Student evaluations of elearning technologies in undergraduate psychology: A blended model for the future

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Undergraduate Psychology moved teaching materials from the school intranet to the University Learning Management System (*WebCT*) during 2005. This change took place to avail students of interactive, reflective and adaptive new elearning technologies. This blended learning approach allowed academics to both provide lecture materials online as well as add to the student experience. Specifically, this has been achieved through the complete redevelopment of learning materials for first year, the incorporation of online discussions – with a dedicated online tutor for second year, and online formative assessment for both first and second year units of study. 2,456 student evaluations of the functionality and educational components of the online units of study were analysed for first and second semesters in 2005. The results of this analysis will i) help determine the elearning materials which students desire and need, ii) influence the way we develop online components of units of study in the future, and iii) determine time and staffing commitments for the development of online resources.

Keywords: blended learning; interactive elearning; student evaluations; online tutor

Introduction

The development of flexible modes of delivery of all first and second year psychology units of study was undertaken at the University of Sydney in 2004/2005 to maximise the educational opportunities available to students. The School of Psychology moved materials off its intranet and developed online learning and teaching materials through the University Learning Management System, *WebCT*. In 2004 site shells were developed for first year psychology units of study (Psyc1001 and 1002) for a cohort of approximately 1200 students. In the following year the School received a grant from the University Teaching Development Fund (TDF) to develop this site shell further with the inclusion of additional content and educational design features. In order to provide the 2004 first year students with a continuing online experience in their second year of psychology, in 2005 the School received elearning project support from the University-funded initiative 'USyd eLearning' to develop unit of study site shells for its four intermediate units: Psyc2011 (Brain and Behaviour), 2012 (Statistics), 2013 (Cognition and Social Psychology) and 2014 (Personality & Differential Psychology), for a cohort of approximately 600 students. In addition, a solution was sought to manage the workload issues associated with online discussions, i.e. through the adoption of an online tutor for all second year units. The focus of the 2005 elearning developments across first and second year was, therefore, clearly different. Consequently this study's rationale for comparing first and second year student evaluations in 2005 was to assess the effectiveness of these different elearning initiatives in order to inform future online learning and teaching development.

The School of Psychology recognised that educational technology could be integrated with traditional forms of teaching to enhance the quality of learning and teaching for students (Pitman, Gosper, & Rich, 1999). The School also acknowledged the need to utilise the advantages of immediacy and accessibility of information provided through online flexible modes (Robinson & Shakespeare, 1995). Moreover, online modes have been shown to allow students to learn efficiently and effectively with minimal disruption to their life and work roles (Barnard, 1995). This is particularly important for the School's numerous part-time students, such as mature-age students and others who are employed full time. In

addition, by introducing online interactive learning to complement existing face-to-face teaching, the School attempted to meet the blended learning objective of its Faculty: to offer students access to many flexible learning techniques, especially online resources.

In order to ensure the maintenance of a competitive edge with other psychology departments in Australia currently implementing extensive online learning facilities, the School realised it needed to make effective use of educational technology. Past research had revealed that in order to achieve a high level of effectiveness with online learning and teaching, materials needed to be reflective and adaptive, as well as interactive (Laurillard, 1993; Biggs, 2003). Interactivity was found by Alderman and Fletcher (2005) to be a defining characteristic of quality online learning. Sims (1999, p. 2) defined interactivity as 'those functions and/or operations made available to the learner to enable them to work with content material presented in a computer-based environment'. Another focus of interactivity – that between students and academic staff – was nominated by Chickering and Ehrmann (1996) as the most important factor of their principles of good practice in undergraduate education which promote student motivation and involvement.

As it incorporated interactivity into quality online learning and teaching, the challenge for the School was to utilise efficient teaching practices which would maximise staff resources during times of increasing workloads. In first year psychology, the TDF grant enabled the appointment of a graduate student who could assist staff in developing content for interactive learning materials. In second year psychology, an online tutor was appointed to facilitate regular communication with students through online discussions. While online discussions can enable students to communicate amongst themselves in the form of online communities (Wenger, 1998), studies by Abas and Kaur (2004) and Cashion and Palmieri (2002) have found that students overwhelmingly direct their communications to the tutor, who they expect to be accessible and available to help them as needed.

