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Web-based lecture technologies: blurring the boundaries between face-to-face and distance learning

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Web-based lecture technologies (WBLT) have gained popularity amongst universities in Australia as a tool for delivering lecture recordings to students in close to real time. This paper reports on a selection of results from a larger research project investigating the impact of WBLT on teaching and learning. Results show that while staff see the advantages for external students, they question the extent to which these advantages apply to internal students. In contrast both cohorts of students were positive about the benefits of the technologies for their learning and they adopted similar strategies for their use. With the help of other technologies, some external students and staff even found WBLT useful for fostering communication between internal and external students. As such, while the traditional boundary between internal and external students seems to remain for some staff, students seem to find the boundary much less clear.

Keywords: web-based lecture technologies; staff perception; student perception; distance education; external students; internal students; Lectopia

Introduction

The gap between students' perception of technology and that of faculty continues to widen. Students and faculty continue to view and experience technology very differently … At the same time, students' expectations are important, and successful learning-focused organizations have long known they ignore these expectations at their peril. (New Media Consortium 2008, 7)

The student profile in higher education is changing. Many need to accommodate work or family commitments while studying (Australian Vice-Chancellor's Committee 2007; McInnis and Hartley 2002). These needs may not be met by 'traditional on-campus teaching paradigms' (Lefoe and Albury 2004). As a consequence, some universities are utilising technologies to combine some of the flexibility of distance education models with the benefits of interactions between peers and lecturers in on-campus study. Blended learning models supported by a range of technologies have emerged which combine, for example, face-to-face lectures and/or tutorials with supplementary online resources and discussion forums (Lefoe and Hedberg 2006; Phillips 2005; Sharpe et al. 2006). As suggested by Lefoe and Albury (2004), 'the teaching, delivery methods and resources once used only for one area are now used to support learning in both'. This, in effect, is blurring the boundaries between campus-based and distance education.

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Where once we may have assumed that those not present in a lecture were indeed distance students studying from afar, this is not necessarily the case any more. One of the technologies used to blur the boundaries between on-campus and distance study is web-based lecture technologies (WBLT). These technologies are best described as distributed recording systems for digitally capturing face-to-face lectures for web delivery. They are essentially a one-way medium of communication which is well suited to the delivery of lecture content in close to real time. Lectopia (previously known as iLecture and more recently Echo 360), a propriety software solution, is an example of this type of technology (Lectopia 2007). The recordings are typically delivered through a password-protected learning management system, such as BlackBoard or WebCT.

In the past, some universities have offered tape recordings of lectures to distance education students to supplement print-based study materials. These recordings have also enabled on-campus students to catch up on missed lectures or revisit the content for review purposes. Whilst transferring from a tape-based to web-based delivery may seem trivial at first sight, these technologies have become somewhat controversial amongst lecturers because of their potentially negative effects on lecture attendance and consequently the quality of student learning for internal students (Massingham and Herrington 2006).

On the other hand, there seems to be less controversy on the impact of WBLT on students who study in an external mode and do not normally attend class. Indeed, a perceived positive feature is that lecture content can be captured together with day-to-day updates, anecdotes, and discussions which provide external students with a richness not available in pre-prepared materials. Because of the immediacy of delivery to students, there is also the potential to provide entrée into follow-up online discussions or similar activities. As such, anecdotally there appears to be an acceptance that WBLT enhance the experience of external students.

Anderson (2005) suggests that a positive educational experience for students studying at a distance involves three types of interactions: students' interactions with the content, with their teacher and with other students. Prior to the popularisation of the internet, most interactions experienced by either distance education or on-campus students were with content, whether it be learning materials, text books or printed notes (Bates 1991). With little student–student interaction and teacher–student interaction, distance education has traditionally been 'perceived and experienced as a lonely way to learn' (Anderson 2005; Galusha 1997; Simpson 2000), with learners relying to a large extent on their own motivation (Smith and Smith 2006). The more recent use of internet-based communication via email or discussion forums in learning management systems has helped greatly to ease the loneliness of distance learning. By providing close to real-time lectures it is worth entertaining the possibility of WBLT helping to break down this isolation further and helping to motivate students to learn, particularly if lecturers acknowledge and cater for the presence of students other than those visible in the lecture room. In combination with communication technologies such as discussion forums, student to student and student to teacher interactions can be established to emulate on-campus interactions.

