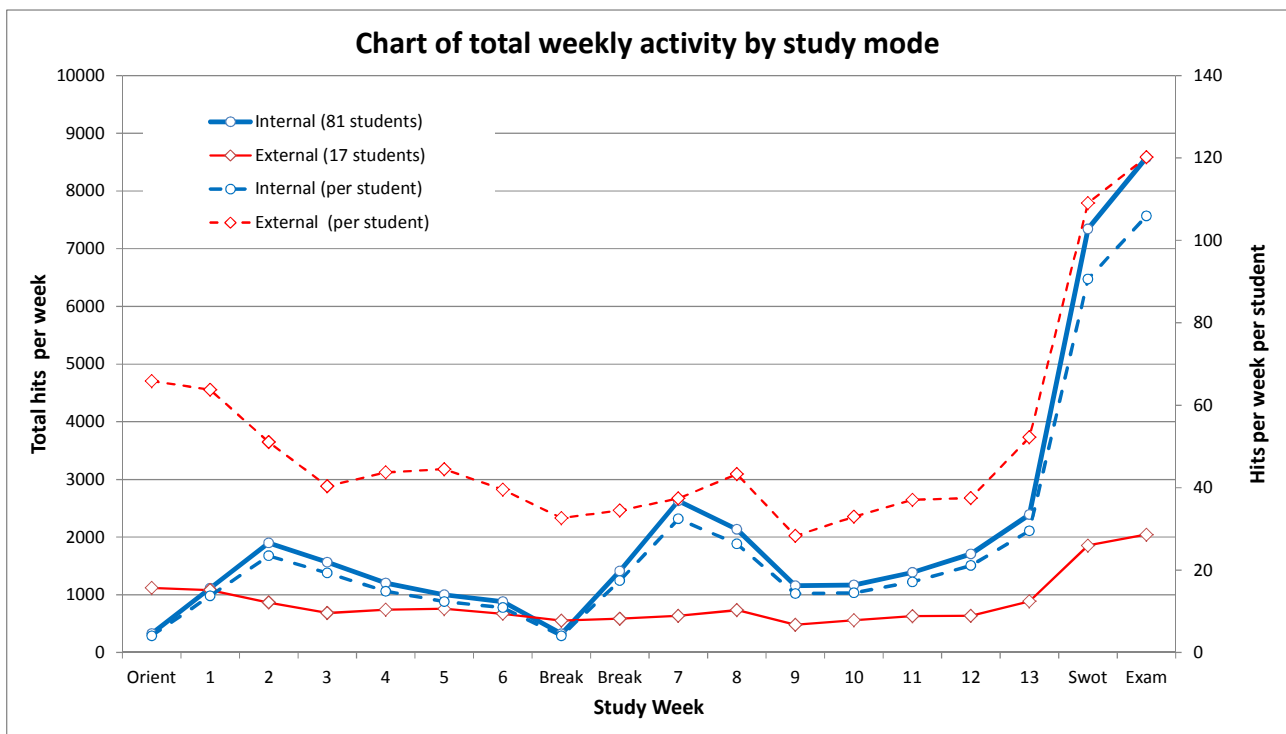
Average Hits Per Student Per Week for Major Learning Tools

Source: Authors

Figure 4

This showed a more balanced access to the major learning tools once navigation and administrative activities were removed. Material that might typically exist on a relatively "flat" website - without interactivity, makes up just under 50% of the activity. This included viewing study guides, workshop guides and resources, as well as reading news posted by the course coordinator. Student interaction was a little over 50% of total activity, particularly the use of the student discussion forum and online quizzes. For most students, forum activity was primarily reading other student posts (3.07 of the 3.13 average for all forum activity). The online quizzes made up the highest proportion of activity with each student attempting roughly 1.88 quizzes per week and reviewing around 2.57 quizzes. Reviewing a quiz is a normal part of taking the quiz, so on this basis 1.88 is the expected minimum for reviews. This value of 2.57 indicates that most students reviewed just less than 1 (0.7 on average) previous quizzes each week.

