



Technological innovation in action: Transforming the learning landscape for multi-locations through networked interactive whiteboards

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This paper commences to unpack the possibilities for the question: *how can technologies transform the learning for our future regional teachers?* Videoconference and interactive whiteboards are not new. Yet, the innovation of these technologies has resulted in a new way of thinking to enhance the learning experiences for regional students who often feel disconnected when studying from a distance (Moore, 1997; Knipe & Lee, 2002; Saw et al., 2008; Worthy, Arul & Brickell, 2008). The advancement arises when a shared digital canvas is created using networked interactive whiteboards in conjunction with the videoconference for video and audio communication to provide two-way distance learning. The Networked Solutions Project is an exemplar of such technologies being developed to improve the learning landscape for regional pre-service teachers at the University of Wollongong (UOW). The new infrastructure, technologies and evidence-based research of multi-location delivery attempts to address issues of: fragmentation; duplication; inconsistency and in-equitability as identified by Winchester & Sterk (2006) in their Australian Universities Quality Agency (AUQA) audit for regional universities. This paper is a work in progress; it explores multi-location delivery of the Graduate Diploma of Education (GDE), the pilot program for the project. Data collection will occur throughout the year, concluding in December, 2010. Arising from the completion of this research in 2011 will be the strengths, challenges and affordances of multi-location delivery. Initial findings have commenced to establish a picture of participant perceptions and experiences. Further to this, more research is necessary to better understand the effectiveness of the networked interactive whiteboards (NIWB) technologies in tertiary institutions (Dawson, 2010).

Keywords: networked interactive whiteboards (NIWB), collaborative videoconferencing, networked teaching, multi-location delivery.

The Networked Solutions Project

A pronounced shortage of teaching professionals exists in the rural and regional areas of Australia. In 2009, the federally funded project, "Networked Solutions" permitted the implementation of an integrated teacher education model across multiple sites at the University of Wollongong (UOW). UOW is an Australian regional institution servicing the south coast of New South Wales. The sites for the GDE program are located one, three and five hours drive from the main campus at Wollongong, Shoalhaven a satellite campus, and the educational centres of Bateman's Bay and Bega. Multi-location delivery involves teaching the same program at more than one location, often employing a variety of delivery modes. In the past UOW has used the following modes: transporting academic staff between locations; face-to-face delivery at the main campus with audio podcast lectures and shared program resources delivered locally via the Learning Management System (LMS). Economic,

time, distance, study, work, life constraints and technological advancement coupled with the need for an equitable teacher education program has driven UWO to explore how networked technologies may be utilised for multi-location delivery.

Technology infrastructure

New developments in educational technology at UOW have facilitated collaborative learning experiences at multi-location sites to minimise fragmentation of program delivery. A two-way digital canvas is created for distance learners when audio and video are combined at the same time. Touch sensitive whiteboards onto which computer screens are projected provide high visibility and can maximise the participation of our regional pre-service teachers. The whiteboards by themselves are not sufficient however, networking them connects geographically distributed learners to each other and other educational institutions as they are the same technologies currently being installed in NSW government schools. UOW believes that the proposed configuration by Caladine, Bavaro & Tindall-Ford (2010) will be the first of its kind. Implementation of these technologies has required considerable funding for facilities upgrade. All sites have networked interactive whiteboards (NIWB) and video conference multi-cameras linked using BRIDGIT conferencing software.

Potential to transform learning from a distance

The GDE is an intensive ten month, post-graduate teacher education program which includes thirty subjects delivered by eighty academics and forty sessional method lecturers. In 2010, the Primary Key Learning Area (KLA) subjects of English, Numeracy, and Science & Technology were delivered face-to-face from Wollongong and via videoconference to the multi-location sites. For the first time, the secondary method subjects of History, Society & Culture and English were also able to videoconference tutorials. This was viewed as an initial step towards implementing an integrated GDE program. With the addition of networked interactive whiteboards in the spring semester an opportunity is afforded to transform the learning landscape for pre-service regional teachers.

No longer does the technology just permit a one-way, asynchronous transmission of information. In 2011 the lecturers at one site will be able to initiate a synchronous “intra-action” i.e. student- to-student initiated activity (Caladine, 2008) through a shared digital canvas. In this way students at different campuses can solve problems by inputting and manipulating data. When used in conjunction with videoconference (vcf) lectures networked interactive whiteboards can expand face-to-face subject delivery (Dawson, 2010) for multi-locations.

Moving from a traditional mode of delivery

For UOW regional learners, face-to-face study is accessed through a satellite campus or education centre. The sites of Shoalhaven, Bateman’s Bay & Bega presently offer the GDE Primary Program with the addition of a restricted Secondary Program. By tradition, lecturing the most common teaching method in higher education was used to deliver the core subjects of the GDE program face-to-face from the Wollongong campus.

For multi-location delivery the lectures were recorded via pod cast and captured using software powered by Lectopia, an example of web-based lecture technologies (WBLT). The WBLT digitally records lectures for delivery over the web, audio files are made available through the Learning Management System (LMS) to local tutors and students. In the past, regional students may have experienced a psychological as well as physical distance from students and lecturers at other campuses. Even though, primary and secondary methods subjects were delivered face-to-face by specialist teachers who worked in the local community.

Significance of the research

Videoconference (vcf) technologies have the potential to increase the educational access for students in regional and rural areas as they provide a synchronous communication tool for multi-location delivery. Child, Nicholls and Smith (2003) confirm that while videoconference cannot replace the face-to-face experience it can add value to the learning process. This is the case if used innovatively with networked interactive whiteboards, as immediate interaction between the lecturer and student-to-student is possible (Dawson, 2010).

