A time for everything: reviewing an institution's virtual learning environment

Roger Cook, Regina Obexer
eLearning Services
Queensland University of Technology

This paper outlines a review carried out at Queensland University of Technology (QUT) in 2013 to identify the extent to which the centrally supported virtual learning environment met current and future learning and teaching needs. A range of consultation and investigation activities occurred from May to November to encourage open stakeholder feedback as well as to allow for reflection on alternative digital technologies, systems and strategies. This resulted in the development of nine recommendations, which, following a planning phase, will commence being implemented from mid-2014.

Keywords: virtual learning environment, blended learning, learning management system, capability building, evaluation

Introduction

Higher education in Australia and around the world is facing unprecedented change. The confluence of ubiquitous affordable devices and connectivity, easily accessible technologies, and the pervasive role technology plays in everyday life is opening up exciting opportunities. At the same time, the need for authentic and lifelong learning, an ever more sophisticated digital and knowledge economy requiring a highly skilled workforce, and increasing cost pressures are demanding higher education to re-invent not only its business models, but the fundamental concept of teaching and of the learner. Technology is key in the endeavour to conceptualise new ways of learning in higher education and prepare our graduates for the world of tomorrow. Oblinger (2013) believes that we must use the best that technology has to offer for education. There are also opportunities to take advantage of pedagogical innovations such as seamless learning that involves connecting learning across settings, technologies and activities; and crowd learning whereby the local knowledge of many people is harnessed (Sharples et al., 2013). Keeping pace with the demands, opportunities, and requirements resulting from these developments is challenging for a large institution, with a diverse student cohort, varying levels of skills and capabilities in our staff, and limited resources. The complex interplay of learner needs, technology affordances, and institutional ambitions and capabilities require new ways of thinking, and the establishment of meaningful relationships with stakeholders to enable collaborative planning and working. Based on these premises, QUT carried out a comprehensive evaluation of its whole Virtual Learning Environment (VLE) to enable future growth to be relevant, agile and sustainable, and to ensure a collaborative and consultative approach to ongoing development. This paper describes the review process and discusses the recommendations resulting from the outcomes of the review.

Review aims

QUT's centrally supported virtual learning environment (VLE) in 2013 included QUT Blackboard Learning Management System (LMS), Blackboard Collaborate, SafeAssign, QUT Student ePortfolio, QUT Media Warehouse, QUT Lecture Recording System, GoSoapBox and Course Materials Database (with Echo360 and Turnitin released in 2014). The aims of the review were to establish the extent to which the VLE enables the university to pursue its ambitions in learning and teaching, and to identify opportunities as well as issues and gaps both for current and future needs. The review considered a range of environmental and institutional factors, including the needs of various cohorts of students, interrelationships between supported and non-supported educational technologies, and the broader context of the disruptive potential of technology to have a significant impact on learning and teaching.

Methodology

The VLE review was sponsored by the Deputy Vice-Chancellor (Academic), managed by a project team in eLearning Services, and overseen by a Steering Committee chaired by the Assistant Dean (Learning and Teaching) from the Faculty of Health with members consisting of four academic staff, two students and five professional staff. Broad and deep consultation occurred with stakeholder groups across QUT through using the techniques summarised in Table 1. Further investigations were carried out by eLearning Services to identify

current trends and the future potential of different VLE approaches to produce: an Environmental Scan Report; a VLE Usage Data Report; a high level comparison of Learning Management Systems (i.e. Blackboard, Moodle and Desire2Learn); a review of MOOC Platforms; and a review of technology-enhanced learning strategies of some Australian and international universities.

