

Academic Staff Perceptions of the Value of the Elements of an Online Learning Environment

Stuart Palmer, and Dale Holt

Abstract—Based on 276 responses from academic staff in an evaluation of an online learning environment (OLE), this paper identifies those elements of the OLE that were most used and valued by staff, those elements of the OLE that staff most wanted to see improved, and those factors that most contributed to staff perceptions that the use of the OLE enhanced their teaching. The most used and valued elements were core functions, including accessing unit information, accessing lecture/tutorial/lab notes, and reading online discussions. The elements identified as most needing attention related to online assessment: submitting assignments, managing assessment items, and receiving feedback on assignments. Staff felt that using the OLE enhanced their teaching when they were satisfied that their students were able to access and use their learning materials, and when they were satisfied with the professional development they received and were confident with their ability to teach with the OLE.

Keywords—Academic staff, Distance education, Evaluation, Online learning environment.

I. INTRODUCTION

IN Australia, Deakin University is a major provider of distance and online education. In addition, it teaches on-campus at four campuses located in three cities in the State of Victoria. Initially, Deakin saw itself as a major distance education provider, with some degree of separation between its teaching methods and materials used for on-campus teaching as opposed to off-campus teaching. The use of distance education methodologies and materials for both student cohorts gathered momentum in the early to mid-1990s under the strategic umbrella of flexible teaching and learning, and with a growing 'technological imperative' [1] for the use of online systems for learning delivery and communication. In more recent times the university has implemented institution-wide online teaching and learning systems to provide opportunities to bring together all students in the one learning community. Online learning environments (OLEs) have been a feature of the educational landscape at Deakin University since the early 1990s. Starting first with a range of different systems used in different academic departments of the university, and primarily used for particular courses, units of study or functions, the university gradually moved toward centralization through the implementation of a corporately

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supported learning management system (LMS).

Iterating through a number of commercial LMSs, the university eventually settled on the WebCT LMS in 2003, branding it internally as Deakin Studies Online (DSO). The new LMS was trialled in 2003, and fully implemented in 2004. Concurrently, the university introduced policies requiring academic departments to migrate all OLE activity to the centrally supported LMS. University policy identified three classifications of online units: Basic Online (administrative support for unit); Extended Online (at least one component of teaching in the unit occurs online); and Wholly Online (all of the teaching of a unit occurs online) [2], with these categories being analogous to those employed more widely in the sector [3]. While there was significant use of online teaching and learning systems at Deakin prior to the introduction of DSO, and in some academic areas the breadth of usage was wide and the level of use comparatively sophisticated, across the entire university usage was varied and far from universal. Another key initiative in the university's strategy to expand its online and distance education profile was to require that, from 2004, all its units of study have at least a 'Basic' online presence, where 'Basic' was defined in detail as:

"Essential elements

- information about the unit (typically as a unit guide)
- a discussion forum for student queries
- a notification facility for unit announcements
- a statement of expectations indicating how students are expected to communicate with staff, which will include how frequently staff in the unit will access the student queries discussion forum and how frequently students are expected to access the forum.

Additional elements

- Optional support elements may include electronic resources for the unit if available." [2]

Additionally, from 2004, all students enrolled in Deakin undergraduate courses had to undertake at least one unit wholly online, with few exemptions given. The rationale provided by senior management and policy makers in the university for the mandatory wholly online unit initiative related to the further development of lifelong learning through the: acquisition and practice of a range of technical skills needed to work effectively in online environments; development of an understanding of issues and learning to act

in an ethical and responsible manner in virtual environments; development of skills in online communication; development of a capacity for online teamwork, collaboration, and negotiation; assessment and evaluation of the quality of online information; and development of organizational and personal management skills necessary to sustain motivation and study effectively and successfully without regular face-to-face contact with teachers and other students.

While the importance of systematic organizational policies as a contributing factor supporting the adoption of online technologies in teaching and learning has been noted [4]–[5], it has also been found that academic staff attitudes to educational technology are a critical factor in the diffusion and use of such technologies [6]–[7], and that the views and acceptance of educational technology vary widely across academic staff [8]–[9]. Academic staff play a fundamental role in the use of online learning by students – in a specific learning context, students can only ‘use’ those aspects of the OLE that staff make available to them. Yet, compared to the number of studies reporting investigations of student perspectives on online learning, studies investigating the perspectives of academic staff are much more limited in number, and those that exist are often limited in sample size [10], and quantitative investigations of staff perspectives are the least common of all [11]. More generally, OLEs are perhaps currently the most widely used and most expensive educational technology tool [5], [9], and, like many other learning technology trends before them, have been adopted by institutions almost automatically, uncritically, and without evaluation of their effectiveness [7].

Given the scope of Deakin University’s commitment (in terms of central infrastructure, policy development, and roll-out of online elements to all taught units) to online education, it was considered essential to evaluate the effectiveness of this investment. This current investigation focuses on the 276 responses obtained from teaching staff at Deakin University during two recent academic teaching sessions/years, seeking to identify what elements of the OLE were valued and used most by staff, and what factors contributed to the perceptions of staff that use of the OLE enhanced their teaching experience and, ultimately, their students’ learning experience. The investigation seeks to provide a quantitative analysis of the perceptions of an OLE from a comparatively large sample of academic staff, thereby making a significant contribution to the literature in this area. Better understanding these factors will allow more informed policy and decision making regarding future developments in this area that is so important to staff teaching and student learning at Deakin University.

