



Uniting on-campus and distributed learners through media-rich synchronous tools: A national project

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Twenty-first century university students find it increasingly difficult to commit to regular face-to-face classes, yet real-time interaction and collaboration are often essential to achieving successful learning outcomes. This paper outlines the authors' plans for a cross-institutional project funded by the Australian Learning and Teaching Council aimed at identifying, characterising and evaluating technology-enhanced ways of bringing together on-campus and geographically dispersed students and engaging them in media-rich collaborative learning experiences. The project will focus on three synchronous technologies: desktop video conferencing, web conferencing and 3D virtual worlds. The paper first presents the rationale for the project, along with the main outcomes envisaged. The project's focus and methodology are then described, before concluding with a call for expressions of interest from members of the ascilite community wishing to join a network of practitioners and/or participate in case-study implementations that will be supported, monitored and evaluated as part of the project.

Keywords: synchronous learning, rich media, multimodal learning, collaboration, affordances

Project rationale and outcomes

Recent research clearly indicates that Australian university students are coming on to university campuses less and are going online more to fulfil their learning needs (James, Krause & Jennings, 2010). As they increasingly need to juggle the competing demands of work, family and study, the ways in which they engage with their institutions is changing. The use of technology is playing a key role in this change. While most students still

enrol to study on a centralised campus, their studies are supported through a range of online resources – lecture recordings, notes, readings, and so on – that make coming to campus more optional. As students choose more flexible study options and technology-based learning support becomes pervasive, the boundary between traditional campus-based and distance learning in higher education is becoming blurred (Dillenbourg, 2008).

Given the changing patterns of student engagement in higher education, the sector is more actively considering how technology can facilitate instructional and collaborative interactions between staff and students who are increasingly distributed and dislocated (Herrington, Herrington, Ferry & Olney, 2008; Lowe, Murray, Li & Lindsay, 2008; Smyth, Andrews, Bordujenko & Caladine, 2011). Higher educators recognise that in many disciplines, interactive activities often lie at the heart of effective, engaging learning experiences. These interactions take a variety of forms, such as: an individual student and tutor participating in a deep discussion about a tricky concept; pairs or small groups of students discussing problems or topics; whole-class discussions including facilitated question-and-answer sessions; or presentations delivered by students before their peers.

While enterprise Learning Management Systems (LMSs) have some ability to support instructional and collaborative interactions, such systems are routinely used for and suited to the provision of resources and asynchronous communication via tools such as discussion forums (Blin & Munro, 2008; Valcke, 2004). But media-rich synchronous technologies have emerged that may be used to greatly enhance the educational experiences of increasingly distributed university students. We have been successful in securing funding through an Australian Learning and Teaching (ALTC) Innovation and Development Grant for a national project that will explicitly consider how three of these technologies – video conferencing, web conferencing and 3D virtual worlds – can be best used to support effective collaborative and communicative activities that engage higher education students and teachers in real-time learning irrespective of their location. The main purposes of this paper are to promote awareness of the project in the ascilite community and to solicit interest in participating in both the project itself as well as the community of practice that it aims to foster.

In undertaking this research and development project we seek to achieve a series of important outcomes:

12. The establishment of a practitioner network comprising higher educators from across Australia with an interest in the use of media-rich real-time collaboration and communication tools for learning and teaching.
13. The development of a collection of case studies documenting six real instances of the design, development, implementation and evaluation of learning and teaching activities that employ media-rich real-time collaboration and communication tools, together with a cross-case evaluation.
14. The development of a publication containing:
 - a. a collection of *learning design exemplars* expressed as reusable templates that encapsulate key pedagogical features and patterns;
 - b. a *technology capability framework* that provides (i) a map of how the three general technologies being considered (video conferencing, web conferencing, 3D virtual worlds) can be used with particular types of collaborative and interactive learning tasks/activities, and (ii) a matrix of the capabilities and limitations of specific tools (e.g. Wimba Classroom, Adobe Connect, Skype) on particular dimensions (e.g. types of communication channels and interactions supported, degree of synchronicity, visibility of participants);
 - c. a set of overarching *guidelines for practice* that will draw on (a) and (b) to help higher educators make informed decisions and choices when designing media-rich real-time collaborative and interactive learning activities.

The project will lead to a greater understanding of how media-rich real-time learning technologies can be most appropriately applied in a range of institutional and disciplinary contexts across the higher education sector. Moreover, as emerging collaborative technologies move into the mainstream, this project will increase the capacity of university staff to use them effectively in conjunction with pedagogically sound learning designs. This has the potential to significantly enhance the learning experiences of students across the sector.