The weekly usage of online resources and activities is indicated in Figure 5 and this is broken down between internal and external students and shows both overall hits and hits per student per week to allow for the smaller proportion of external students.



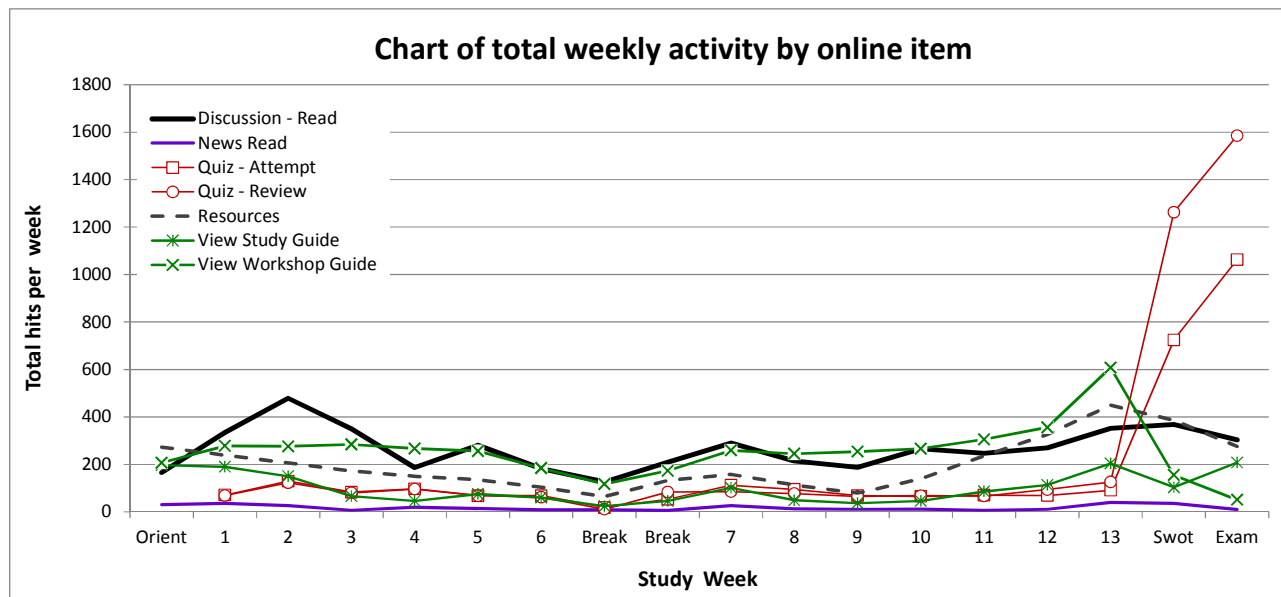
Total Weekly Hits by Mode of Study

Source: Authors

Figure 5

The chart highlights the difference in online activity between internal and external students. Internal students generally did not visit the online materials until after the first lecture in week one after which the activity slowly declined until the break in the middle of the study period. Their activity peaked again after the study period as they became anxious about the requirements to keep up to date with assignment work. Activity then declined around weeks 9 and 10 but with a marked peak leading into the examination period with hits per student per week averaging around 100 per student per week leading into the examination. External students used the website significantly

during the orientation period and in week 1 as they investigated how to study the course. Their activity was reasonably regular throughout the study period but again with a marked peak moving into the pre-examination period and examination period. Typically with the exception of the pre-examination and examination period hits per student per week for externals were usually at least twice that of internal students. This was expected as internal students had the convenience of the face-to-face contact in obtaining study material. This weekly online usage pattern was then broken into specific activities in Figure 6.