II. METHOD

During two successive academic teaching sessions, all teaching staff at Deakin University were invited to complete the DSO evaluation survey. The DSO evaluation survey sought responses from staff relating to:

- demographic and background information;
- perception of importance and satisfaction with a range of

OLE elements;

- a number of overall OLE satisfaction measures; and
- open-ended written comments about the OLE.

There were three differences in the DSO evaluation survey between the two academic teaching sessions. Firstly, the phrasing of one scale item was varied for the second session to reflect the fact that it was no longer the initial phase of the university-wide roll out. Secondly, an additional scale item was added for the second session asking respondents to indicate their main source of support for using DSO. Finally, an additional scale item was added for the second session asking respondents to indicate the importance of, and their satisfaction with, the level of support they had received for using DSO. Because of the differences in these scale items, this section of the survey is not reported in detail in this paper; however these items were included in the respective multiple regression analyses for each session reported later in the paper, but were not found to be significant factors. The complete DSO evaluation survey is included in the Appendix. As required by Deakin University human research ethics procedures, the surveys were anonymous and voluntary. The collected data were analysed and the following information was compiled:

- response rate and demographic comparison information;
- importance-satisfaction analysis (items 15-29);
- overall satisfaction measures (items 30-34); and
- multivariate linear regression to find the significant independent survey items contributing to the dependent survey item “DSO enhances my teaching”.

In the following sections, the results for both academic sessions are reported individually – both because the samples are not independent (some staff may have responded in both sessions), and so that any similarities and/or difference between the results from each session can be observed.

III. RESULTS AND DISCUSSION

A. Response Rate and Demographic Information

Table I provides a summary of the response rate and demographic information for the overall staff population and survey respondents in the two successive academic teaching sessions. The effective response rate was 20.2% in session 1, and 14.9% in session 2. A range of demographic information was available for the overall Deakin University teaching staff population [12], as well as collected as part of the survey, including gender, age range, and home faculty. This permitted a comparison between the respondent sample and the overall staff population on these demographic dimensions, as presented in Table I – note that actual staff numbers are given in parenthesis. Although the response rates obtained were comparatively low, they were not unexpected for an online voluntary survey [13], and the generally good match between the sample and population demographic characteristics in both sessions suggests some confidence in drawing more general inferences about the wider Deakin University academic staff population from the respondent data.

TABLE I
RESPONSE RATE AND DEMOGRAPHIC INFORMATION

No. of Respondents	Session 1		Session 2	
	Sample	Population	Sample	Population
	156	772	120	805
Gender				
Female	44.9% (70)	46.0% (355)	55.0% (66)	46.7% (376)
Male	55.1% (86)	54.0% (417)	45.0% (54)	53.3% (429)
Age range				
20-39 years	41.7% (65)	23.7% (183)	39.2% (47)	22.7% (183)
40-59 years	53.8% (84)	63.7% (492)	57.5% (69)	63.2% (509)
60+ years	4.5% (7)	12.6% (97)	3.3% (4)	14.1% (113)
Home faculty				
Arts	16.7% (26)	32.0% (247)	19.2% (23)	30.5% (246)
Business and Law	35.2% (55)	15.6% (120)	36.7% (44)	16.0% (129)
Education	7.7% (12)	10.2% (79)	10.0% (12)	10.1% (81)
Health and Behav. Sci.†	16.7% (26)	15.3% (118)	20.8% (25)	17.3% (139)
Science and Technology	23.7% (37)	26.9% (208)	13.3% (16)	26.1% (210)

†Faculty of Health and Behavioural Sciences

B. Importance-Satisfaction Analysis

The DSO evaluation survey asked respondents to rate the importance of, and their satisfaction with, a range of elements of the OLE at Deakin University. A rating of 1 represented low importance, while a rating of 7 represented high importance. A rating of 1 represented low satisfaction, while a rating of 7 represented high satisfaction. For both importance and satisfaction a ‘not applicable’ option was also provided to permit staff not using a particular element to avoid having to provide a contrived rating. Table II provides a summary of the mean responses for the importance and satisfaction ratings from the two successive academic teaching sessions.