Besides delivering practical value, the project will also leverage, build on and extend scholarly knowledge in a number of areas related to learning, teaching and technology. There is broad consensus among educational researchers about the positive effects of collaborative learning on achievement (see, for example, Jonassen, Lee, Yang & Laffey, 2005; Joseph & Payne, 2003; Slavin, 1995). A key component of the longstanding research agenda in Computer Supported Collaborative Learning (CSCL) has been a focus on the effective design and use of social technologies (Suthers, 2006). Understanding how the features or ‘affordances’ of these technologies affect learning processes in specific instances and then comparing results across cases makes it possible to determine those elements of technology design that are vital and distinguish them from those that are less crucial

(Dwyer & Suthers, 2005). A primary goal of this project, then, will be to find and share collections of affordances that support effective collaborative and communicative learning processes.

Project focus

The project will focus on ways in which three types of media-rich synchronous technologies can be effectively used to engage lecturers and students in real-time learning regardless of where they are situated. The three technologies being considered are:

- *Video conferencing* systems enable synchronous interaction between remote participants in which they exchange detailed audio-visual information. They have a long history of transmissive use in higher education, for example to allow learners in rural and isolated locations to ‘attend’ lectures at regional centres (e.g. Caladine, 2006) and to connect students with teachers based at different sites of multi-campus institutions. However, as bandwidth and hardware costs continue to fall such approaches may be especially useful for bidirectional exchange of high-fidelity multimedia information, and for allowing students to participate in campus-based classes from their own homes and workplaces.
- *Web conferencing* tools such as Adobe Connect, WebEx and Wimba Classroom allow a group of users to enter a shared virtual ‘room’ that supports synchronous interactions through a variety of modalities. Users can collaboratively author text, draw shared diagrams and vote on issues of common interest, working together in real time in an environment that enables them to focus directly on the task and materials at hand (see Bower, 2008, 2011). While web conferencing has typically been used to facilitate entirely online learning (for instance, see Chapman & Wiessner, 2008), this project will also explore its potential for bringing together face-to-face and remote learners in integrated collaborative learning experiences.
- *3D virtual worlds* allow users portrayed by an animated figure or ‘avatar’ to move around a synthetic environment and interact with other objects and users. Examples of popular virtual world platforms are Second Life, Active Worlds and OpenSim. Virtual worlds can be used to support collaborative and interactive learning by allowing real-time verbal and non-verbal interaction, fostering co-presence, and enabling immediate control of objects and artefacts (Andreas, Tsiatsos, Terzidou & Pomportsis, 2010; Dalgarno & Lee, 2010). They can also be used in conjunction with face-to-face classes to create ‘blended reality’ experiences (Bower, Cram & Groom, 2010).

These learning technologies differ from those commonly provided within a university LMS, in that they are able to provide an increased sense of *co-presence* among staff and students, offer new possibilities for *concept representation*, and depend on *collaboration* coordinated in real time. Human-computer interaction researchers (Clark & Brennan, 1991; Kraut, Fussell, Brennan & Siegel, 2002) have shown how the characteristics of media such as co-presence (people have a sense of ‘being there together’ in the environment), co-temporality (communication can be sent and received at the same time), visibility (people and artefacts can be seen) and tangibility (people and artefacts can be touched) can all impact on the utility and effectiveness of both face-to-face and computer-mediated interaction. In terms of concept representation, selecting the most appropriate modalities is critical because it influences the effectiveness with which meaning is shared (Kress, Jewitt, Ogborn & Tsatsarelis, 2001).

Moreover, collaborative and communicative technologies relate differently to different pedagogical strategies, discipline contexts and types of educational material or content and as such may have different collaborative overheads or ‘costs’ attached to them. For example, Neale, Carroll and Rosson (2004) use the term ‘process loss’ to describe the overhead incurred when attempting to coordinate a collaborative activity. They also define ‘distributed process loss’ as the amount of coordination required to manage the main activity of interest when collaborators are operating remotely. They argue that distributed process loss in technology-based environments is much more costly than in face-to-face contexts, “so costly, in fact, that groups often do not recover from its effects” (p. 117). In their study, they observed that when participants struggled to understand what their remote partners were doing and why, collaborative breakdowns resulted. It is thus essential for higher educators to not only understand which technologies to use to meet the intended learning requirements but also to develop efficient techno-pedagogical strategies for effectively implementing online synchronous learning.