Total Weekly Hits by Online Item

Source: Authors

Figure 6

Investigating which items were accessed in each week shows that primarily quiz attempts and quiz reviews led to the significant peak around the pre-examination and examination period. Noticeably, just prior to the examination period in week 13, hits on resource areas such as lectures handouts, workshop guides and study guides reached a peak in the week prior to students significantly hitting the site in terms of quizzes. This could suggest that students did their study first before testing their level of understanding. Also during this period the discussion forum was not heavily used with students preferring the self test mechanism of quizzes. During the study period students tended to only review their quizzes upon completion with quiz attempts and quiz review results being almost identical however during the examination preparation periods students actively review previous quiz attempts.

Correlations

Correlations are used as a simple preliminary method to examine the relationship between each online item and the various summative assessment pieces. Correlations were included in order to give a picture on how the various online components relate to the students' performance (see Tselios et al 2001); because of the limitation of correlation coefficients the authors then used regression analysis to overcome its shortcomings in the following section. These correlation coefficients together with their level of significance using a standard two-tailed T test are indicated in Table 1. The results show that every online item was significantly correlated with at least one

assessment piece. Although students frequently used the online quiz system there was very little correlation between the number of times a student attempted quizzes and the assessment results.

The primary exception seems to be that the calculations and decision-making section of the examination was weakly correlated with the number of attempts in quizzes. While the number of attempts at quizzes was not generally correlated with summative mark outcomes, average mark of quizzes taken was closely correlated. The average mark for all quizzes taken was a statistically significant correlation with all assessment items; all had a correlation above 0.4. The average of quizzes taken during the study period however had only a small impact on workshop marks (internal students included a short weekly test) however the average mark of tests taken during the pre-examination period showed significant but lower correlations with each assessment item. Almost no online item was related to the mark in the essay question in the examination except the average mark of all quizzes.

This essay question required students to bring together their learning across the entire course. It was found that students achieving a higher mark than average in the essay question, received a higher than average mark in aggregated quiz results. This suggests that the ability of students to synthesise the material and present it in a logical manner required for the essay question resulted from their involvement in more rigorous study throughout the course. Workshop marks were closely related to those items online which encourage interaction and deeper learning such as the formative quizzes and online forums. The record showed that most discussions were about the workshop topics and thus students who had participated actively in the forums did well in their workshops. This is in line with Lewis's (2002) suggestion that a higher frequency of participation in online discussion tends to engage in deep learning process and enhance learning outcomes.

Online Item	Workshops	Assignment	Exam MC	Exam Calcs	Exam Essay
Practice Exam Multi Choice - Number of Attempts	.188	.161	.131	.341**	.129
Practice Exam Calcs - Number of attempts	.152	.170	.047	.305**	.148
Formative Quizzes - Number of Attempts	.372**	.268**	.308**	.381**	.166
All Non-formative Quizzes - Number of Attempts	.337**	.175	.171	.288**	.144
Average mark quizzes taken during study period	.337**	.191	.169	.127	.190
Average mark quizzes taken during pre-examination	.253*	.270**	.338**	.535**	.267**
Average mark ALL quizzes	.589**	.463**	.513**	.674**	.459**
Add Forum Topic	.328**	.154	.193	.133	.008
Add Forum Post	.365**	.244*	.223*	.224*	.153
View Forum	.424**	.294**	.270**	.292**	.160
View News Item	.376**	.166	.146	.138	.106

** Correlation is significant at the .01 level (2 tailed).

* Correlation is significant at the .05 level (2 tailed).

Correlation Coefficients Between Online Items and Summative Assessment Pieces
Source: Authors
Table 1

The results suggested that each online item contributed to higher summative marks in at least one assessment piece so making a worthwhile contribution to the package of learning tools. However it

was also obvious that simple involvement in online activities such as taking quizzes and reading forums had little or no effect on exam marks. In practice such activity was still reasonably passive; students may simply read questions, comments or suggestions from other students and partake of quizzes without ever actively studying the material.