TABLE II
Mean importance and satisfaction ratings from session 1 and session 2

OLE element / function	Session 1		Session 2	
	Imp.	Sat.	Imp.	Sat.
15. Accessing Unit Guides/unit information	6.00	4.71	5.75	5.29
16. Accessing lecture notes/tutorial notes/lab notes	6.03	4.59	5.94	5.25
17. Contacting teachers via internal unit messaging	3.89	3.04	4.33	3.81
18. Contacting students via internal unit messaging	5.18	3.47	5.59	4.19
19. Using calendar	2.57	3.30	2.70	3.45
20. Interacting with learning resources	5.16	3.82	5.59	4.60
21. Contributing to discussions	5.40	3.91	5.90	4.53
22. Reading contributions to discussions	5.52	4.09	5.92	4.65
23. Using chat and/or whiteboard	3.42	2.87	3.76	3.27
24. Working collaboratively in a group	4.78	3.19	5.28	3.76
25. Completing quizzes/self tests	4.24	3.87	4.59	4.11
26. Submitting assignments	5.50	3.04	5.65	3.32
27. Receiving feedback on assignments	5.01	3.08	5.54	3.43
28. Managing assessment items	5.46	3.48	5.77	3.75
29. Reviewing unit progress	5.06	3.57	5.32	4.13

A method for visualizing and interpreting importance-satisfaction data is the importance-satisfaction grid [14] – where the importance rating is plotted on the vertical axis and

the satisfaction rating is plotted on the horizontal axis. Fig. 1 shows the session 1 data plotted as an importance-satisfaction grid – the number labels correspond to the question numbers given in Table II. The grid is divided into quadrants using the grand mean values for all importance ratings as a vertical divider and the grand mean of all satisfaction ratings as a horizontal divider. The interpretation of the quadrants is normally as follows:

- Quadrant D: low importance and low satisfaction – low priority items;
- Quadrant C: low importance and high satisfaction – possibly doing more than necessary on these items;
- Quadrant B: high importance and high satisfaction – keep up the good work! and
- Quadrant A: high importance and low satisfaction – concentrate improvement efforts on these items.

However, given that academic staff may not be free to choose all aspects of the configuration of the OLE they create for their students (institutional policies regarding online learning may set/constrain some of the parameters of what is possible/permissible), in the context of higher education, the results of the importance-satisfaction grid need to be interpreted with some caution. Fig. 2 shows the session 2 data plotted as an importance-satisfaction grid.

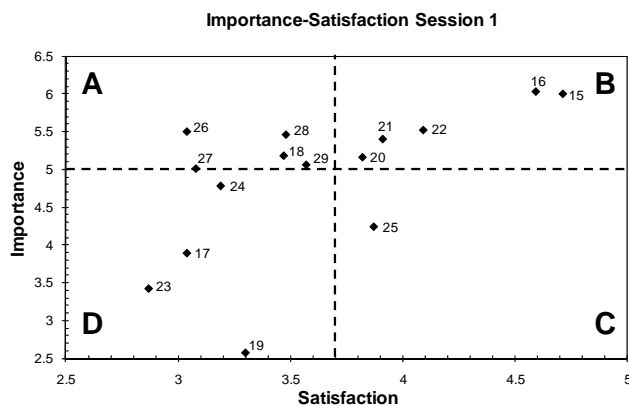


Fig. 1 Importance-satisfaction grid for session 1 data

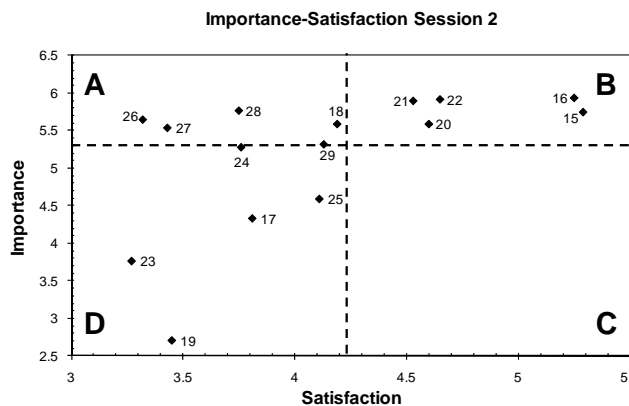


Fig. 2 Importance-satisfaction grid for session 2 data

Fig. 1 and Fig. 2 showed a striking similarity in the general location of OLE elements within the importance-satisfaction grid for both sessions under consideration. Staff didn't seem to value the chat/whiteboard element of the OLE. This finding was not surprising, given that this element did not initially work reliably, forcing those needing synchronous online communication functionality for their teaching to seek alternative arrangements. In recognition of the limitations of the in-built OLE synchronous communications facilities, the university provided a separate corporately supported synchronous communication tool with audio, video, chat, whiteboard, and other functionality, and which integrated into the OLE. Staff didn't seem to value using the calendar element of the OLE. This finding was not surprising, given that the university already provided a separate corporately supported calendar system, and the OLE calendar did not integrate with other university applications, or with mobile computing devices that staff might have used for managing appointments. Staff didn't seem to value the use of the OLE internal messaging system as a means for students to contact staff. This finding was not surprising given that the OLE messaging system was effectively a separate email system that could only be accessed when logged on to the OLE, and which did not integrate with any external email system. Given that it was a common experience that many students did not use their standard email account provided by the university (preferring to use their existing personal email account), yet another email tool generally lay idle. It was concluded that staff will not highly value OLE elements that do not work reliably, that do not operate conveniently or that attempt to replicate existing functions that are already in widespread use.