Project methodology

The project will be conducted in four overlapping phases. Phase 1, which will run from October 2011 to March 2012, will involve documenting existing practice in the use of media-rich real-time collaboration tools for learning and teaching. This phase will entail surveying extant literature as well as higher educators in a range of disciplines to create a bank of innovative practices in the area. Specifically, an online questionnaire will be administered to gather summary information and learning design descriptions from academics and educational designers already employing media-rich collaborative and communicative technologies. Respondents will also be invited to join a practitioner network.

Phase 2 will commence in February 2012 and conclude in June 2012. In this phase, the various learning and teaching activities from the collection of innovative practices assembled in Phase 1 will be systematically analysed to understand their learning design patterns and technological requirements, with a view to creating a technology capability framework. The salient features of collaborative learning designs and the capabilities of the technological tools used in each case will be distilled, characterised and drawn together in a framework to help higher educators make informed media/tool choices and design decisions. As the framework is being developed it will undergo peer review by practitioner network members.

Next, in Phase 3, six cases will be followed and investigated through participatory evaluation. This phase will run for approximately eight months, from June 2012 to January 2013. The cases will be selected with reference to the data gathered during the first phase as well as in consultation with members of the practitioner network. Planning and shaping of the implementations will occur in collaboration with participating staff to encourage renewal and enhancement of their existing practice. Ongoing evaluation and consultation will take place throughout the implementation so as to optimise outcomes for students and staff. In addition, a summative 'effectiveness' evaluation of the approach used in each case will be performed.

A central driver behind this project will be the goal of building a networked community of technology educators interested in media-rich synchronous tools, and as such the final phase (Phase 4 – January 2013 to September 2013) of the project will be dedicated to the dissemination of project outcomes and material across and beyond this network. The project's findings will be reported and shared through a website and publications that draw on the exemplar learning designs, technology capability framework, and the case studies and their evaluations. It is intended that these resources will contribute to the development of staff capability in the domain of media-rich synchronous learning, thereby engendering improvements to their practice and to the learning experiences of students. Through these activities, and with the support of organisations such as ascilite, we expect to be able to not only promote awareness and uptake of the project results and resources, but also to provide demonstrations of the synchronous learning approaches and strategies through webinars so that attendees may more easily apply them in their own practice.

The outcomes of the project will enable university teachers to better understand how important characteristics of synchronous technologies – types of presence, ways of representing information, and modes of collaboration – impact upon learning processes, so that they can more effectively meet the learning needs of their students. The project will build on existing literature, such as that emanating from recently completed ALTC projects focusing on video conferencing (Smyth et al., 2011) and video lectures (Gosper, Green, McNeill, Phillips, Preston & Woo, 2008), as well as other national initiatives (e.g. the DEHub virtual worlds scoping study – see Dalgarno, Lee, Carlson, Gregory & Tynan, 2011), by both widening the spectrum of media being examined and also more explicitly addressing how different tasks and technologies can be *practically* combined to support effective, location-independent real-time interaction among students. The project will also draw on research and literature in the area of reusable technology-enabled learning designs – see, for example, the products of the projects in this area sponsored by the Australian Universities Teaching Committee (AUTC, 2003) and the UK Joint Information Systems Committee (JISC, 2010). The integrated set of synchronous learning design patterns produced will provide the higher educators with concrete examples to support them in synchronously blending campus-based and online learning and teaching. Concurrently considering an array of tools that lend themselves to broader collaborative and representational possibilities will permit the derivation of more robust, pedagogically informed frameworks and principles for technology selection and use, that will readily support application across the sector as the technologies become more pervasive and accessible to students and staff.

Conclusion and call for participation

In this paper, we have discussed the rationale and intended outcomes as well as the methodology for a national project that seeks to investigate approaches for facilitating truly collaborative learning experiences among on-campus and distributed students through the use of media-rich synchronous technologies, with a particular focus on three representative technologies, namely desktop video conferencing, web conferencing and 3D virtual worlds. A key feature of the project is the formation of a network of practitioners, with whose help six case-study implementations will be identified, supported, monitored and evaluated. A technology capability framework and set of exemplar learning designs, along with practical guidelines for staff, will be generated, then trialled and refined as part of the case studies. These resources as well as interactive webinars will be practical outcomes of the project, from which members of the ascilite community will be able to benefit.

We would like to take this opportunity to issue a call for participation in the project, which can be at a number of levels. Firstly, Australian higher educators with an interest in the use of media-rich synchronous collaborative technologies for learning and teaching are invited to join the practitioner network, and may request further instructions on how to do this via email. Secondly, those who have experience and/or expertise in this area are asked to complete the online questionnaire, details of which will be made available through the ascilite mailing list and at the conference. Thirdly, expressions of interest are sought from those wishing to lead the implementation of a case study at their institution within their subject/teaching area.

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