If the use of WBLT can enhance the experience of external students, why should they not also be beneficial to internal students who cannot attend lectures? Indeed, existing studies indicate an increasing uptake of these technologies by internal students requiring flexible access to lectures due to a variety of reasons including timetable clashes, work commitments, disability, medical conditions or illness (Williams and Fardon 2007).

With internal students taking advantage of the flexibility offered by WBLT and not attending lectures, the boundaries between the experiences offered to internal and external students are already beginning to blur. While the blurring may be a reality for students – with internal

students adopting lecture attendance patterns of external students and externals having access to the same real-time lecture as internals – this may not be the case for staff. It is likely that staff are still viewing internal and external students as separate cohorts, with different needs and expectations. If this is the case, then the mismatch between the expectations of students and those of staff will have important implications for learning and teaching – the role of lectures, the way they are delivered and the way students and staff communicate and collaborate.

It is timely, therefore, to explore the nature of the experience of WBLT for internal and external students – whether they use the technology in different ways, have different perceptions of the benefits for their learning and whether WBLT can facilitate communication and collaboration between the cohorts.

These are some of the issues that the authors explored in a large research study investigating how web-based lecture technologies can be used to best effect to support learning and teaching. Further details about the project are available on the project website at: http://www.cpd.mq.edu.au/teaching/wblt/overview.htm.

In this paper we will report on the issues relating to the mismatch in staff and student perceptions of WBLT for internal and external students. In particular the paper will focus on three questions:

- Do internal and external students have different perceptions of the benefits of WBLT for their learning?
- Do internal and external students use WBLT differently?
- Do WBLT facilitate communication and collaboration for external students and internal students?

In light of the changing student profile, for this research the term 'internal' refers to students enrolled in internal mode, where the expectation is for them to come regularly to campus for lectures and other activities. 'External' refers to students enrolled in external mode; the expectation is that they will not be able to participate in regular on-campus lectures or activities.

Methodology

Four Australian universities were involved in the study. Three of the participating universities used different versions of Lectopia (Lectopia 2007). The fourth made use of a combination of streaming video/audio and media files to deliver lecture materials across the university. The four universities varied in their use of the media accompanying the recordings, which ranged from audio alone to audio accompanied by slides or video. The delivery method also varied encompassing streaming, downloading to computers or mobile devices and podcasting. Variation was also present in the level of automation of the recording process, the level of centralised support, and the extent of adoption across campus. Despite the variations, we found no significant differences between the results of different universities on the impact of WBLT in learning and teaching. As such, the rest of the paper will not distinguish between the results from different universities.

The study employed a mixed methods approach (Creswell 2003), drawing on quantitative and qualitative data obtained from both students and staff who used WBLT. Three main data collection activities undertaken were a student survey, a staff survey, and in-depth interviews with both students and staff. The student and staff surveys aimed to provide a comprehensive overview of experiences of web-based lecture technologies, with a particular focus on

pedagogy and student learning. The interviews were designed to probe the emerging issues in greater detail.

Student and staff survey

The student survey collected data on four specific areas in relation to the students and their use of WBLT:

(1) Students' experience of WBLT in the context of a specific subject including lecture attendance patterns, reasons for attending lectures and using WBLT, and the strategies employed when listening to WBLT;
(2) Students' approaches to learning using the Revised Two-factor Study Process Questionnaire (Biggs, Kember, and Leung 2001);
(3) Students' overall experience of WBLT in relation to perceived benefits for learning and the achievement of better results; and
(4) General demographic information (age, gender, language) and academic information (enrolment mode, area of study and length of study).

The process of developing the student survey involved collaboration from all four participating universities. Inputs were sought for the construction of the survey from previous research on the use of iLecture and similar technologies (Fardon 2003; McElroy and Blount 2006) and the findings from various evaluation surveys and focus groups conducted at the four participating universities about the experiences of staff and students. A mixture of quantitative and qualitative responses to survey questions was employed in order to identify patterns and trends as well as to provide qualifying explanations. Once an initial draft was produced, feedback was collected from interested academics at each university and the survey was piloted with a cohort of 30 students from one of the participating universities.

Students from units/courses making use of web-based lecture technologies at all four universities were invited to participate. Stratified sampling was used to identify a range of courses /units. The sample included representation from:

- broad discipline areas
- class sizes (fewer than 50 students, 50–200 and more than 200 students)
- enrolment mode (internal and external students)
- level (undergraduate and postgraduate).