OLE elements that staff were generally happy with and rated highly included accessing unit information, accessing lecture/tutorial/lab notes, and reading online discussions. These elements could all be considered 'basic' or 'hygiene' OLE elements, and an institution should aspire/hope to achieve a satisfactory (at least) rating from staff for these. Staff gave the highest importance rating in combination with the lowest satisfaction rating to a trio of OLE elements relating to online assessment: submitting assignments, managing assessment items, and receiving feedback on assignments. Given the critical importance of timely formative/progressive feedback for delivering information about progress and clarifying expected and actual performance, so as to influence students to take a proactive role in their learning and for their development as self-regulated learners [15]–[16], these importance-satisfaction results should be of concern. They act as a flag for action that could have a positive impact on the contribution of the OLE to student satisfaction and learning, and to staff satisfaction.

Along with the relative importance of OLE elements, it is instructive to understand the level of usage of each element. The question of element usage was not asked directly on the DSO evaluation survey, but could be inferred by considering any importance-satisfaction rating (other than 'not applicable') given to an element as an indication of usage. On this basis, Fig. 3 shows the reported proportions of usage by staff of

elements of the OLE – the element numbering employed is the same as given in Table II.

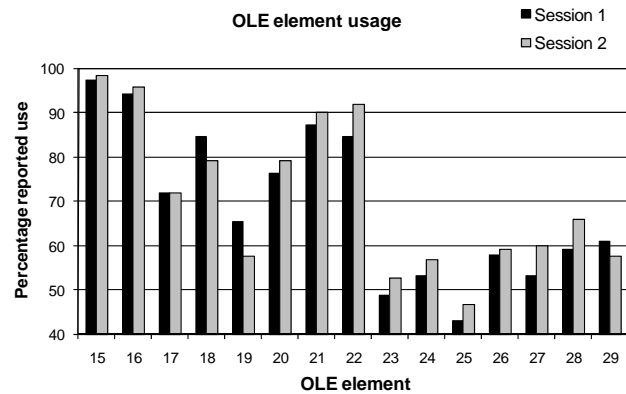


Fig. 3 OLE element usage in the two successive academic sessions

As with the importance-satisfaction analysis, there was a high degree of consistency in level of usage between the two sessions considered. Staff 'usage' of a particular OLE element, that is, them employing it their online teaching, would normally be a fundamental precursor to students having access to, and being able to 'use', that element in their learning interactions with that particular staff member. The most highly used elements were those found in Quadrant B of the importance-satisfaction grid, that is, those elements that staff valued and were most happy with. The two items that stand out as the most used and having the highest importance-satisfaction combination are accessing unit information and accessing lecture/tutorial/lab notes. These results support a long history of research that indicates, at least initially, academic staff view, and most value, OLE systems primarily as a mechanism for efficient and accessible delivery of teaching and learning materials to students [7]–[8], [10]–[11], [17]–[18].

C. Overall Satisfaction Measures

The DSO evaluation survey asked respondents to rate their level of agreement with five statements about their satisfaction with aspects of their use of the OLE at Deakin University. A rating of 1 represented strong disagreement, while a rating of 5 represented strong agreement. Table III provides a summary of the mean responses for the satisfaction measures from the two successive academic teaching sessions, and, based on independent sample t-test assuming unequal variances, the statistical significance of the differences in the mean responses for both sessions. While the raw mean response scores for all items are higher in session 2 compared to session 1, whether these differences are deemed significant will depend on the significance criterion used. At the 0.01 level, staff were significantly more satisfied that DSO enhanced their teaching and they felt more confident teaching using DSO. If the significance criterion used is 0.02, staff were also significantly more satisfied that DSO enhanced the learning of their students and they felt more prepared for developing their units in DSO. There was no significant difference observed in the

relatively high mean reported satisfaction with the timely availability of DSO unit materials. Given that session 1 was earlier in the university-wide, compulsory roll-out of the OLE to all units of study, it is not unreasonable to expect that, by session 2, following an extra year of experience with the OLE, that academic staff, the university support systems (academic and technical) and students would all be better placed to use and support the OLE, and hence, be more satisfied with it.

TABLE III

Mean responses for the satisfaction measures from the two academic teaching sessions

	Session 1	Session 2	Significance
30. DSO enhances my teaching	2.80	3.25	$p < 0.003$
31. DSO enhances learning by my students	2.79	3.16	$p < 0.013$
32. I feel confident to teaching using DSO	3.06	3.58	$p < 0.001$
33. I feel adequately prepared for developing my unit/s in DSO	2.85	3.23	$p < 0.019$
34. The materials for my unit/s were complete & available on time	3.67	3.72	$p < 0.733$

