

## Learning to swim in an ocean of student data

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Like other Australian universities, Western Sydney University collects a large amount of data on student learning experiences, including their use of technologies. For busy discipline academics the task of mining and analysing all the data, to create meaningful evidence that informs teaching practice, can seem overwhelming. Graphs of responses to multiple choice questions are relatively straightforward to generate and share. But text comments in response to open-ended questions, although potentially very revealing, are often not used systematically. The University is making both quantitative and qualitative student survey responses available in a format that teaching staff can access directly through an institutional data dashboard. There has been some progress and there are some challenges. During 2015 we have been aiming to encourage teaching staff not just to dip their toes in the water but to take the plunge and use both quantitative and qualitative data actively and with purpose.

**Keywords:** student feedback, data mining, text analytics.

### Launching into the strategy

In late 2012, Western Sydney University embarked on an ambitious 3 year strategy to ramp up the use of technology-enhanced learning (TEL). In 2010, a student survey on learning technology had identified that students were expecting more and better use of technology than they were experiencing. In particular they wanted their teachers to engage with TEL (Gosper, Malfroy, & McKenzie, 2013; Russell, Malfroy, Gosper, & McKenzie, 2014). During 2011 and 2012, wifi was improved, lecture recording was transferred to an opt-out system and there were various other incremental improvements made to online learning facilities.

At the beginning of 2013 there was a step change. The University issued all new students with iPads and began investing in enhanced support for redesigning curricula across all disciplines; recruiting blended learning support staff and in some cases also arranging for additional academic staff time. The new support teams were configured in a 'hub and spoke' model, with blended learning specialists available within disciplines to work hands-on with academics. Curriculum redesign initially focused on 1<sup>st</sup> year undergraduate study, but in the following two years rolled out to other study levels, aiming to enhance flexibility for all and equity of access for students from low socioeconomic status backgrounds. Online and mobile technologies were combined with face-to-face campus classes. In the summer of 2013-4, condensed summer term options (many in blended or fully online mode) were introduced and in 2014 the University began expanding its fully online offerings.

The University's strategic plan for 2015-2020 has a central strategic objective of being 'a distinctly student-centred university'; within which it aims to 'transform its teaching and learning environments by integrating digital technologies with innovative curricula and work-integrated learning'. The challenge now is to ensure that these innovations are routinely being informed by evaluation evidence using data on students' learning experiences and outcomes. This paper outlines work in progress to ensure that we are making effective use of the data we gather from and about students, to inform how we integrate technology into the curriculum.

### Evidence for strategic navigation

A nationally funded Australian project on quality management for online learning environments in higher education found that while strategic plans are important, there is a need for distributed ownership and leadership – not just among teaching staff but also among the students who are supposed to be the beneficiaries (Holt et al., 2013). The project put forward a quality management framework with six components. The University has been addressing several of these: planning, technologies, resourcing and to some extent also organizational structure and governance. The sixth

component, evaluation that connects with a distributed leadership model, is the focus of this paper. Given the 'student-centred' strategic direction, gathering evidence from students has been a priority. Many teaching staff still needed convincing that students either benefit from or appreciate a shift away from established classroom teaching methods.

To make sure that staff and students are on board and are pulling in the same direction, the overall approach in setting up the evaluation has been a pragmatic one; recognizing the need to accommodate multiple perspectives and to triangulate different sources of information (Phillips, McNaught, & Kennedy, 2012, pp. 77-78). Consistent with a pragmatic approach, the evaluation design has involved mixing qualitative and quantitative evidence; using a convergent research design to gather and merge complementary data from different sources (Creswell & Plano-Clark, 2011, pp. 77-81).

We introduced a Blended Learning Survey (BLS) in September of 2013, including some questions from the more comprehensive 2010 survey for comparison. The BLS went to 1<sup>st</sup> year undergraduate students and included both multiple choice questions about use of online and mobile technologies for learning, and requests for text comments (Russell & Qi, 2013). In 2014, questions on technology access and use were added to the regular Commencing Students Survey (CSS) and the BLS was run again, this time with both 1<sup>st</sup> and 2<sup>nd</sup> year undergraduate students. By then, student representatives on the University Senate were questioning the evidence that students wanted more 'online lectures' and asked for an additional survey. This was done (Russell, 2014). The extra survey included multiple choice questions about preferred study modes along with a request for text comments on their needs for flexibility. Other surveys in 2014 gathered student comments from open questions on 'best aspects' (BA) and 'needs improvement' (NI), which could be mined for comments on TEL (Table 1). The regular surveys were repeated in 2015, with the BLS now including all undergraduates.