Invitations were sent to 13,278 students, but only those students who used the WBLT were eligible to answer the survey. In total 815 responded, representing a subset of users. The percentage response rate could not be determined because we were unable to identify the actual number of students using WBLT. Nonetheless, the sample size was large enough for statistically valid conclusions to be made.

Of the 815 respondents, 702 identified themselves as being enrolled in internal/on-campus mode and 113 in external/distance mode.

The staff survey was designed to correspond where possible with the student survey, so that results could be compared. The survey collected data on four specific areas in relation to lecturers and their use of WBLT:

(1) The teaching and curriculum context, including details of delivery mode and discipline area;

(2) Lecturers' perspective of teaching and their teaching philosophy, using Trigwell and Prosser's (2004) *Approaches to Teaching Inventory*;

(3) The reasons for using WBLT and the strategies adopted; and

(4) Perceptions of the effect of WBLT on lecture attendance and communication patterns between themselves and their students.

A total of 676 academic teaching staff who had made use of WBLT were invited to participate in the survey and 155 (22.9%) responded from across the four universities.

The interviews of staff and students aimed to provide a contextualised view of the issues that arose from the surveys. In particular they were designed to be descriptive in nature in order to: highlight the manifestations of particular issues in different contexts; explore the opportunities and challenges evident in these contexts; and provide examples of good practice. Participants self nominated through the surveys and in total, six lecturers and 10 students were interviewed using a semi-structured instrument derived from the survey questions.

Data analysis

The statistical package SPSS was used to undertake analysis of the quantitative data and the general descriptive data was supplemented by selective correlational analysis to further explore the data set. Factorial analysis, analysis of variance and regression analysis were used to further explore the relationships between the independent and dependent variables. A significance level of $p<.001$ was used for correlations throughout the study. The Software package NVivo was used to analyse the qualitative data, with the data being classified and line coded in relation to emerging themes.

Overview of findings

Overall there was a general mismatch between lecturers' perceptions and students' on the potential benefits of WBLT for student learning. How they differ, and whether lecturers' perceptions of how students use/abuse WBLT is substantiated against students' experiences will be discussed. This will be followed by a closer examination of the differences between external and internal students, their perceptions of the benefits of WBLT, the way in which the technologies are used and the ways in which WBLT can facilitate communication and collaboration

Lecturers' perceptions

Lecturers perceptions of WBLT were canvassed from three questions with responses based on a five-point scale. They were asked whether:

(1) their experience of using WBLT for teaching and learning was positive (almost always to almost never);

(2) using WBLT made it easier for your students to learn (yes – in a significant way to no – it was detrimental); and

(3) using WBLT helped your students to achieve better results (yes – in a significant way to no – it was detrimental).

In general, lecturers seem to be rather negative in their experience with WBLT and their perceptions on WBLT's benefits for student learning. Table 1 shows that less of half of the

Table 1. Percentage of lecturers' agreements on their overall experience with WBLT, and the benefits of WBLT on aspects of student learning.

	Staff Overall (n = 134) (combining the first two categories of the scales)
Positive experience of staff	47.5%
Easier to learn	48.9%
Achieve better results	30.2%

staff respondents had an overall positive experience (47.5%) or agreed that WBLT made it easier for their students to learn (48.9%). An even lower percentage of lecturers (30.2%) were positive about WBLT helping their students achieve better results.

When designing the survey, the team did not foresee that lecturers would make a distinction between benefits for internal and external students, so there were no quantitative questions targeted at unravelling the differences. However, even without any promptings, many lecturers made the distinction in their open-ended responses. They suggested that WBLT benefit external students through:

- providing external students with up-to-date information;
- increasing their sense of belonging; and
- providing opportunities for interactions for external students.

At the same time, lecturers also commented on the detrimental impacts WBLT may have on internal students' learning, as typified by the comments:

> It does support external students … On many points I would argue that [WBLT] enhance the study experience of external students, but generally diminish the study experience of internal students.

> For internals I think it can help them to justify not coming to lectures. They think, 'it's OK not to go, I'll listen to the iLecture later'. I fear later never comes or comes too late and they cram for assessment. Externals, however, brilliant!

As illustrated by the second quote above, some lecturers were concerned that the availability of WBLT could give internal students a false sense of security, and without good self-management skills, the students may never listen to the lecture.