D. Multivariate Linear Regression

The ultimate purpose of OLEs is, presumably, to support and improve student learning, and academic staff are unlikely to be enthusiastic adopters and users of OLEs unless they feel that such use contributes to student learning outcomes. For both of the successive academic teaching sessions, a multivariate linear regression of all the DSO evaluation survey items was performed against item 31 – “DSO enhances learning by my students”. For both session 1 and session 2, the only significant predictor for item 31 was item 30 – “DSO enhances my teaching”. This finding was supported by a strong correlation between item 31 and item 30 (for session 1 $\rho_{30,31} = 0.902$ and for session 2 $\rho_{30,31} = 0.804$), these were the largest pair-wise correlations observed between survey items in both sessions respectively. This suggests strongly that staff believed that if using DSO improved their teaching, it would also be improving their students’ learning. Regression analysis of item 31 could not move beyond identifying item 30 as a closely coupled proxy variable. So, for both academic teaching sessions, item 31 was removed from the data pool and a multivariate linear regression of all the DSO evaluation survey items was performed against item 30 – “DSO enhances my teaching”. All other remaining items were initially introduced as independent variables, and step-wise regression was performed until all remaining variables were significant. Table IV presents the linear regression model variables, and their corresponding coefficients and significance, in order of their contribution, for the dependent variable, based on session 1 data. The label ‘(Sat)’ indicates that the variable refers to the satisfaction rating for a particular OLE element. Table V presents the same information based on session 2 data.

TABLE VI

Multivariate linear regression model for dependent survey item 30 – session 1 data

Evaluation survey item	Coefficient	Std err	Beta	Significance
20(Sat). Interacting with learning resources	0.204	0.058	0.303	$p < 0.0007$
16(Sat). Accessing lecture notes/tutorial notes/lab notes	0.197	0.061	0.294	$p < 0.0016$
9(Sat). Satisfaction with DSO professional development	0.171	0.061	0.244	$p < 0.0060$
Constant	0.544	0.301	–	$p = 0.0742$

TABLE V

Multivariate linear regression model for dependent survey item 30 – session 2 data

Evaluation survey item	Coefficient	Std err	Beta	Significance
32. I feel confident to teaching using DSO	0.345	0.086	0.343	$p < 0.0002$
16(Sat). Accessing lecture notes/tutorial notes/lab notes	0.239	0.066	0.319	$p < 0.0005$
18(Sat). Contacting students via internal unit messaging	0.186	0.049	0.302	$p < 0.0003$
Constant	-0.117	0.323	–	$p = 0.7184$

An Analysis of Variance (ANOVA) test suggested that the session 1 regression model was significant ($F_{99} = 21.67$, $p < 9 \times 10^{-11}$), though the model predicted only 40.4 % of the variation in the agreement by staff that DSO enhances their teaching ($R^2 = 0.404$). The regression residuals were approximately normally distributed and the model did not suffer from multicollinearity. The standard error of the predicted variable estimate from the model (0.97) was less than the standard deviation of all staff responses to question item 30 (1.26). An ANOVA test suggested that the session 2 regression model was significant ($F_{86} = 38.65$, $p < 1 \times 10^{-15}$), though the model predicted only 58.3 % of the variation in the agreement by staff that DSO enhances their teaching ($R^2 = 0.583$). The regression residuals were approximately normally distributed and the model did not suffer from multicollinearity. The standard error of the predicted variable estimate from the model (0.85) was less than the standard deviation of all staff responses to question item 30 (1.23). The models explained just under (session 1) and just over (session 2) half of the variation observed in staff agreement that DSO enhances their teaching, hence there exist other factors with a significant influence on staff agreement that were not included in the DSO evaluation survey. Strictly, all of these variables were ordinal rather than interval, so care must be taken in interpreting the multi-regression models literally. However, they do indicate those factors that contributed the most to the response of staff for survey item 30. While there were differences observed in the significant variables identified in the regression models for session 1 and session 2, closer inspection reveals an underlying factor consistency. Staff felt that DSO enhanced their teaching when:

- they were satisfied that their students were able to access and use their learning materials (survey items 16 and 20);

and

- they were satisfied with the DSO professional development they have received / they were confident with their ability to teach with DSO (survey items 9 and 32).

The first item resonates with the findings here and elsewhere that academic staff highly value and use OLEs, at least initially, primarily as a means for efficient online distribution of learning materials to students [7]–[8], [10]–[11], [17]–[18]. The second item provides guidance to those responsible for institutional OLEs that staff development, so that academic staff feel confident in their use of the OLE, is likely to be a critical success factor. The link between academic staff development, course design, student learning experience, and student learning outcomes has been noted elsewhere [19]–[20].

E. General Discussion

In an organizational effort to kick-start the widespread adoption of the OLE at Deakin University, institution-wide policies were introduced that mandated at least a basic online presence for all undergraduate study units offered by the university, and that all students enrol in at least one wholly online unit during their undergraduate studies. While there is support in the literature for the use of systematic incentives and/or external requirements for the embedding of organizational use of OLEs [4]–[5], it is not an automatic or guaranteed outcome that all, or even most, academic staff will adopt educational technology enthusiastically into their teaching [8]. In Fig. 3 it was observed that while the OLE elements with the highest reported percentage of usage are those associated with the university's definition of a 'basic online presence' for a study unit given in section I, these same reported percentages of use are all less than 100 percent. In fact, there is a possibility that being overly prescriptive about the OLE environment may actually constrain academic staff and ultimately lead to conservative use of the system [8], effectively enforcing a lowest common denominator configuration.