Table 1. Consultation techniques

Staff consultation	Student consultation
• 14 focus groups with approximately 90 academic and professional staff (recruited via email through the Assistant Deans Learning and Teaching and the Faculty Administration Managers). • Written responses to the terms of reference from six Faculties, the Learning and Teaching Unit, QUT International College and QUT Library. • Interviews with 10 individual staff. • A 3 week long crowdsourcing campaign for staff. • A final staff/student focus group (10 staff and 4 students) to discuss the draft recommendations.	• Review of 330 QUT student responses from the 2013 Educause Centre for Analysis and Research (ECAR) Study of Undergraduate Students and Technology. • Review of 2013 Insight survey responses filtered for the terms 'engage/engagement/engaging'. • A 3 week crowdsourcing campaign for students. • A final staff/student focus group (10 staff and 4 students) to discuss the draft recommendations.

The focus group responses were central in helping to identify emerging themes. Responses focused on a set of pre-determined questions and a visual representation of QUT's VLE designed to stimulate but not limit the discussion and enable interaction between participants (Kitzinger, 1994, p. 1). Feedback from the initial focus group was used to inform modification of the approach for subsequent sessions. As a result, two strategies, recommended by Breen (2006), were used to facilitate meaningful discussion. Firstly, the stimulus questions were sent to participants prior to the remaining focus group sessions so they had time to consider what was being asked. Secondly, session duration was extended to up to two hours to allow time for participants to seek clarification about the concepts arising from the questions. A third strategy, small group discussion, was introduced in subsequent focus groups as a warm up exercise (Kitzinger, 1994). This encouraged participants to engage with each other, thus giving greater opportunity to clarify understandings before responding to the moderator. Saturation point, which occurs where no new themes emerge is in a series of focus groups (Breen, 2006), was identified between the third and fourth focus groups. Agreement across the responses was very high and there was no noticeable changing of opinion among the participants of any group.

There were more than 1000 responses from the focus groups and these were coded to identify underlying themes. The codes were moderated by the group facilitator and the note-taker to minimise bias. The themes identified from the focus groups formed the basis of the analysis and categorisation of responses resulting from other consultation techniques and investigations. A gradual consolidation of the themes led to the development of nine draft recommendations by the core project team, which were shared with a final staff and student focus group. The Steering Committee subsequently helped to confirm the wording, supporting details and categorisation for each recommendation. In November 2013 the VLE Review Report was endorsed by the Learning Environments Working Party (chaired by the Deputy Vice-Chancellor, Technology, Information and Learning Services) and the University Learning and Teaching Committee (chaired by the Deputy Vice-Chancellor, Learning and Teaching).

Recommendations

The review outcomes resulted in the following nine recommendations, which are presented in four categories below. Supporting details and some student and staff feedback are provided with regards to the future directions of QUT's VLE. It is important to note that specific implementation plans are not included in this paper.

1. A strategic approach

In recognising that technology has become fundamental to teaching and learning in the 21st century, there was a strong theme throughout the consultation with staff that they would like to see an agreed and articulated QUT vision, and would value clearer information on institutionally endorsed technologies and related supports, as well as guidelines around use of tools outside the institutional VLE. At the same time, there was significant emphasis on the need to optimise alignment between the development of the VLE and related systems, projects and initiatives, and to develop strategies that allow learners to engage in QUT's VLE beyond their studies, as

lifelong learners.

R1.1: QUT should confirm and consolidate QUT's clear vision about the fundamental role of digital technologies for learning and teaching.
The most emphatic response common across all focus groups was that of the need for 'leadership from the top'. Staff indicated there is a need for 'genuine investment' in resources, particularly resourcing of multidisciplinary teams that explore and develop technologies and then promote and support the wider use of these for learning and teaching. Staff expect the purposeful development of a safe environment and culture in which they can take risks to explore and implement new technologies. They expect leadership which values and safeguards the autonomy of academics in developing, innovating and implementing in the blended/online learning and teaching environment. At the time of the review, Blueprint 3, the university's five-year strategic plan, included some general aims relevant to the VLE such as to "provide high-quality, learner-centred environments that capitalise on both physical and virtual innovations" (Queensland University of Technology, 2011, p. 4).