**Table 1: Sources of data from 2014 students**

Survey	Target respondents and timing	No of 'BA' comments	No of 'NI' comments	Evaluation purpose
Commencing Students Survey (CSS)	newly enrolled students in weeks 3-4 of semester 1	985	907	experience of transition into higher education
Blended Learning survey Part A	all undergraduate students (2014 only, with BLS)	3137 (flexibility)	3111 (on campus NI)	campus/ online study mode preferences and flexibility needs
Blended Learning Survey (BLS)	1 <sup>st</sup> and 2 <sup>nd</sup> year undergraduates in Sept.	1976	1940	student use of technology for study
Student Feedback on Units (SFU)	all study units in all terms	43,630	35,399	design of study units and activities within them
University Experience Survey	sample of years 1 & 3 undergraduates	2989	2878	overall experience in degree course
Course Experience Questionnaire (CEQ)	sample of graduates in the year following graduation	3697	3040	experience and value of course after graduation

Various reports to senior management summarised the survey findings. For example, in one such report in 2015, a summary of evaluation evidence on use of mobile devices showed that in some disciplines laptops might be more useful for core study activities than iPads; suggesting a shift to providing multiple devices for students.

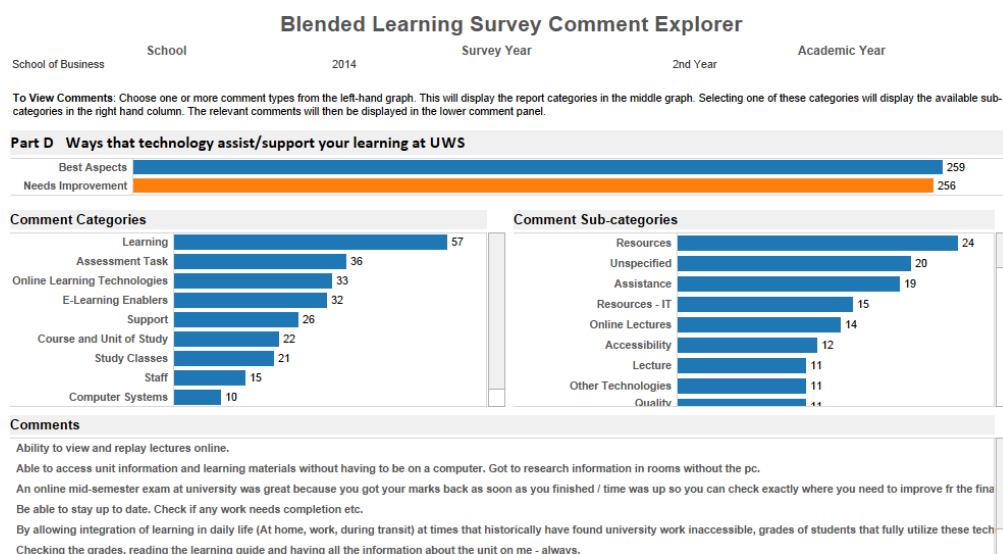
Although we were collecting more evidence about the student experience of technology, teaching academics and their discipline team leaders still had no way of directly accessing and using this evidence. The SFUs are embedded in the established disciplinary curriculum and teaching review cycles, but do not include specific questions on TEL, while the surveys providing explicit information on TEL are not included in regular reviews. As a result, most teaching academics are largely unaware of what student feedback is available on TEL. So there is a need to streamline the gathering and use of survey data on TEL, to ensure that the students' voices can be heard directly by their teachers, as well as at a more strategic level.

## Data dashboard to the rescue

For some years, the University has been running an institutional data visualization dashboard using Tableau software. The dashboard is used for planning academic programs and tracking institutional performance indicators. It also displays results from routine student surveys such as the SFUs and the CSS. The dashboard shows not only graphs of responses to multiple choice questions about the study experience, but also shows text analytics for student comments (Gozzard & Grebennikov, 2013).

Targeted manual analysis of the BLS and other TEL data is time-consuming and requires skills with both quantitative and qualitative analysis methods. Given the amount of data available, and the wide variety of questions that could be asked of each dataset, it is impossible to generate and disseminate reports for all potential evaluation needs; especially when those who might use the evaluations do not know what is available. The dashboard is an ideal tool for academic teams to explore student feedback on technology use.