Other lecturers indicated that they were concerned that students may not attend lectures regularly and keep up-to-date with the unit:

> [WBLT] encourages internal students to think of lecture attendance as optional. Many students regularly only come to one lecture a week (on the same day as the tutorial) and miss the other one. However they do not always listen to the [recording] of the lecture they have missed. Consequently they then take up class time asking questions about issues that were discussed extensively in the missed lecture, which is frustrating for the other students.

Even if the internal students listen regularly, many lecturers commented that the quality of their experience could be diminished due to missing out on the group experience, the opportunity to ask questions, the enthusiasm and motivation associated with being present at the lecture, and the opportunity to get to know the lecturer. For the students who are only listening, they were concerned they would also miss out on the non-verbal aspects of communication and the visual aids in the lectures.

The overall perception of lecturers that WBLT are more beneficial for externals than for internals presents a mismatch with students' experiences and their perceptions in relation to achieving better results and helping to learn.

Comparison between internal and external students' perceptions of the effectiveness of WBLT

The perceptions of effectiveness of WBLT were canvassed from three questions which asked student respondents to rate on a five-point scale whether:

(1) their overall experience of using WBLT was positive (almost always to almost never);
(2) using WBLT helped them to achieve better results (yes – in a significant way to no – it was detrimental); and
(3) WBLT made it easier for them to learn (yes – in a significant way to no – it was detrimental).

Table 2 shows the percentages of respondents who expressed overall positive agreement with these items. Agreement was calculated by combining the first two categories on the scale.

In regard to *their overall experience*, 76.3% of participants, whether studying in internal or external mode, reported they had a positive experience almost always or frequently. There was no significant difference between external and internal students. The positive student responses are consistent with the general findings in the literature (Donnan, Kiley, and McCormack 2004; Goldberg and McKhann 2000; Maag 2006; McElroy and Blount 2006; Shannon 2006; Signor 2003; Soong et al. 2006; Tynan and Colbran 2006; Williams and Fardon 2007).

When asked whether using WBLT made it *easier to learn*, 79.9% of respondents agreed that it had in either a significant or a moderate way. Once again, there was no significant difference between responses for external and internal students. The external students being interviewed highlighted the benefits of WBLT in providing another dimension to their learning. One interviewee commented that using WBLT 'makes it easier to learn than just relying on notes'. Moreover, when looking at the open-ended responses and interviews, it appeared that the need for flexibility is the same for externals and internals. For example, one of the external students being interviewed had two young children and found it very useful to be able to listen to the recordings on an iPod whilst her daughters had ballet lessons. She commented that WBLT made it possible for her to keep up-to-date with the course. However, the same need for flexibility was required by an internal student who lived over an hour away from campus and needed to drop off her children at school at the time when the lecture was on.

Table 2.   Percentage of students' agreement.

	Internal (n = 643)	External (n = 103)	All students (n = 746)
Positive experience	76.9%	72.6%	76.3%
Easier to learn	79.5%	82.5%	79.9%
Achieve better results*	65.6%	73.8%	66.8%

* significant difference between internal and external students *p < 0.001*.

When students were asked whether using WBLT helped them to *achieve better results*, 66.7% of respondents agreed that it had in either a significant or a moderate way. There was a significant difference between external and internal students with externals being more likely to perceive that WBLT allowed them to achieve better results. Note that while there is a significant difference, almost two-thirds of the internal students were still positive about WBLT's impact on helping them achieve better results.

External students were passionate in their open-ended comments on the ways WBLT helped them in terms of reducing isolation, providing guidance and clarification of issues, and increasing confidence and motivation:

> iLecture is my lifesaver. As I study completely by external I find iLecture clarifies and explains any points I am struggling to grasp. iLecture also introduces materials that may not appear in the Readings. I also find the iLecture that discusses exam preparations a vital source. Please don't take it away!

> Studying externally iLecture was an invaluable tool in keeping in touch with the expectations for the subject. It is a major help with confidence and direction when you would otherwise as an external student be very unsure of expectations and requirements. Very helpful in keeping on track.

As such, using WBLT seems to have lowered the barriers for external students and helped to provide more parity in their experience with internal students.

Comparison between internal and external students' usage of WBLT

To understand how students were using the technology to support their learning, we asked students to respond to a number of usage patterns they may have adopted when using WBLT, as shown in Table 3. These patterns had been identified from previous research (McElroy and Blount 2006) and discussion with staff.