R1.2: QUT should state and clearly communicate levels of institutional support for VLE technologies and tools.
Students stated they want a reliable and seamless experience with the VLE, consistency between units, and all lectures to be recorded. Staff responses indicated that the VLE needs to be more than QUT Blackboard to suit different learning and teaching needs and contexts. They were unsure what additional technologies and tools could be used and often perceive their use of many educational technologies and tools to be against the wishes of the institution. Therefore, this recommendation recognised the need for better engagement with staff about the current and future components of the VLE and how these are supported. As a result, it was decided to adopt a Core+ model similar to that used at Manchester Metropolitan University to frame a distributed VLE. This model, shown in Figure 1, is comprised of four components:

1. Core technologies: provided by the institution with compulsory use and consistent access - e.g. QUT Blackboard
2. Arranged: provided by the institution with optional use and training - e.g. Blackboard Collaborate
3. Recommended – partly supported by guidelines, case studies and resources (both from QUT and vendors) – e.g. Google Drive for use in collaborative learning spaces
4. Recognised – an experimental space where new learning and teaching ideas and experiences are shared (Stubbs, 2010; Ballard, 2013).
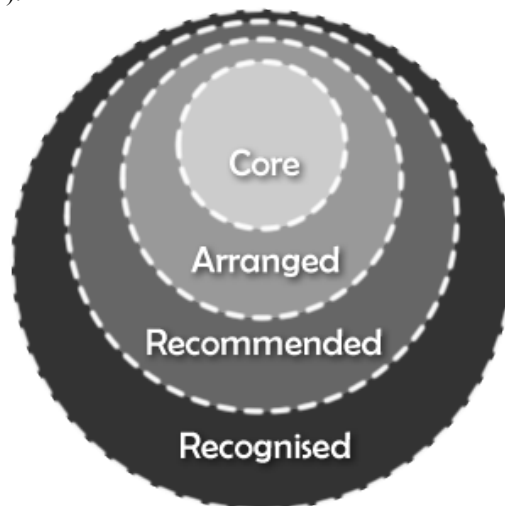

Figure 1. Core+ model

It is intended that innovative academics, tutors and students are likely to identify new tools and provide some evidence of success so that they might eventually be taken on as 'recommended'—support materials would be created demonstrating how a seamless experience can be established with the core; and, over time, thresholds for digital literacy would be raised to embrace the new skills required by all staff to make best use of new tools. In this way the learning technology base would grow organically over time while still maintaining the convenience of a guaranteed entry point through the core VLE for students seeking consistency.

There are some important points to make about having an LMS such as Blackboard as the core of a distributed VLE. Mott and Wiley (2009, p.4) argue that LMS use has 'generally been focused on helping teachers increase the efficiency of the administrative tasks of instruction (e.g., distribute documents, mark assignments, give

quizzes, initiate discussion boards, assign students to working groups, etc.)' leading to 'instructor-centrism'. Therefore, the LMS may continue to play a role in meeting particular baseline needs at QUT rather than being a one-size-fits-all teaching toolbox, whereas the distributed VLE will support a greater variety of student-centred learning and teaching requirements. Furthermore, it was recognised that a number of challenges exist when incorporating freely available technologies into the VLE (including those not designed for educational use); therefore, suitable adoption processes would be required to ensure that the VLE evolves to meet individual, faculty and institutional contexts.

R1.3: QUT should maximise synergies between the VLE and other projects, initiatives and approaches.
Staff responded that there must be an institutional and collaborative approach to the future development of the VLE and this also needs to take into consideration how the VLE integrates with other QUT systems. This recommendation recognised that strategic directions and associated projects at QUT impact on the design and use of the VLE. A need exists for collaboration and synergies to occur between projects and relevant stakeholders since the VLE does not operate in isolation but is dependent on other QUT nodes and networks. This could lead to improved efficiency, ease of navigation, seamlessness, interoperability and reliability.