Another issue uncovered from the records suggested that many students did not study the material before attempting the quizzes. An interpretation of the findings suggested that they hoped to get good marks by just rote-learning the questions with suggested solutions. Also, this conclusion was supported by the fact that higher average marks in quizzes and active involvement in the forums did lead to better outcomes. This suggested students who participated online having otherwise studied the material reap the benefits of online activities while students who ignored "old-fashioned" study and sought to use the online material as a way of shortcutting study were much less successful. In practice online quizzes are a useful tool for student self-assessment but are not a quick-fix learning mechanism and students need to be made aware of this fact.

Regression Models

The difficulty with relying on correlation coefficients is that many indicators may be measuring much the same thing and may imply causation between the online facilities and study outcomes which is unwarranted. The advantage with regression modelling in this instance was that the authors sought to explain the relationship between each online activity and a summative mark outcome holding other factors constant. In order to correctly measure the difference between internal and external students it is vital to include these control variables or the parameter estimates will be biased. Such issues might include the student's age, gender, mode of study and residency status. Variables to control these issues have been included in the regression model together with a control for the number of workshops completed. While all students included in the sample completed the assignment and the examination, some students did not submit all workshops which would have had a major effect on their overall course mark. It was also possible that those students who did not complete all workshops might not have developed a satisfactory understanding of the material.

The regression model was designed to avoid the problem of multicollinearity - effectively double counting of assessment items which have the same effect. The presence of multicollinearity in the model would lead to the incorrect interpretation of the regression coefficients and this was avoided by careful selection of the independent variables. Three models were specified. The first model used the overall course mark as the dependent variable and the other two used the total examination percentage and total assignment percentage as the dependent variables. The two separate pieces of assessment were considered separately as it was likely that certain students would perform better in one than the other and that external students might be in this situation. Typically we would expect internal students to have an advantage with continuous assessment where the weekly contact with staff is more effective than online forums. Conversely, external students tend to attempt more work themselves before they go to the trouble of forming a written question for the online forum. This may lead to a situation where they achieve a similar mark in the continuous assessment but have achieved deeper learning of the material leading to higher marks in the exam and overall.

Table 2 shows the regression model including statistics using the overall course mark as the dependent variable.

R Square	0.667
Std. Error of the Estimate	8.7874
F	21.026

Parameter	B	Std. Error	Standardized Coefficients	t	Sig.	VIF
(Constant)	14.535***	5.111		2.844	0.006	
External	6.095**	3.044	0.159	2.003	0.048	1.589
International	2.675	2.488	0.071	1.075	0.285	1.114
Mature (over 25 years old)	1.217	2.635	0.036	0.462	0.645	1.556
Female	-0.177	1.996	-0.006	-0.089	0.929	1.149
The Number of Workshops Completed	4.213***	0.996	0.308	4.232	0.000	1.339
Add Forum Post	0.418	0.512	0.063	0.818	0.416	1.501
Quizzes - # of Attempts	-0.017	0.044	-0.027	-0.385	0.701	1.270
Quizzes - Average Mark	41.23***	5.732	0.573	7.195	0.000	1.600

*** Regression Coefficient is significant at the .01 level (2 tailed).

** Regression Coefficient is significant at the .05 level (2 tailed).

* Regression Coefficient is significant at the .10 level (2 tailed).

Regression Model - Dependent Variable = Overall Course Mark **Source: Authors**

Table 2

The model showed that (using a 95% level of confidence and holding other variables constant) external students had a significantly higher overall mark of around 6 marks out of 100 on average, compared to internal students. Student age, gender and residency status had no significant effect on the overall mark. The number of workshops completed had a significant effect on overall course marks and its coefficient value of 4.2 was roughly equal to the contribution for each workshop (5%) of the final mark. The number of forum posts nor the number of quizzes attempted had a statistically significant effect, while the average mark for tests overall was the most significant contributing factor to the final overall mark, remembering that these tests were student self tests and did not contribute to the final grade. The standardised coefficients show that of the significant variables, average quiz mark had the most influence on the overall mark followed by the number of workshops completed and then if the student was external. The low VIF values for each variable indicated that multicollinearity was not a problem in this model. This would have existed by using most of the other possible variables.