The School also aimed to harness educational technology to assist students to become independent learners. Jones (1997) found that teaching innovation in the form of online curriculum material, self-paced learning and practical demonstrations encourage tertiary students to become independent learners who experience a range of learning and teaching modes. The new online components therefore include the following: a large number of online multiple-choice quizzes for students to practise concepts and skills and assess their understanding; interactive demonstrations that, for example, require students to carry out simple reaction-time experiments; and current video content to provide stimulus material for students to answer discussion questions. The video content supersedes the existing out-of-date material and provides vivid visual illustration of topic concepts. Taped interviews and dramatisations give students exposure to a wider range of current research opinions than those provided by existing video content.

In conducting student evaluations of the online learning and teaching materials, the School took note of suggestions by Oliver (2000) that evaluating new web technologies is often given a low priority in the development of such technology. More recently, studies at the University of Houston and the Learning Institute of Texas have been conducted to address this research limitation. Here Song and Kidd (2005) and Song (2005) have found that students' level of interest in online learning and ease of locating information is affected by the organisation of information, site navigation and clear instructions. Quality of instructional design has also been found to be a key characteristic of student satisfaction in studies by Alderman and Fletcher (2005) and Cashion and Palmieri (2002). In order to build on this research, this study evaluated not only the educational process but also the process associated with the functional usability of elearning technology (Sheard & Markham, 2005).

The move to blended learning

First and second year psychology units of study approached the move from the school intranet to the Learning Management System in different ways. First year psychology innovations and developments included: i) a *WebCT* interface that was easy to navigate; ii) fourteen online multiple-choice quizzes (seven per semester) to assess students' understanding of tutorial and lecture material as they progress; iii) 'Flash-modules' developed within the school and tailored to specific teaching requirements (e.g. report writing) and specific tutorials; iv) self-paced exercises that assess textbook material; including interactive demonstrations, flashcards, and labelling of diagrams.

Second year psychology innovations affected four units of study (Psyc2011, 2012, 2013, 2014) and included: i) the creation of a consistent set of unit of study website shells; ii) the incorporation of existing materials from the intranet into the site shells; iii) the development of a complete set of online components including discussion boards; iv) online quizzes for Psyc2012 and part of Psyc2013; and v) the training of an online tutor to moderate the four discussion boards. The online tutor was employed as staff expressed concerns about workload implications of the online communications tool. As a result, a single online tutor coordinated all four discussion boards in second year psychology.

It is important to emphasise that the approach, learning focus, allocation of resources and time taken for development of the units of study websites varied in first and second year psychology, and as a consequence differences were predicted in students' evaluations of the functionality and educational features of these blended learning initiatives. Because a greater focus and more resources were spent on the functional features of the online units of study for first year, these students would be expected to report stronger support for the navigational and organisational features than second year students. In a similar vein, because a greater emphasis was given to the online tutor and moderation of the discussion board, second year students would be expected to report greater support for these educational features compared to first year students.

Method

Participants

2,456 student evaluations of the online learning components from two first year, and four second year undergraduate psychology units were obtained across the two semesters in the 2005 academic year. Of the 1,701 first year responses, 68.36% were from female students, with a mean age of 19.44 (SD = 3.82). Of the 755 second year responses, 73.97% were from female students, with a mean age of 21.59 (SD = 5.27). 93.12% of the students were enrolled in their unit(s) full-time, and 87.67% primarily accessed their online learning materials from home.

Materials and procedure

Students completed the 'Student Evaluation of eLearning in Psychology Units of Study' (SEEPUS – see Appendix A) questionnaire at the end of each unit, as part of a battery of unit evaluation surveys. The SEEPUS was presented electronically through each unit's website, with first years completing it during their final tutorial class each semester, and second years in their own time at the end of each unit.

The SEEPUS was designed to assess student attitude towards the new *WebCT*-based online components for each unit, and their satisfaction with the integration of this new elearning content into their unit(s) as a whole. In addition to demographic questions, the SEEPUS contained two subscales specifically evaluating the functional and educational features of each unit's website. The four functional questions assessed ease of use, navigation, organisation and presentation, whereas the seven educational questions assessed the educational benefit received from the unit's website both as a whole and through specific elearning components (discussion forums, online lecture notes, and online quizzes). Students responded to each question on a 5-point Likert scale, ranging from 'strongly disagree' to 'strongly agree'. Finally, an 'Overall Satisfaction' question (Q.17) was included where students responded to the question on a 5-point Likert scale, ranging from 'very poor' to 'very good'.