R1.4: QUT should develop strategies to meet the need for open and ongoing access to the VLE.
Students commented on the need for an online social space, course level collaboration, and extended access to unit content for continued learning (both during a course and beyond). Staff noted that they are already using a wide range of educational technologies external to Blackboard suggesting that a more open and distributed VLE would benefit all students. This review has revealed a number of important concepts and ideas about open and personalised learning, importantly that the role of students has changed from one of 'information consumers' to 'knowledge producers', and that informal as well as formal learning opportunities are an essential part of a student's experience during and after their studies. Such a 'connected' learning environment is integrative, personalized, interconnected, and authentic (Smith, 2013) and is not bound by semester-length periods of time.

The Open Learning Network (OLN) model proposed by Mott and Wiley (2009) is a hybrid between the LMS and the personal learning environment (PLE) and is one that could be customised to suit QUT's VLE. In this model the LMS is used where privacy and security is paramount, for example with students grades, assessment related information and online quizzes. However, other OLN components do not need to be private, such as staff and student blogs, wikis, portfolios, open courseware and open educational repositories. A significant advantage of the OLN is that it allows students to build learning networks over time and so the 'artificial boundaries of the CMS [LMS] are removed thereby allowing the learner to benefit from participation in a broader community of networked learning' (p. 15).

The Horizon Report Technology Outlook for Australian Tertiary Education 2013–2018 lists 'openness' as the third top ten trend impacting on technology decisions where "concepts like open content, open data, and open resources, along with notions of transparency and easy access to data and information—is becoming a value (Johnson et al., 2013, pp. 17–18). Similarly, QUT academics have been experimenting with open learning approaches. For example, Carroll et al (2013) used a free wiki tool to share and showcase student research on contemporary health issues for peer review and critique. Students clearly benefited from the experience where:

> the learning that occurred was done socially, publically, collaboratively, and competitively; and via an iterative process… Overall, the wiki allowed some of the most advantageous elements of social media and information and communication technologies to work in parallel with the pedagogical goals of the teaching staff to ensure deep and sustained learning for students (p. 523).

2. An extended, agile and integrated VLE

Despite many comments about the lack of certain functionality and the less than perfect nature of Blackboard, the key message resulting from the consultation with staff and students did not indicate that change to a different LMS was needed. Rather, there was a call to extend and integrate beyond Blackboard so as to accommodate the emerging needs of new generations of learners, and to better support innovative pedagogies, authentic and connected learning. There was recognition that the LMS is inherently teacher-centred by definition, and that many of its core functions are valuable and can contribute to a quality student experience. Students in particular raised the need for consistency in unit site structure and navigation. At the same time, many academic staff use a range of learning technologies in their teaching (including social media) with good student feedback, but often with a sense that this is "not officially sanctioned". Based on these findings, it was recommended to newly conceptualise QUT's VLE beyond Blackboard (including giving it a name and creating a dashboard representing it); to extend VLE functionality by continually improving the users' Blackboard experience (e.g.

through shorter upgrade cycles), by experimenting with, evaluating and adding suitable tools and supports based on defined learning and teaching priorities; and to aim for maximum integration within and beyond the VLE.

R2.1: QUT should brand the VLE and provide a clearer representation for both staff and students.
Across all focus groups there was a high level of concern for the support available for students. Respondents indicated there needs to be caution regarding the number of different applications students could be required to learn. Moreover, some staff identified the VLE as being largely synonymous with QUT Blackboard. However, the VLE should be a collection of educational technologies that enables learning diversity. Therefore, this recommendation suggests two changes. Firstly, the VLE should be represented as an integrated system in a way that makes sense from a user-perspective. An example of this is the *eLearning Environments at USQ* dashboard for staff created by the University of Southern Queensland (refer to http://www.usq.edu.au/ele). Secondly, the VLE should be branded by using a more generic name that is not related to one particular tool or system (which is the case for 'QUT Blackboard'). Selecting a more meaningful identity such as 'QUT Learn' may enable staff to gain a broader appreciation of the range of educational technologies available and would more easily accommodate any changes within the distributed Core+ model (mentioned previously in R1.2).