Table 3 shows the equivalent regression model using the total examination mark (out of 100) as the dependent variable.

R Square	0.531
Std. Error of the Estimate	11.7733
F	11.889

Parameter	B	Std. Error	Standardized Coefficients	t	Sig.	VIF
(Constant)	20.527***	6.848		2.997	0.004	
External	8.226**	4.078	0.190	2.017	0.047	1.589
International	8.358**	3.333	0.198	2.507	0.014	1.114
Mature (over 25 years old)	1.951	3.530	0.052	0.553	0.582	1.556
Female	-0.392	2.674	-0.012	-0.147	0.884	1.149
Number WKs completed	1.020	1.334	0.066	0.764	0.447	1.339
Add Forum Post	-0.100	0.685	-0.013	-0.146	0.884	1.501
Quizzes - # of Attempts	0.019	0.059	0.027	0.326	0.745	1.270
Quizzes - Average Mark	47.962***	7.679	0.590	6.245	0.000	1.600

*** Regression Coefficient is significant at the .01 level (2 tailed).

** Regression Coefficient is significant at the .05 level (2 tailed).

* Regression Coefficient is significant at the .10 level (2 tailed).

Regression Model - Dependent Variable = Total Examination Mark
Source: Authors
Table 3

This model shows that (at a 95% level of confidence) the age and gender of students did not affect the total examination mark but that external students performed better on average achieving about 8/100 higher marks than internals and that international students had a statistically significantly better performance in the examination achieving about 8/100 higher marks on average than non-international students holding other variables constant. This is reflective of our past experience that international students tend to perform better in this numeric-rich exam. Based on the standardised regression coefficients the average quiz mark has almost 3 times the impact of being an external or international student on the examination mark.

Table 3 shows the regression model using the assignment percentage (out of 100) as the dependent variable.

R Square	0.339
Std. Error of the Estimate	18.1051
F	5.397

Parameter	B	Std. Error		t	Sig.	VIF
(Constant)	16.563	10.531		1.573	0.120	
External	3.050	6.271	.054	0.486	0.628	1.589
International	-9.735*	5.126	-.178	-1.899	0.061	1.114
Mature	-1.309	5.429	-.027	-0.241	0.810	1.556
Female	0.270	4.112	.006	0.066	0.948	1.149
Number WKs completed	5.995***	2.051	.300	2.923	0.004	1.339
Add Forum Post	0.621	1.054	.064	0.589	0.558	1.501
Quizzes - # of Attempts	-0.075	0.090	-.083	-0.827	0.410	1.270
Quizzes - Average Mark	38.740***	11.810	.368	3.280	0.002	1.600

*** Regression Coefficient is significant at the .01 level (2 tailed).

** Regression Coefficient is significant at the .05 level (2 tailed).

* Regression Coefficient is significant at the .10 level (2 tailed).

Regression Model - Dependent Variable = Assignment Mark

Source: Authors

Table 4

Table 4 shows some difference to the result for the examination. While being an international student had a positive impact in the examination mark this model shows that we are 90% confident that international students achieved roughly 10% lower marks in the more language rich assignment. There is no significant difference in the mark for external students or any variation caused by gender or age. Making forum posts or attempting quizzes has no significant affect but the number of workshops completed and the average mark in quizzes significantly contributes to the assignment percentage and the effect of these two was much greater than the small relative effect of being an international student.

The results of these three models show some consistent results. Simply making forum posts or attempting quizzes did not affect any assessment, however students with high average marks in quizzes showed statistically higher marks. The statistically significant result for average quiz marks in all three models suggested that students who performed well must study the material independently before going online and using the quizzes as a self testing mechanism and that simply going online and repeatedly taking quizzes provided no significant benefit to students. International students performed on average better in the numerically rich examination but poorer in the language rich assignments - overall performing about the same as local students. External students performed better overall but this was due to significantly higher results in the examination where self study is a major factor but there was no on-average difference in the assignment mark.