Unfortunately, there is minimal research literature about the effectiveness of collaborative videoconference and networked interactive whiteboards. A literature search has found only one peer-reviewed research article that has investigated this area (Dawson, 2010). The lack of published literature has motivated UOW to conduct research with the view of adding to the negligible body of knowledge on the subject.

Research methodology

The Faculty of Education has undertaken a proactive evidence-based approach utilising both qualitative and quantitative methods. As a result a multi-phased design was developed to examine multi-location delivery. At the time this paper was submitted the study had completed the first phase of data collection. The central questions of focus include:

1. What are the perceptions and experiences of the GDE multi-location participants?
2. How are technologies utilised to support an equitable experience for all students regardless of location?

The chosen sample involves all participants in the multi-location delivery of the GDE Program at UOW i.e. students, academics, sessional lecturers and tutors at all sites. Data sources are drawn from observations, entry and exit questionnaires, surveys and semi-structured interviews.

Findings of an initial snapshot

1. Contextualisation of the student cohort

At a recent teacher education conference at UOW Professor Ian Gibson from Macquarie University affirmed the need to research pre-service teacher's expectations, so that they be managed and aligned by their educators. Preliminary data analysis from phase one of the study has highlighted the cohort's Information and Communication Technologies (ICT) experience prior to commencement of the GDE program. 70% of students indicated that they were born in the decade 1980-89. These learners may be characterised as, "digital native" that is, a person for whom digital technologies already existed when they were born and have grown up with digital technologies (Prensky, 2001) or the 'Net generation' (Tapscott, 1998) or Gen Y, the millennial generation (Nimon, 2006).

One cannot make the assumption that all these learners possess the technical skills and are literate for networked learning by virtue of their age (Bennett, Maton & Kervin, 2008). However, GDE students have indicated they have "much and abundant" *confidence, knowledge, and experience* in using computers. Further collection of data, from the Appropriate Technologies survey revealed that 78% percent of the cohort perceived themselves as being competent and able to troubleshoot with ICT technologies. This presents significant implications for multi-location delivery in particular reference to subject re-organisation and the integration of ICT into the learning process. From the literature, tertiary educators are advised to focus specifically on learning outcomes rather than the technology when delivering via videoconference technologies (Worthy, Arul & Brickell, 2008; Kehoe, et al, 2005).

2. Students' experiences with multi-location delivery

Lectures and tutorials are the most common mode of delivering a subject at university. Initial data confirms that 74 % of the GDE students almost always or frequently prefer to attend face-to-face lectures. Some of the reasons for regularly attending lectures are listed as being: I found live lectures motivating; the presence of the lecturer added learning value and I could communicate and interact with the lecturer. This is supported by Hodgson's (2005) research indicating students were motivated by the lecturers' enthusiasm.

In terms of a preferred mode of delivery, the GDE cohort's highest rating was face-to-face, with videoconference and videoconference recordings as the next highest preference. The least preferred mode of delivery was a pod cast. A notable strength of videoconference lectures is the synchronous "real time" delivery of a subject to all sites. Nonetheless, anecdotal discussions with GDE students confirm the slow nature of videoconference delivery. This is supported by Freeman's (1998) research which compared vcf to face-to-face delivery:

... the lecturing, learning activities and interaction were not improved. They were slower. Other disadvantages were the times lost through technical difficulties and the greater likelihood for distractions at the remote campus (Freeman, 1998, p.209).

3. Academic experiences with multi-location delivery

Coping with ever-changing technologies is a constant ordeal for many educators. Initial data analysis from the semi-structured interviews revealed the challenges experienced by academics. A “steep learning curve” was a common experience articulated by many, particularly when learning to adapt the delivery of prepared face-to-face lectures to videoconference delivery. The primary reaction of academics in this study was one of anxiety and stress, which subsided with ongoing one-on-one support. Academics discussed the need to re-contextualise the new learning environment created by the introduction of videoconference technologies. A major issue was the inclusion of all students regardless of their location.

Meeting the learning needs of all students is demanding. One example discussed by an academic was the simultaneous delivery of a student-centred science experiment during a videoconference lecture. The brave academic overcame initial discomfort and with additional planning, organisation and support of the local tutors successfully executed the activity with maximum student engagement at all sites.

If we teach today as we taught yesterday, then we rob our children of tomorrow.
John Dewey (1859-1952).

Multi-location delivery using videoconference lectures cannot be assumed to be equal to delivering face-to-face lectures (Worthy, Arul & Brickel, 2008). This is a major challenge for tertiary educators. Caladine (2008) recommends re-thinking the structure of the lecture to encourage student interactivity. He further advises ten minute segments of lectures interspersed with structured activities linked to specific learning outcomes for sustained student engagement. Structured synchronous discussions during videoconference lectures can also be problematic as they require different management strategies. Further in-depth discussions to support learning can be explored with other technologies such as the LMS can provide asynchronous threaded discussions /blogs or synchronous “chat” forums.

Conclusion

Videoconference lectures, tutorials and networked interactive whiteboard activities present enormous benefits for regional pre-service teachers who have limited options. Nevertheless, it is naive to assume that by merely achieving technical success creates effective learning for geographically distant learners. This is only an element of the solution to: *how technologies can transform the learning for our future regional teachers?*

An affordance for regional pre-service teachers is synchronous, student-directed learning that was never before possible. The “Networked Solutions Project” has provided the opportunity to learn in new ways with a shared digital canvas created by networked interactive whiteboards in conjunction with collaborative videoconference. This project aims to continue collecting evidence to document the strengths, challenges and affordances of networked solutions to improve learning outcomes for regional pre-service teachers. Further to this, more research is necessary to better understand the effectiveness of networked technologies in tertiary institutions (Dawson, 2010).

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