R2.2: QUT should improve QUT Blackboard as part of the VLE while experimenting with alternative tools to provide extended functionality.
There were no calls from students to replace the Blackboard LMS, rather to make it better integrate with other tools to provide a seamless experience. Student responses highlight the need for a consistent approach by academics in using Blackboard, so that students know what to expect from Blackboard, across all units. Several responses indicated 'customisation' of particular unit sites is frustrating: 'it is just ridiculous trying to navigate through them'. Staff identified both strengths and weaknesses but there was no suggestion that Blackboard should be replaced by another LMS solution. Rather, there was a strong feeling across all focus groups and responses that the whole VLE (including the Blackboard LMS) must be flexible and that integration includes not only learning and teaching technologies, but other QUT systems to ensure flexibility of academic calendar, enrolment, administrative processes such as assessment sign offs and workflows, and the timetabling of resources. The responses indicated a need to focus on what a VLE should do, functionally, rather than what type of 'products' it should consist of. One faculty response noted that significant investment has been made in academic staff becoming accustomed to using the Blackboard LMS and thus a change is not warranted at present. To support this recommendation, it was decided that a 3-5 year technical roadmap for the VLE should be produced (and be disseminated to staff) based on an ongoing evaluation of learning and teaching needs in consultation with key stakeholders.

3. Improved and focused support for staff

There was agreement across stakeholder groups consulted that investment in staff capability building is the most important cornerstone of the successful use of digital technologies in learning and teaching. The starting point for this must be specific learning and teaching needs and desired learning outcomes, with appropriate learning design driving the use of technology rather than technology availability. While current activities are seen as valuable, there was a strong emphasis on increasing opportunities and support for communities of practice enabling staff to connect with one another and exchange ideas and good practice. Staff also raised the need to acknowledge the time and effort required, and to have resources and structures in place to encourage, enable and reward staff involvement in these activities. As a result, the review recommendations were to base capability building programs on defined and agreed learning and teaching needs; and to review current supports with a view to design a range of refreshed learning, collaboration and training opportunities to enable staff to effectively support their students' learning with technology.

R3.1: QUT should prioritise, address and highlight specific learning and teaching needs and initiatives.
Key to the success of the VLE is its ability to support current and future pedagogies by providing effective solutions for learning and teaching problems (i.e. rather than using technology for its own sake). As a result, this recommendation suggests that by identifying and prioritising particular pedagogical needs, suitable combinations of VLE technologies can be implemented and the outcomes (i.e. successes and challenges) then need to be shared with the wider QUT community. Based on student and staff feedback in this review, pedagogical needs included: using a flipped classroom approach; teaching face-to-face and online students at the same time; sourcing, creating, presenting, sharing and publicising content (for both staff and students); mobile learning; collaboration, communication and interaction in student teams; online assessment; developing and delivering MOOCs; and learning and teaching in collaborative learning environments. In addition, staff also need to be informed of what the VLE is not capable of doing and what alternatives exist or are being planned for inclusion. Therefore, the VLE dashboard outlined in R2.1 should be designed to showcase learning and teaching

initiatives and summarise known challenges and alternatives when working with individual or groups of tools.

R3.2: QUT should refresh the support mechanisms for staff to use the VLE effectively in their teaching.
Students emphasised the need for staff to fully understand the technologies being implemented: 'it's a joke sometimes… lecturers should be technology literate'; 'Students have to learn to be multifaceted… so lecturers should learn to use technology.' The focus group and faculty respondents felt strongly that support needs to be available when and where it is required both online and in the physical space. They particularly mentioned the lack of 'fit' between the learning and teaching 'window' and the support 'window'.