As noted previously, many academic staff most value and use the OLE as an efficient means of online delivery of learning materials to students. While it might be tempting to dismiss this as a 'trivial' use of the OLE, it would appear to be an important, perhaps essential, point of initial engagement for many staff with the OLE [8]. It is often the case that academic staff taking on the task of online teaching of a course are doing so as either an additional mode of delivery of their existing teaching, or as an addition to their current teaching workload. The literature suggests that even where an online teaching task is a 'straight replacement' for an existing conventional class-based teaching role, there will be additional preparation and delivery work required [21]–[22]. For these staff, if there are not some 'efficiency gains' to be made in their initial use of an OLE, then the increased teaching workload burden may mean that they are never able to develop their online teaching beyond a basic transmissive model. It should not be forgotten that there is evidence that

students also value highly and demand the online material delivery function of OLEs [8]. In an analogy to Herzberg's Two Factor Theory [23], while online transmission of learning materials may not be a great 'value adder' for online teaching and learning, failure of an OLE to provide this basic/hygiene functionality is likely to lead to significant staff (and student) dissatisfaction. While many academic staff report mainly pragmatic factors that influence their initial engagement with online teaching and learning [17]–[18], and that enhanced OLE functionality is the least important factor in adoption of online teaching and learning [4], there is also evidence that their perceptions and use of online technology in teaching and learning develops in pedagogical sophistication over time [11], [17]–[18]. For many academic staff, the starting point of a primarily transmissive conception of online teaching and learning may be a practical and/or developmental necessity; with the development of richer pedagogical conceptions of online teaching and learning emerging as they adapt their teaching styles to embrace the technological possibilities [24].

At Deakin University, since the time that the DSO evaluation survey reported here was conducted, DSO has expanded beyond being an internal tag for the WebCT LMS. DSO is now the Deakin University 'brand' for a portfolio of e-learning technologies that includes: the original WebCT (now BlackBoard Vista) LMS; a synchronous communication tool that supports audio, video, chat, and whiteboard functions; a system for audiovisual recording of lectures for later online distribution via streaming and downloading; a third-party online service for the detection of plagiarism and collusion; and a set of social software tools. All of these new e-learning technologies have been brought on-stream in response to requests from academic teaching staff to expand and develop their repertoire as they adopt more sophisticated pedagogical approaches to online learning. The status of the LMS has evolved from being the entirety of the OLE to effectively having an underpinning infrastructure/gateway role, with its presence and features now being presumed and taken for granted, and providing a linking platform for the support of other value-adding e-learning technologies. The university's new teaching and learning plan countenances the addition of extra e-learning technologies under the DSO banner.

While the results presented here are consistent with the proposition from the literature that many academic staff initially engage with OLEs as a convenient online delivery service to students for learning materials, there are a number of reasons why there is now a pressing need for the university to update this information, as well as for establishing on-going, systematic monitoring of the OLE:

- The OLE has expanded significantly to include a range of software applications in addition to the underpinning LMS – In what ways are academic staff engaging with this dramatically expanded palette of educational technologies at their disposal? And, what combination of e-learning technologies, chosen from the available portfolio, creates the greatest potential educational value in a given teaching and learning context?
- While the initial use of the OLE by many academic staff

may have been basic, the literature suggests that exposure to, and experience with, the system, over time, leads to more pedagogically sophisticated uses of the OLE – In the intervening period since the surveys reported here, has the use of the OLE by academic staff changed and developed? And, if so, in what ways?

- The university has reached the important juncture where it needs to migrate its LMS activities and content to a new system – the current product will no longer be supported by the vendor – Should the university invest in a new licence for a new corporate/commercial LMS system, or should it invest in the internal technical and human resources required to operate a ‘free’ open source LMS?
- As the university re-considers both its technological approach for the delivery of its OLE, and its policy regarding mandated wholly online units, it needs up-to-date intelligence regarding the use of its OLE by academic staff on which to base these critical decisions.

IV. CONCLUSION

Based on 276 responses obtained from academic staff in two recent academic teaching sessions as part of the DSO evaluation survey, the analysis presented here identifies those elements of the OLE used at Deakin University that were most used and valued by staff, those elements of the OLE that staff most wanted to see improved, and those factors that most contributed to staff perceptions that the use of the OLE enhanced their teaching and, ultimately, the learning of their students. There was a high degree of consistency between the results obtained for both academic teaching sessions. The most used and valued elements were core LMS functions, including accessing unit information, accessing lecture/tutorial/lab notes, and reading online discussions. These elements could all be considered ‘basic’ or ‘hygiene’ OLE elements, and an institution should aspire/hope to get a satisfactory rating from staff for these. The OLE elements identified as most needing attention related to online assessment: submitting assignments, managing assessment items, and receiving feedback on assignments. These functions, while not being particularly associated with learning online, are crucial for assisting students to become self-regulated learners. Based on a multiple linear regression of the DSO evaluation survey items, staff felt that using DSO enhanced their teaching when they were satisfied that their students were able to access and use their learning materials, and when they were satisfied with the DSO professional development they have received and were confident with their ability to teach with DSO. The results presented here document an important historical context of the introduction of a corporately supported OLE to Deakin University, and were consistent with the proposition found in the literature that many academic staff initially engage with OLEs as a convenient online delivery service to students for learning materials. The literature also suggests that staff perceptions and attitudes are key factors in the diffusion and use of online technologies in teaching and learning. As the university moves forward with the development of its OLE,

there is an urgent need to update its knowledge of the attitudes and perceptions of its academic staff, so that it might make informed decisions about the future of the university OLE.