Although the literature suggests that blended learning is superior than other form of learning modes (Kerres and deWitt, 2003, Pratt 2002), results from the above regression analyses negated the

authors' earlier hypothesis that blended learning delivers better learning outcomes with the overall result indicating that learning outcomes from online learning was better than blended learning, however in terms of continuous assessment there was no difference and the superior result was the result of better examination performance. This could be due to the fact that external students were usually more self-motivated than internal students as many of them were mature working students who strived to enhance their qualification for better career prospects. As well, these external students were self-selecting in which those students who did not perform well withdrew from the course early where 34% of external students withdrew from the course and only 38% completed the exam. The blended learning with in-class activities that were used to scaffold the assignment tended to help internal students focus on the assignment and hence improved marks in this regard.

Although the external students did not have face-to-face workshops in assisting them with their assignment, it is worth noting that the online workshops were found to be useful online educational scaffolding items in helping them to achieve good assignment results.

Although the external students had less access to academics they tend to be more independent learners than the internal students, as evidenced from the number of times the online materials were accessed per student as illustrated in Figure 5. There could be many possible reasons why more hits were made by external students: they may be double-checking the material, working on the online quizzes, participating on the online discussion, or even printing their material they failed to print off the first time. We may infer from all these activities that, in this program of study, the external students are working harder compared to their internal counterparts.

CONCLUSION

More and more property programmes in Australia are delivering online courses in order to cater for the increasing demand from students of diverse backgrounds. This is particularly relevant to satisfy those part-time students, as well as those who find it difficult to access the traditional face-to-face learning. Having the advantages of both face-to-face and online learning, blended learning offers more flexibility and student support, and has been highly recommended to enhance student engagement thus improving student learning outcomes.

Contrary to the literature, findings from this research revealed that external students who were exposed to online learning performed better than students in blended learning mode. This suggests external students may be more self-motivated as most were studying part-time; also, they were self-selecting in that less motivated students tended to withdraw from the course at an early stage leaving only the more driven students to complete the course. Even though the research finding did not find blended learning to be more effective than online learning, as Boyd (2010) says, property academics should explore how best to incorporate blended learning into their programmes to enhance student engagement given that blended learning actually offers more students learning support and flexibilities.

In terms of effectiveness of individual online items, the average mark of online quizzes had a strong correlation with final grades suggesting that those students who attempted the quizzes after studying the material diligently did well in course. Noticeably, from the data, students who did not do their study before attempting the quizzes did poorly in their first attempts. This reaffirms the need to understand the material in order to excel. Also, the regression analysis revealed that the frequency of attempts for online quizzes did not affect the learning outcome as students simply could not do well by just rote-learning the answers. While online quizzes are a useful tool to engage students, they can lead students into a false "sense of security" if they keep repeating quizzes until they get a high mark. Students should be advised that quizzes are only effective if they use them to self-test their competency after studying the course material comprehensively.

Another significant finding is online educational scaffolding items, in this case the online workshop was found to be significant in assisting external students to perform well in their major assignment. Although the internal students were given face-to-face support in their weekly workshops, the completion of online workshops was equally effective for external students suggesting that the online project-based learning approach adopted in this property course was useful in engaging external students in their study. Thus, this finding is an important contribution to the higher education in online pedagogy as the online scaffolding approach can be extended to other disciplines appropriately to enhance student learning.

Lastly, it is important that the results of this paper be taken with caution because of the small sample size of students across only one course; therefore our next project aims to expand this research by collecting qualitative and quantitative feedback from a larger sample of property students, particularly in terms of their perceptions, satisfaction level and suggestions to improve online interaction.

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