For staff to successfully address specific pedagogical challenges as mentioned in R3.1, a suitable range of support mechanisms must be put in place. This requires careful consideration of staffing, capability building strategies (including engaging academics over sustained periods of time) and support availability (Keppell et al., 2011, p. 2). The Horizon Report Technology Outlook 2013–2018 lists the top five challenges faced by Australian tertiary institutions and these are consistent with feedback we received:

1. Faculty training still does not acknowledge the fact that digital media literacy continues its rise in importance as a key skill in every discipline and profession.
2. Most academics are not using new and compelling technologies for learning and teaching, nor for organising their own research.
3. The demand for personalised learning is not adequately supported by current technology or practices.
4. Our organisations are not set up to promote innovation in teaching (Johnson et al., 2013, pp. 17–18).

Therefore, it was recognised that there is a need to review the support requirements for staff in the design, development, enactment and review phases of learning and teaching activities, with a particular focus on just-in-time support in the enactment phase.

4. Ongoing evaluation and review

At a time of rapid technology development and change, it is imperative to continually evaluate and review the effectiveness of the VLE, and to recognise that plans need to be flexible to ensure new developments can be taken on board. By re-conceptualising the VLE as a network of systems and tools which will be in constant flux (particularly at the more loosely defined levels), it is important to have a collaborative approach to evaluating and reviewing the effectiveness and fit for purpose of the VLE on an ongoing basis. Therefore, it was recommended to review the VLE on a frequent and regular basis, and to develop a shared framework for ongoing evaluation that includes input from all stakeholder groups.

R4.1: QUT should evaluate on a regular basis the effectiveness of the VLE.
Staff and faculties commented that there needs to be an evidence base for the development of the VLE. All focus groups requested the use of statistics and analytics from the VLE to be self-generated, rather than requested from a third party, as appropriate for units and courses of study. There was an equivalent call for analytics and statistics to be available to students to inform their learning, study planning and make explicit the progress through their courses of study. Interestingly, the ECAR survey results revealed that students are only moderately interested in early-alert learner analytics and guidance about course offerings (2013, p. 35).

It was decided that the ongoing evolution of the VLE needs to be informed by a continuous improvement approach. This could include the use and/or modification of existing processes and the implementation of more streamlined ones to attempt to determine the impact the VLE has on student learning and how well it meets staff needs. Evidence of impact could be obtained from:

1. VLE usage data. However, it is has been challenging to obtain meaningful usage data for this review indicating data collection approaches need to be improved.
2. Faculty review processes (including responses from student surveys).
3. Monitoring IT Helpdesk and Blackboard Support queries.
4. Crowdsourcing campaigns used as part of the technology adoption process.
5. Data interpretations from the *QUT Strategic Intelligence Unit* (including process mining).
6. Learning and teaching publications and presentations by QUT staff.
7. Benchmarking activities.

Discussion

The review has provided QUT with an opportunity to reimagine the VLE and re-engage with a range of academic and professional staff. On the whole, there was a willingness from staff to contribute to the review process, more positive feedback was received than expected about the current VLE (especially about the use of Blackboard), and academic staff seemed adventurous in the range of tools they currently used for their own learning and teaching needs. Yet, at the same time, there was concern about how students are able to cope with the range of technologies used during their studies. eLearning Services will continue to rely on this network, and hopefully expand it, for future review-related activities. However, it was a challenge to engage with students directly during the review partly because the crowdsourcing campaign and student/staff focus group occurred at the end of the first semester. Consideration is being given to how to better obtain input from students over extended periods of time while studying at QUT through face-to-face activities as well as already established engagement activities (e.g. regular student surveys that could include questions more relevant to the use of the VLE). Furthermore, consulting with alumni students might be worthwhile to obtain insights about how the VLE can support graduates in the real world.