Results

Completion of the SEEPUS was not compulsory. In the first year units, where unit evaluations were completed during the final tutorial, 77.18% of enrolled students completed the questionnaire. Second year units, where students were asked to complete evaluations in their own time, saw a significantly lower response rate of 46.19% [$t(4) = 3.344$, $p = .029$]. Note also that the data are not always independent across units as many students were enrolled in multiple units. Students' answers could not be matched so as to run repeated measures analyses due to responses being anonymous.

Functional features

To assess student's evaluation of specific elements of their unit's website, analyses were grouped according to the two major sections of the SEEPUS – functional and educational features. Mean responses on the questions assessing the functional features of each unit's website are shown in Table 1.

Table 1: Means of student evaluations of 'functional features' of elearning technology

	Psyc1001 (*n* = 969)	**Psyc1002 (*n* = 732)**	**Psyc2011 (*n* = 216)**	**Psyc2012 (*n* = 115)**	**Psyc2013 (*n* = 257)**	**Psyc2014 (*n* = 167)**
Functional questions	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)
Q1.Easy to locate info on UoS website	4.07 (.87)	4.10 (.92)	3.93 (.78)	3.98 (.80)	4.02 (.78)	3.88 (.75)
Q2.UoS website was well organised & presented	4.11 (.76)	4.12 (.82)	3.89 (.75)	3.88 (.94)	3.86 (.77)	3.88 (.76)
Q3.UoS website was easy to navigate	4.00 (.78)	4.13 (.75)	3.86 (.78)	3.84 (.85)	3.91 (.81)	3.96 (.71)
Q4.UoS website was easy to use	4.07 (.74)	4.16 (.71)	3.97 (.65)	3.97 (.76)	4.00 (.75)	4.01 (.69)
Total functional features	4.07 (.68)	4.13 (.68)	3.91 (.63)	3.92 (.74)	3.95 (.70)	3.93 (.65)

Note. A mean score close to five suggests strong agreement with the statement; UoS = unit of study

Functional features across first and second year psychology
In order to test whether there were any differences in students' perceptions of the functional features of their unit of study websites across first and second year psychology, scores for the two first-year units (Psyc1001 and 1002) and the four second-year units (Psyc2011, 2012, 2013 and 2014) were collapsed. An ANOVA test revealed that first year students reported stronger agreement ($M = 4.09$, $SD = .68$) for the total functional features of their unit of study websites than second year students ($M = 3.93$, $SD = .68$), and that this difference was statistically significant [F (1, 2453) = 28.6, $p < .001$].

Functional features across semesters 1 and 2
Several one-way ANOVAs were also conducted to test whether there were any changes in students' perceptions of functionality between semesters 1 and 2. Analyses revealed that differences only existed in the first year cohort. Specifically, the analyses revealed that the second semester cohort of Psyc1002 students reported easier navigation [F (1, 1697) = 12.55, $p < .001$] and use [F (1, 1697) = 6.87, $p < .01$] of the websites than the first semester cohort of Psyc1001 students. There were no significant differences between first and second semester student perceptions of functionality amongst the second year cohort.

Educational features

Mean responses on the questions assessing the educational features of each units' website are shown in Table 2.

Educational features across first and second year psychology
In order to test whether there were any differences in students' perceptions of the educational features of their unit of study websites across first and second year psychology, scores for the two first-year units (Psyc1001 and 1002) and the four second-year units (Psyc2011, 2012, 2013 and 2014) were collapsed. Several one-way ANOVA tests revealed that second year students reported stronger support for the online tutor moderation [F (1, 2435) = 35.38, $p < .001$], online tutor posts [F (1, 2432) = 184.53, $p < .001$], online discussions [F (1, 2441) = 112.68, $p < .001$] , future elearning integration [F (1, 2443) = 38.47, $p < .001$], and total educational features [F (1, 2449) = 36.54, $p < .001$] of their unit of study websites than first year students. Student evaluations of the two first year units of study and the second year unit of study (2012) in which online quizzes were used throughout the entire semester reported stronger agreement that the quizzes assisted students' understanding than evaluations of the unit (2013) which

only used quizzes for half the semester [t (2046) = 6.45, p < .001]. Post hoc (Bonferroni) analyses confirmed that the three units that did use quizzes throughout the semester did not differ significantly from each other on this question.

