

Video Conferencing in Distance Learning: A New Zealand Schools' Perspective

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Introduction

Distance learning is characterised by the separation of place and/or time between teacher and learners and learning resources; it involves interactions that are synchronous or asynchronous; it can be conducted through a variety of media and may employ a variety of delivery methods. Technology is a tool that enhances distance learning (Lai, Pratt, & Grant, 2003).

The evolution of distance learning is generally described as *generational*, a term that relates to the technologies and pedagogies prevalent at a particular time. Scholars vary in their categorisation of the generations in relation to distance learning. A simple overview of the generational stages begins with the correspondence phase and its reliance on print-based media; then radio and television were effective means of broadcasting to the masses; the next generation used computer-assisted learning and advances in telecommunications (audio and videoconference). And that brings us to the current generation, which uses the internet for distance learning (Rumble, 2001, in Lai et al., 2003). Web 2.0 technologies are already on the stage to be generation five in the distance learning story. Some scholars have included a *systems approach* as a step in the generational timeline, in acknowledgement of large-scale distance educational institutions such as the Open University, which led to “new ways of organising technology and human resources, instructional techniques and educational theories” (Moore & Kearsley, 2005, p. 33).

Video-conferencing solutions

Video conferencing is a synchronous audio and video telecommunications technology in which people are able to see and talk to others from two or more separate locations. It can also support the sharing of files, applications, and electronic workspaces. The two main types of video-conferencing systems are *desktop* and *dedicated* systems (Becta, 2003).

Desktop video conferencing operates through a normal computer. This type of conferencing is most suited to one-to-one communication, and is used in some New Zealand classrooms for small-group conferencing. This is a good low-cost option for schools (Western, 2006). One example of how desktop video conferencing is being used in distance learning is Project LIVE, an initiative of the Northern Health Board School. The aims of Project LIVE are to increase student/teacher contact and facilitate peer interactions, enhance face-to-face tutorials, and share teacher expertise across the school (Northern Health Board School, 2007).

Dedicated video-conferencing systems usually comprise a video camera and CODEC device for recording, compressing, and sending video and audio data across a network; two television monitors (one to view the local site and another to view connecting sites); and an audio unit and controlling device (Mason, 1994).



Figure 1 Dedicated video-conferencing system

Data can be inputted through a document camera or connected data device such as a laptop. Nationally, an increasing number of secondary schools are collaborating to use dedicated video-conferencing systems to provide distance learning opportunities for their students. These schools have formed a national video-conferencing network linked through a virtual private network.

History of video conferencing

Video conferencing in distance education has developed from the broadcasting generation through the media of television. The first interactive video conferencing took place through the cabling of closed-circuit television connections. Satellite television links that were originally broadcast then became interactive by linking audio, and delivery of distance learning took place through satellite television beamed to different locations. Participants could use the telephone to ask questions and engage in discussion. This form of distance learning required a studio for the television production, and technicians to provide support on all receiving sites. The National University Teleconference Network (a consortium of American Universities) was an early user of this technology (Duning, 2000).

In the 1970s, video conferencing was trialled across telephone networks but the quality was too poor to be effective. Faster digital networks improved the quality of transmission in the 1980s, but it was still too expensive for general adoption. Advances in video compression, improved bandwidth and IP (Internet Protocol) technology in the 1990s improved the quality of video conferencing, but cost was still a prohibitive factor for general educational uptake. It wasn't until the early 2000s that widespread availability of increased bandwidth, lower prices for equipment, and standardisation and interoperability of networks led to greater uptake by many sectors. At this time, video conferencing began to be known in New Zealand education as a tool to support distance learning. Web-based video conferencing became a commonly used technology in homes, offices, and schools as the inception of CU-SeeMe led to a plethora of free services and software such as Skype, MSN Messenger, and Net Meeting (Wikipedia, 2007).

Key stages in adopting video conferencing

There were several stages in the growth and development of distance learning through video conferencing in New Zealand secondary schools. In the early 1990s, The Correspondence School was the first in the school sector to

begin trialling telecommunications technology. Casatech, a group of seven Canterbury schools, was initiated in 1994. These schools collaborated to teach classes to each other's students through an audiographics network (Browning, 2005). By 1996, other school networks using audiographics had been established. They were TosiTech (top of the South Island schools cluster), CentralTech (lower North Island schools), Ngata Memorial College, and Rangitikei College. Funding from the Ministry of Education (MOE) Rural Schools Pool enabled these networks to grow (Moffatt, 1996).

Kaupapa Ara Whakawhiti Matauranga (KAWM) was the first e-learning cluster to form, and one of their main goals was to use video conferencing to enhance learning opportunities for their students. Established in 2000, KAWM has grown to over 20 schools spread all over New Zealand from Kaitia to Invercargill; it includes the Māori boarding schools, kura kaupapa, and East Coast Area Schools. Te Kura Hiko (the online classroom) was part of a wider ICT project (with professional development for classroom teachers, and a shared infrastructure) which aimed to strengthen curriculum delivery. Another key focus was the development of Wharekura Expert Teachers to address the shortage of Māori medium subject specialists at the secondary level (Stewart, 2001).