It is important to note that the review coincided with a number of other learning and teaching priorities:

- the 'Learning Transformation Initiative' was investigating how to modularise Graduate Certificate course content for online delivery anytime and anywhere (with trials planned for 2015);
- preparations were underway for the release of two Massive Open Online Courses (MOOCs) about Robotics; and
- the Blueprint 4 was released in May 2014 providing more explicit detail about QUT's digital transform agenda (refer to https://www.qut.edu.au/about/strategic-ambitions/blueprint-for-the-future). To support this, 'visioning' activities are occurring to develop a more strategic view of all online and blended learning initiatives across QUT and within faculties.

The outcomes of the review are consistent with and confirmed by the thinking and strategies resulting from all of the above activities, in particular with regards to the need for a more flexible and extended vision of the VLE, the concept of which is widely understood and shared. The Core+ Model continues to be a useful representation not only to frame the technology stack making up the VLE, but also to discuss associated support strategies and levels, governance questions (e.g. what tools need to be used consistently), and for planning purposes.

Subsequent to further stakeholder engagement and endorsement from relevant committees, an implementation plan has been developed for the VLE Review. Relevant activities will commence in the second semester of 2014 with progress being dependent on available resourcing and funding. In summary, the review has provided a catalyst for change and it is hoped that this period of serious inquiry into how we use and support learning technologies will produce something of significant and of lasting value.

References

Ballard, J. (2013). *Learner engagement: A metric for learning*. Retrieved from http://www.slideshare.net/JamesBallard2/learner-engagement

Breen, R. (2006). A practical guide to focus-group research. *Journal of Geography in Higher Education*, 30(3), 463–475.

Carroll, J.-A., Diaz, A., Meiklejohn, J., Newcomb, M., & Adkins, B. (2013). Collaboration and competition on a wiki: The praxis of online social learning to improve academic writing and research in under-graduate students. *Australasian Journal of Educational Technology*, *29*(4), 513–525. Retrieved from http://ascilite.org.au/ajet/submission/index.php/AJET/article/view/154/607

Hakkinen, P., & Hamalainen, R. (2012). Shared and personal learning spaces: Challenges for pedagogical design. *Internet and Higher Education, 15*(4), 231-236.

Johnson, L., Adams Becker, S., Cummins, M., Freeman, A., Ifenthaler, D., & Vardaxis, N. (2013). Technology outlook for Australian tertiary education 2013–2018: An NMC Horizon project regional analysis. *Austin, TX: The New Media Consortium*. Retrieved from http://www.nmc.org/pdf/2013-Technology-Outlook-for-Australian-Tertiary-Education.pdf

Keppell, M., Suddaby, G., & Hard, N. (2012). *Good practice report: Technology-enhanced learning and teaching*. Retrieved from http://www.olt.gov.au/resource-good-practice-report-technology-enhanced-learning-and-teaching-2011

Kitzinger, J. (1994). The methodology of focus groups: The importance of interaction between research participants. *Sociology of Health & Illness, 16*(1), 103–121.

Mott, J., & Wiley, D. (2009). Open for learning: The CMS and the Open Learning Network. In education, 15(2), 1–10. Retrieved from http://ineducation.ca/index.php/ineducation/article/view/53/529

Oblinger, D. (2013). *The beginning of something big*. Retrieved from http://www.educause.edu/library/resources/beginning-something-big

Queensland University of Technology (2011). *QUT Blueprint 3: 2011-2016. Brisbane: Queensland University of Technology*. Retrieved from http://www.qut.edu.au/about/university/pdf/qut-blueprint-2011-20110411.pdf

Smith, S. R. (2013). *The connected learning environment*. Retrieved from http://www.educause.edu/library/resources/connected-learning-environment

Stubbs, M. (2010). *Outcomes of learning technologies review*. Retrieved from http://lrt.mmu.ac.uk/ltreview/2010/03/04/outcome-of-learning-technologies-review/

University of Southern Queensland. *Teaching support: eLearning environments at USQ*. Retrieved from http://www.usq.edu.au/ele

Contact authors: Roger Cook, roger.cook@qut.edu.au; Regina Obexer, r.obexer@qut.edu.au

Note: All published papers are refereed, having undergone a double-blind peer-review process.