Table 2: Means of student evaluations of 'educational features' of elearning technology

	Psyc1001 (*n* = 969)	**Psyc1002 (*n* = 732)**	**Psyc2011 (*n* = 216)**	**Psyc2012 (*n* = 115)**	**Psyc2013 (*n* = 257)**	**Psyc2014 (*n* = 167)**
Educational questions	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)
Q10.Lecture-outlines helped me get more from lectures	3.93 (.93)	3.90 (.95)	3.95 (1.00)	3.49 (1.14)	3.95 (.90)	4.04 (.94)
Q11.Online tutor moderation motivated my involvement in discussions	3.17 (.81)	3.29 (.86)	3.33 (.95)	3.38 (.84)	3.45 (.91)	3.63 (.86)
Q12.Online tutor posts helped me make most of topics discussed	3.27 (.81)	3.34 (.82)	3.69 (.89)	3.75 (.93)	3.84 (.88)	3.92 (.84)
Q13.Online discussions helped me better understand key issues	3.20 (.81)	3.36 (.91)	3.51 (.84)	3.53 (.86)	3.71 (.90)	3.92 (.80)
Q14.Online quizzes helped me check my understanding of main ideas of learning tasks	4.10 (.85)	4.03 (.89)	–	4.09 (.88)	3.66 (1.01)	–
Q15.More elearning integrated in future Psych units	3.43 (1.02)	3.51 (.98)	3.64 (.88)	3.94 (.88)	3.67 (1.00)	3.80 (.89)
Q16.UoS website helped me get more out of my Psych studies	3.92 (.76)	3.94 (.77)	3.80 (.76)	3.92 (.81)	3.89 (.75)	3.92 (.70)
Total educational features	3.57 (.54)	3.62 (.55)	3.65 (.59)	3.72 (.55)	3.74 (.54)	3.87 (.55)

Note. A mean score of five suggests 'strong agreement' with the statement; UoS = unit of study

Educational features across semesters 1 and 2

Several one-way ANOVAs were also conducted to test whether there were any changes in students' perceptions of educational features of their unit of study websites between semesters 1 and 2. Analyses revealed that the semester 2 cohort of Psyc1002 students reported stronger support for online tutor moderation [F (1, 1685) = 7.43, p < .01] and online discussion forums [F (1, 1691) = 14.61, p < .001] than the semester 1 cohort of Psyc1001 students. Analyses also revealed that the semester 2 cohort of second year students (Psyc2013 and Psyc2014) reported stronger support for online lectures [F (1, 747) = 7.09, p < .01], online tutor moderation [F (1, 749) = 6.56, p < .01], online tutor posts [F (1, 748) = 6.16, p < .01], online discussion forums [F (1, 749) = 18.99, p < .001], and total education features [F (1, 749) = 7.47, p = .006] than the semester 1 cohort (Psyc2011, 2012). Overall, these results imply that in most instances student evaluations of the educational features of the websites improved with time, usage and familiarity.

Overall satisfaction with unit of study websites

Means of overall satisfaction with the integration of websites into their respective units of study (Q.17 of the SEEPUS) were compared between the two first-year units (Psyc1001 and 1002) and the four second-

year units (Psyc2011, 2012, 2013 and 2014). First year students reported a slightly higher mean satisfaction ($M = 4.17$, $SD = .70$) than second year students ($M = 3.96$, $SD = .71$), and an ANOVA test showed this difference to be statistically significant [F (4, 2438) = 13.4, $p < .001$]. On average however, both cohorts perceived their unit of study website as 'Good'. There was very little difference in overall satisfaction levels between semesters 1 and 2.

Discussion

The School's adoption of Oliver's (2000) suggestion to evaluate new web technologies was found to be very fruitful. Not only have the research findings provided insights into the educational features of the unit of study websites which students find improve their learning, it has also highlighted the functional aspects of online learning which students find beneficial. The findings in this research support previous findings by Song and Kidd (2005), Song (2005), Alderman and Fletcher (2005) and Cashion and Palmieri (2002) that the quality of instructional design influences student satisfaction with online learning.