APPENDIX

DSO evaluation survey

The question/item numbering is that used in the session 2 survey.

- 1: Gender [Male, Female]
- 2: Age [20-39, 40-59, 60+]
- 3: How many years have you been teaching? [fewer than 2, 2-5, 6-10, more than 10]
- 4: What is your faculty? [Arts, Business & Law, Education, Health & Behavioural Sciences, Science & Technology]
- 5: At what level do you teach? (Select all that apply) [Undergraduate (on-campus), Undergraduate (off-campus), Postgraduate (on-campus), Postgraduate (off-campus)]
- 6: On which campus do you do most of your teaching? [List of campuses]
- 7(session 1): Is this semester the first time you have taught using DSO? [Yes, No]
- 7(session 2): How many semesters have you taught using DSO? [This is my first semester, 2 semesters, 3 semesters, 4 or more semesters]
- 8: What professional development in DSO have you completed that was provided by Learning Services or your faculty? (Select all that apply) [None, Demonstration, Introductory workshop, Specialised workshop, One-on-one session, small group session]
- 9: How important is professional development for using DSO to you, and what is your level of satisfaction with what has been provided? [Importance: N/A, 1 - 7] [Satisfaction: N/A, 1 - 7]
- 10(not in session 1): What support in DSO have you received? (Select all that apply) [DSO Help site (<http://...dso/dsohelp>), Internal DSO Help link, Online resources in DSO, Personal (face-to-face), Personal (telephone)]
- 11(not in session 1): How important is support for using DSO to you, and what is your level of satisfaction with what has been provided? [Importance: N/A, 1 - 7] [Satisfaction: N/A, 1 - 7]
- 12: How were your unit/s in DSO developed? (Select all that apply) [Teaching staff (including yourself), Learning Services staff, Faculty teaching & learning support staff, Other]
- 13: Which of the following best represents the frequency with which you use DSO? [Daily, Twice weekly, Once weekly, Twice monthly, Once monthly, Less often than any of these]
- 14: How satisfied are you with the amount of time you have been able to spend using DSO? [Very dissatisfied, Not satisfied, Neutral, Satisfied, Very satisfied]
- (a) How important is each of the following DSO activities to the success of your teaching and students’ learning and (b) How satisfied are you with DSO in relation to each of these? (1=Low, 7=High)
- 15: Accessing Unit Guides/unit information [Importance: N/A, 1 - 7] [Satisfaction: N/A, 1 - 7]

- 16: Accessing lecture notes/tutorial notes/lab notes [Importance: N/A, 1 - 7] [Satisfaction: N/A, 1 - 7]
- 17: Contacting teaching staff via internal unit messaging [Importance: N/A, 1 - 7] [Satisfaction: N/A, 1 - 7]
- 18: Contacting students via internal unit messaging [Importance: N/A, 1 - 7] [Satisfaction: N/A, 1 - 7]
- 19: Using calendar [Importance: N/A, 1 - 7] [Satisfaction: N/A, 1 - 7]
- 20: Interacting with learning resources [Importance: N/A, 1 - 7] [Satisfaction: N/A, 1 - 7]
- 21: Contributing to discussions [Importance: N/A, 1 - 7] [Satisfaction: N/A, 1 - 7]
- 22: Reading contributions to discussions [Importance: N/A, 1 - 7] [Satisfaction: N/A, 1 - 7]
- 23: Using chat and/or whiteboard [Importance: N/A, 1 - 7] [Satisfaction: N/A, 1 - 7]
- 24: Working collaboratively in a group [Importance: N/A, 1 - 7] [Satisfaction: N/A, 1 - 7]
- 25: Completing quizzes/self tests [Importance: N/A, 1 - 7] [Satisfaction: N/A, 1 - 7]
- 26: Submitting assignments [Importance: N/A, 1 - 7] [Satisfaction: N/A, 1 - 7]
- 27: Receiving feedback on assignments [Importance: N/A, 1 - 7] [Satisfaction: N/A, 1 - 7]
- 28: Managing assessment items [Importance: N/A, 1 - 7] [Satisfaction: N/A, 1 - 7]
- 29: Reviewing unit progress [Importance: N/A, 1 - 7] [Satisfaction: N/A, 1 - 7]
- Please respond to the following statements by selecting a box from 1 (strongly disagree) to 5 (strongly agree)
- 30: DSO enhances my teaching. [Agree: 1 - 5]
- 31: DSO enhances learning by my students. [Agree: 1 - 5]
- 32: I feel confident to teaching using DSO. [Agree: 1 - 5]
- 33: I feel adequately prepared for developing my unit/s in DSO. [Agree: 1 - 5]
- 34: The materials for my unit/s were complete and available on time. [Agree: 1 - 5]
- Any other comments? [Free text entry]