Early in 2015, the institutional data analysis team extended the dashboard to display the BLS results from 2013 and 2014. Previous analyses of survey comments on TEL had used NVIVO for thematic analysis of student comments. The data analysis team used this earlier work and data (including the 2010 survey as well as 2013-14 comments) to update the text analytics to include categories and subcategories for TEL. The same text analytics programming is used for all student survey comments. So we can now use it to mine qualitative data on TEL from the other surveys. All the student data are de-identified, and the comments are cleaned to remove any references to individual teachers. Because the text analytics process is automated, it can cope with large amounts of text and can even deal with idiosyncratic student spelling. Figure 1 shows an example.



**Figure 1: Example of comment explorer dashboard display for 2<sup>nd</sup> year Business students**

At this point, it seemed that we had solved the problem. Directors of Academic Programs and blended learning support teams could access to the dashboard and extract whatever was relevant to answer their own evaluation questions. Everyone concerned was duly informed about the availability of the dashboard displays, and those who requested dashboard access were able to see and select from all the blended learning survey data and other surveys where relevant. At the study unit level, academic coordinators could also use the analytics in the online learning management system to track student use of the online activities and digital resources they provide. We are also working to make aggregated analytics data available on student online activity across study units. So in principle, we had provided the tools for distributed leadership in curriculum evaluation and innovation.

## Still in danger of drowning

After some initial presentations about the BLS dashboard to university committees and discussions with the blended learning support staff, it became clear that simply making the facility available would

not be enough to encourage its widespread use. Many potential users lack the time and/or skills for educational evaluations. They need help to develop evaluation questions, as well as to decide what data to extract and how to analyse it.

Staff interviews were also part of the overall evaluation of the institutional TEL strategy – to gauge the effectiveness of staff development and curriculum development support in building staff capacity to introduce innovations. The semi-structured interviews covered a cross-section of 17 staff members across different roles, types of employment and discipline. Half of the interviews were in 2013 and half in 2015, with 6 interviewees participating both times.

Thematic analysis of the interview records showed a shift over the two years in the dominant themes. Among these was an increased frequency of discussion of learning activity design and of evaluation evidence. However, the main comments on evaluation evidence in 2015 related not to the BLS data, but to learning analytics, SFUs or other surveys at study unit level. These indicated that finding time to evaluate could be a barrier, for example:

“...we are currently still analysing the data from the vUWS analytics. We can track weekly activity and preparation for class. We spent half a day extracting the data....”

“I don't have time to track. I run two big units [...] So there is no time for forward thinking.”

The Quality Management Framework developed by Holt et al. (2013) implies that evaluation of a university's use technology-enhanced learning should include stakeholder needs (staff and students), be embedded in governance structures and provide evidence not only for the selection of new technologies but also for ongoing assessment of performance, value and impact. In this case, we have a great deal of data from one set of stakeholders, the students, on how institutional decisions about technology have been changing their study experience, only some of which is being used effectively. We can track online activities through analytics in the online learning management system, and will soon make this available via a Tableau dashboard. We collect information from students about their experiences and already have this in a form that can be interrogated by academic groups. But we have work to do in building the feedback loops into institution-wide processes that engage the majority of teaching staff. This need was also picked up by the student representatives on the University Senate. When the results of the additional survey they requested in 2014 were reported, they asked that the University set up a body to regularly review the TEL strategy.

### **Next steps: swimmer support**

In response to the student request the Senate Education Committee charged an established subgroup, the Student Experience & Engagement Committee, with developing a regular review process. Towards the end of 2015, there is a proposed framework and process for reporting annually, drawing in relevant student feedback from the regular surveys listed in Table 1. The proposal identifies components at three levels, drawing on a framework suggested by Gosper et al. (2013): institutional, academic-led and student-led technology use. It links these to specific objectives in the University's strategic plan and identifies the data sources that can be used to draw out key messages for consideration by the Education Committee at the start of each year, so that the Committee, which includes discipline educational leaders, can discuss and recommend follow-up action.

The intention is that an institution-wide formal review of student data on TEL will mean that resources and expertise are made available to support the distilling of key messages and translating these messages into actions within discipline groups. However this is still work in progress. There are outstanding questions on the details of who owns and analyses the data, what institutional expertise and tools are needed and how discipline academics will engage with the evidence produced. Our experience implies that many teaching staff will not dive into an ocean of student data and engage in meaningful evaluation unless support for evaluation is embedded at all institutional levels. Although a few of the more confident data swimmers may venture out into this ocean unaided, most will want at least one form of support – fins or flotation (support staff), swimming lessons (time to familiarise with data sources, analysis methods and tools) and navigation guidance (educational analysis).

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