In addition, the advantages of interactive web technologies as proposed by Laurillard (1993), Biggs (2003), Alderman and Fletcher (2005), Sims (1999) and Chickering and Ehermann (1996) were also positively evaluated by students. The students demonstrated strong support for their interaction with a dedicated online tutor through online discussions, as well as computer-based interaction with learning and teaching material via online quizzes.

Functional features of unit of study websites

First year students reported significantly stronger support for organizational and navigational features of their unit of study websites than second year students. The single navigational pathways implemented, and the appropriate hierarchical organization of materials in first year may explain this finding. In addition the significant improvement in Psyc1002 students' perception of 'navigation' and 'use' in Semester 2 can be explained by the experience and familiarity gained through using the website in Semester 1. The implication of these findings for the School is that future blended models should invest time in developing the quality of instructional design aspects of unit of study websites.

Educational features of unit of study websites

Previous research has shown that online discussion boards have a significant potential to promote interactivity between students, in addition to that which occurs in the traditional tutorial room (Curtin, 2002). In an extension of this finding we found evidence that the implementation of a single online tutor to moderate online discussions and directly answer student course content related questions assisted students' reported learning for all second year units of study. More importantly, where online quizzes were incorporated into the unit of study websites (Psyc1001,1002 and 2012) students showed strong support for this form of interactive online learning (refer to Table 2). Moreover, Flash animations developed to increase interactivity and student understanding of concepts essential for first year psychology were also positively evaluated. These positive evaluations of the educational aspects of the websites imply that future blended models should invest time in developing content for interactive online learning and teaching materials, and employ an online tutor to moderate discussion boards for large groups of students.

Since we focused most funding on the development of online educational materials in first year, and on the online tutors in second year, our results reflect the positive impact of these elearning initiatives. Overall, student evaluations revealed that they felt that their unit of study website was a useful addition to traditional face-to-face teaching. In addition students were more than satisfied with the online components of their first and second year psychology unit of study websites, particularly those involving formative assessment, moderated discussions and well organised materials. These are important considerations for staff to take into account when designing online learning materials. Furthermore, the implications of these current findings for academics interested in implementing a blended approach to learning into their curriculum are that time and staffing are crucial to ensure students are learning. This may need to involve the establishment of teaching teams, including the appointment of online tutors for large cohorts of students, and the provision of dedicated staff (or time release for academic staff) to develop content for online learning materials.

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Appendix A

Student Evaluation of eLearning in Psychology Units of Study (SEEPUS)

Part A

Demographics

1. What is your age? _____

2. What is your gender? ☐ Female ☐ Male

3. Please place a tick next to the unit in which you are enrolled:
☐ PSYC1001 ☐ PSYC2011 ☐ PSYC2012
☐ PSYC1002 ☐ PSYC2013 ☐ PSYC2014

4. Please place a tick next to your enrolment status:
☐ Full time ☐ Part time

5. Please place a tick next to the location in which you are most likely to access your unit of study website:
☐ Home computer ☐ School of Psychology ☐ University Location

Part B

Use the following scale to rate each of the statements below

1	2	3	4	5
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

Functional Features
6. I found it easy to locate information on my unit of study website site.
7. My unit of study website site was well organised and presented.
8. My unit of study website site was easy to navigate around.
9. I found my unit of study website site easy to use.

Educational Features
10. The lecture outlines on the unit of study website helped me to get more out of my lectures.
11. The way the online tutors moderated our discussions motivated me to get more involved in the discussions
12. The posting of the online tutor to our discussions helped me to make the most of the topics discussed
13. The discussions on the unit of study website helped me better understand key issues we were studying.
14. The online quizzes helped me to check my understanding of some of the main ideas of our learning tasks
15. I would like more elearning integrated in Psychology units in the future
16. The unit of study website helped me get more out of my psychology studies this semester.

Overall Satisfaction
17. Overall, I would rate the integration of the unit of study website in Psychology as (please *circle* one):

1	2	3	4	5
Very Poor	Poor	Satisfactory	Good	Very Good

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