REFERENCES

- [1] D. M. Holt and D. J. Thompson, "Responding to the technological imperative: The experience of one open and distance education institution," *Distance Education: An International Journal*, vol. 16, pp. 43-64, 1995.
- [2] Deakin University. (2009, November 2). Online Technologies in Courses and Units - Procedure [Online]. Available: <http://theguide.deakin.edu.au/TheDeakinGuide.nsf/7264c32fe71924374a2566f3000a65de/4d252055c8941cfbca256e64000f8bb3>
- [3] T. Browne, M. Jenkins, and R. Walker, "A longitudinal perspective regarding the use of VLEs by higher education institutions in the United Kingdom," *Interactive Learning Environments*, vol. 14, pp. 177-192, 2006.
- [4] Y. Baek, J. Jung, and B. Kim, "What makes teachers use technology in the classroom? Exploring the factors affecting facilitation of technology with a Korean sample," *Computers & Education*, vol. 50, pp. 224-234, 2008.
- [5] R. West, G. Waddoups, and C. Graham, "Understanding the experiences of instructors as they adopt a course management system," *Educational Technology Research and Development*, vol. 55, pp. 1-26, 2007.
- [6] A. Albirini, "Teachers' attitudes toward information and communication technologies: the case of Syrian EFL teachers," *Computers & Education*, vol. 47, pp. 373-398, 2006.
- [7] H. Mahdizadeh, H. Biemans, and M. Mulder, "Determining factors of the use of e-learning environments by university teachers," *Computers & Education*, vol. 51, pp. 142-154, 2008.
- [8] W. H. Dutton, P. H. Cheong, and A. Park, "An Ecology of Constraints on e-Learning in Higher Education: The Case of a Virtual Learning Environment," *Prometheus*, vol. 22, pp. 131-149, 2004.
- [9] M. F. Salinas, "From Dewey to Gates: A model to integrate psychoeducational principles in the selection and use of instructional technology," *Computers & Education*, vol. 50, pp. 652-660, 2008.
- [10] G. H. Jones and B. H. Jones, "A Comparison of Teacher and Student Attitudes Concerning Use and Effectiveness of Web-based Course Management Software," *Educational Technology & Society*, vol. 8, pp. 125-135, 2005.
- [11] R. Woods, J. D. Baker, and D. Hopper, "Hybrid structures: Faculty use and perception of web-based courseware as a supplement to face-to-face instruction," *The Internet and Higher Education*, vol. 7, pp. 281-297, 2004.
- [12] Department of Education Employment and Workplace Relations. (2009, November 2). Higher Education Statistics Collection [Online]. Available: <http://www.deewr.gov.au/HigherEducation/Publications/HEStatistics/Pages/HEStatisticsCollection.aspx>
- [13] C. Cook, F. Heath, and R. L. Thompson, "A Meta-Analysis of Response Rates in Web- or Internet-Based Surveys," *Educational and Psychological Measurement*, vol. 60, pp. 821-836, 2000.
- [14] H. Aigbedo and R. Parameswaran, "Importance-performance analysis for improving quality of campus food service," *International Journal of Quality & Reliability Management*, vol. 21, pp. 876-896, 2004.
- [15] D. J. Nicol and D. Macfarlane-Dick, "Formative assessment and self-regulated learning: a model and seven principles of good feedback practice," *Studies in Higher Education*, vol. 31, pp. 199-218, 2006.
- [16] M. Yorke, "Formative Assessment in Higher Education: Moves Towards Theory and the Enhancement of Pedagogic Practice," *Higher Education*, vol. 45, pp. 477-501, 2003.
- [17] G. Morgan, Faculty Use of Course Management Systems - ERS0302. Boulder: EDUCAUSE, 2003.
- [18] R. G. Wingard, "Classroom Teaching Changes in Web-Enhanced Courses: A Multi-Institutional Study," *EDUCAUSE Quarterly*, vol. 27, pp. 26-35, 2004.
- [19] G. Brown, C. B. Myers, and S. Roy, "Formal course design and the student learning experience," *Journal of Asynchronous Learning Networks*, vol. 7, pp. 66-76, 2003.
- [20] M. K. Tallent-Runnels, J. A. Thomas, W. Y. Lan, S. Cooper, T. C. Ahern, S. M. Shaw, and X. Liu, "Teaching Courses Online: A Review of the Research," *Review of Educational Research*, vol. 76, pp. 93-135, 2006.
- [21] G. Rumble, "The costs and costing of networked learning," *Journal of Asynchronous Learning Networks*, vol. 5, pp. 75-96, 2001.
- [22] M. J. Spector, "Time demands in online instruction," *Distance Education*, vol. 26, pp. 5 - 27, 2005.
- [23] F. Herzberg, "The Motivation-Hygiene Concept and Problems of Manpower," *Personnel Administration*, vol. 27, pp. 3-7, 1964.
- [24] K. Georgouli, I. Skalkidis, and P. Guerreiro, "A Framework for Adopting LMS to Introduce e-Learning in a Traditional Course," *Educational Technology & Society*, vol. 11, pp. 227-240, 2008.