There were some significant differences between internal and external students in their usage patterns. External students were more likely to listen to the entire recording of the lecture, to listen regularly, and to listen to several weeks at a time. They were also less likely to listen and browse and stop at points of interest. Overall, they seemed more systematic in their approach to using WBLT. One reason for the difference could be that the recording is the only way externals can access the lecture. Internals, on the other hand, have a choice of attending the lecture or listening to the recording.

Table 3. Students' usage patterns (% agreed).

	Internal (n = 643)	External (n = 103)
Listen to entire recording*	69.0%	82.7%
Listen more than once	55.7%	55.1%
Listen regularly*	45.2%	76.5%
Browse and stop at points of interest*	37.7%	36.0%
Listen to several weeks at a time*	36.2%	59.4%
Choose particular segments*	31.6%	23.6%

* significant difference between internal and external students *p < 0.001*.

Nonetheless, the usage patterns adopted by the two groups were similar. The statement, *I usually listen to the entire recording of the lecture,* was at the top of the list for both groups. Moreover, just over half of both groups of students agreed that they listen to the recordings more than once. Overall this suggests that both groups of students used WBLT as a study tool. This is supported by students' responses to a question about the ways WBLT was used to support learning.

As shown in Table 4, both groups of students listed using WBLT to revise for exams, to revisit complex ideas and concepts, and to work at their own pace as one of their top four purposes of use.

There were significant differences in two of the purposes. One of the differences was that internals were more likely to use the technology to pick up things they missed in class, which clearly does not relate to external students, so a significant difference could be expected. The second difference was that external students were more likely to use the technology to work at their own pace. This could be because internal students have the pace set by scheduled lectures and other on-campus activities. Externals, on the other hand, have more freedom in determining their time and pace of study.

In sum, external students and internal students seem to use WBLT for their study in similar ways. Again, this reflects firstly the nature of the merge of the two cohorts – internal and external students are exhibiting similar patterns of studying. Secondly, it begs the question of why lecturers would believe that one group of students would benefit more from WBLT than the other if they are using the technologies in similar ways.

Fostering communication and collaboration for externals

As discussed earlier in the paper, one of the key issues for external students is the lack of interaction with the teacher and other students, and the associated sense of isolation (Anderson 2005). While the previous section has demonstrated that WBLT provide internal and external students with an extra tool to interact with the lecture content, our findings also suggest that WBLT have potential for increasing other interactions. For example, an internal student found that WBLT enhanced their communication with their lecturer:

> I can validate a question before I ask it. I can listen to the lecture maybe a few times then really refine what I want to ask. I can then (with confidence) approach the lecturer to seek my answer based on accurate reflections, not what I thought the lecture said.

Table 4.   Students' purpose of use (% agreed).

	Internal (n = 643)	External (n = 103)
Used to pick up on things I missed in class*	80.7%	54.5%
Used to revise for exams	77.4%	69.9%
Used to revisit complex ideas and concepts	76.7%	72.5%
Used to work at my own pace*	72.2%	84.8%
Used to take comprehensive notes	61.3%	70.4%
Used to pick up announcements and exam hints	61.2%	69.2%
Used to revisit as lecturer was unclear	21.2%	18.6%

* significant difference between internal and external students *p < 0.001*.

To further explore the issue of communication, one of the open-ended questions included in the student survey was*: Have you experienced changes in the way you interact and communicate with your fellow students and teaching staff? Please explain these changes.* In response to this question, some external students commented that they felt less isolated and more connected with the lecturer and other students as a result of using WBLT:

> Hearing a lecturer's voice makes them feel more real. So that when you write to them they are a person not a figment of your imagination. Also when talking with others on WebCT I can discuss lectures if necessary.

> Yes as an external it has been very helpful as you don't feel so alone and through this I have made regular contact and met a few of the students in my course.

The comments from these external students seem to indicate a move towards an experience that is more like that of internal students. When asked about possible enhancements to the technologies, external students were more likely than internal students to report that they would use WBLT more if discussions were captured or if podcasts were available. These features can further add to an external student's sense of becoming part of the class.

Staff perspectives

In the staff survey, staff were asked about the impact of WBLT on communication with students. 58.2% of staff reported no significant change or that they were not sure of any changes. Those who noticed changes were divided on whether the change had been positive. Lecturers who felt positive about the change in communication noted benefits for external students, for example:

> It assists distance learning students who want a 'voice' – adds some interaction.

> Contact with the external students is much improved, as most access the lecture soon after its actual delivery. Feedback and discussion of topics is much improved.

> I have had students say that the iLecture makes them feel a part of the group, that they 'know' me. One student told me she calls out answers to the questions, talks back to the iLecture and chips the internals for being too slow to volunteer answers.

In one of the staff interviews the benefits of broadening the range of collaboration opportunities between external and on-campus students was highlighted:

> I started directly talking to the external students during (WBLT) recording … I could ask questions in a lecture and within an hour or two externals have heard the lecture, heard the question and posted on the discussion forum their responses to the questions, so it's more of a united group of students now.

There were also signs that a community was being built between internal and external students. The same lecturer found that 'the students are helping each other more and more, not just with concepts but also supporting each other emotionally'.

The lecturers who feel the impact has been negative considered it in the context of reduced attendance and difficulty in communication with internal students:

> I do not have the chance to get to know the students face-to-face unless they are in my tutorials. The class itself misses the chance to share a communal experience where students can interact with each other.

Recorded lectures have far less human impact than live ones. I find a growing sense of distance and alienation. Students are less likely to come and talk to me. They are far less often on campus, and so make poor use of the library as well.

The examples provide insights into the way in which these technologies can influence the learning experience beyond the mere delivery of content. They have demonstrated the potential for WBLT to foster communication and collaboration between the previously divided groups of internal and external students. Some of the lecturers have also indicated that the technology has enabled the growth of a sense of community between the two groups that was previously not possible – another illustration of how the boundaries between internal and external students are eroding.

The examples given also indicate the impact can be negative, as well as positive. As the last two examples rightly indicate, the traditional way of doing things and the dynamic between staff and students will change. For those wedded to the status quo, this can be challenging.

On the positive side, the examples provided have identified ways in which communication and collaboration can be enhanced. In these examples, staff and students have remained alert and seized the opportunities offered through the technology that have arisen. More work needs to be done to identify other strategies adopted by students and staff so they can be proactively integrated into the teaching and learning environment from the outset.

Conclusion

The use of WBLT has provided both internal and external students with a high degree of flexibility in access to lectures. Although external students appeared to be more systematic in their usage patterns, both internal and external students used WBLT in similar ways to support their learning and were generally positive about their experience of using WBLT. They found WBLT made it easier for them to learn and helped them to achieve better results.

WBLT is not the only technology in the changing higher education landscape. The availability of social software applications typified by blogs, wikis and discussion forums (New Media Consortium 2006) is allowing external students to have communication and collaboration opportunities that were once only possible for internal students. Although WBLT were introduced to capture lecture content, their use in association with other communication technologies can reduce the sense of isolation and help to connect external students to their lecturers and to each other, particularly when used in conjunction with other social technologies. As one external student commented:

Every lecture should be available on [WBLT] and I would not mind if the tutorials were as well … With modern day technology external students could send their presentation taped and have discussion via skype … So we would not really be 'external'.

While students enrolled in internal mode might previously have been seen as having a superior learning experience than students enrolled in external mode, the possibilities brought about by WBLT and social technologies are challenging this traditional expectation. Students enrolled in internal mode now also expect to experience the same online interactions that are available to students enrolling in external modes. One implication as illustrated by the findings in the study is that internal students may not exhibit traditional on-campus behaviours such as regular attendance at lectures.

What is striking is that whilst WBLT and social technologies were introduced to allow students to become more flexible, lecturers still perceive the students' absences from lectures, even with access to these technologies, as being detrimental to their learning. Whilst most agreed that external students benefit from WBLT, they were concerned that internal students could suffer from a poorer learning experience if they chose not to attend lectures. Given that the internal and external students are provided with these technologies for flexibility and parity, one can question why staff are concerned about the experience of one group but not the other.

While feedback from students participating in the study has been largely positive about the use of WBLT, that from staff participants is mixed. This mismatch gives weight to the quote at the beginning of the paper which highlighted an increasing gap between staff and students' expectations of technologies:

> Students and faculty continue to view and experience technology very differently … At the same time, students' expectations are important, and successful learning-focused organizations have long known they ignore these expectations at their peril. (New Media Consortium 2008)

The disparity in staff responses could also reflect the complexities of the learning environments. The next phase of the research involves a series of case studies to tease out the complexities of different curriculum contexts and provide a more complete picture including the experiences of those who have elected not to use the technology.

Acknowledgements

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