Although KAWM were pioneers in providing video-conferencing learning opportunities for their students, it was OtagoNet that would provide the model for many other New Zealand schools to follow. Community Trust Funding in 2001 delivered fully equipped broadband video-conferencing facilities for every school in the cluster ("OtagoNet Shows the Way," 2002). OtagoNet developed a virtual private network, which was to become the Telecom SchoolZone service that is used by the majority of e-learning schools today. OtagoNet also documented their journey with extensive formal research (notably *e-Learning Initiative: Evaluation of the OtagoNet Project*, a report submitted to the Community Trust of Otago; and the work of 2004 eFellow Lynda Walsh-Pasco, *From Teletubbies to Teleteacher: Effective Practices in Video Conference Teaching*).

A key enabler of the e-learning cluster development nationally was the improvement in bandwidth afforded by Project Probe (2002–2005). This was a joint government initiative that aimed to ensure all schools, including the most rural and remote, had access to broadband (eGovernment, 2007). The MOE funding of a national video conferencing bridge ("ICT Importance Backed," 2003), and investment in the development of the Virtual Learning Network (VLN) ("Transforming the Learning Environment," 2006), were

also important factors in the initiation and development of new e-learning clusters and their collaboration within a wider national network. The VLN, which originated within The Correspondence School, and is now a division of the MOE ICT unit, has a central role in coordinating and anticipating the future needs of clusters.

The Correspondence School, New Zealand's largest distance learning provider in the school sector with a roll of 16,000, provided some video-conferencing support to early clusters such as KAWM (Waiti, 2005) and OtagoNet (The Correspondence School, 2002), but did not play a pivotal role in the development of online learning communities. Derek Wenmoth, then eSection head of The Correspondence School, had envisioned that:

there is no longer going to be a highly centralised focus on the Correspondence School. We will have an anchoring role, networking schools to ensure the breadth of curriculum is provided.... broadband will also enable schools to deliver education in a more collaborative way—moving away from teacher/student relationships towards the development of learning communities (“Broadband on its Way,” 2002, ¶ 33).

The Correspondence School may not have gone on to collaborate with schools because of the restructuring that was taking place within the school at that time.

around 50% of the school's 20,000 students were in fact already attending traditional secondary schools, using TCS courses to supplement the limited subject offerings of what was available to students in their own school. The transition into an eLearning environment, I thought, provided a wonderful opportunity to not simply supplement our existing school system, but to transform it!

Unfortunately, at a time of increasing scrutiny into costs etc., the opportunity for transformation was lost to those on the conservative side of the fence—and so we go on building new old schools....

(Wenmoth, 2007, ¶ 1–2)

The Correspondence School has recently begun to offer video conference support again, with a number of classes being offered on the VLN brokerage website for the first time in 2009. The appointment of a VC Coordinator within The Correspondence School has helped it to work more collaboratively with cluster schools, enabling them to identify areas of need, and providing classes alongside other schools to help fill the curriculum gaps.

In 2008 and 2009, E-learning Cluster Leadership Funding was made available to school clusters by the MOE to maintain cluster leadership roles and cross-cluster relationship building, with a key goal of e-learning cluster sustainability. This has given rise to “a new type of leader among New Zealand’s schools—the ePrincipal. Not principals in the traditional sense, the ePrincipals are tasked with managing clusters of schools that deliver virtual classes through the internet” (“Leaders of the E-learning Evolution”, 2008, n.p.). This group of e-learning leaders, who have named themselves *Mahi Tahi* (‘working as one’) have made a difference within their own clusters and nationally as they collaborate to support e-learning in schools. They have worked to develop and refine policy and procedure for the delivery of online learning, share best practise, provide professional learning opportunities for teachers, develop student support networks and structures, set up programmes such as Scholarship Mentoring, and Gifted and Talented Students; identify areas for innovation; support research; and look for opportunities to include the wider community and support new schools and clusters as they join the VLN. A strong leadership base in the e-learning clusters has also been reflected by a growth in the number of students enrolled in online classes. For example, in the TaraNet cluster of the schools, the student roll has grown from 40 students in 2007 to 104 in 2009, with 21 new classes being offered, compared with 12 new classes in 2007 (Roberts, 2009).

Video conferencing in the New Zealand school sector

As discussed, school e-learning clusters have existed in New Zealand since the early 1990s but have grown exponentially in number since 2003. Browning (2005, p. 3) defines them as, “a regional or interest-based cluster of schools that use one of, or a selection of, ICTs (including video conferencing) to enable the sharing of resources, staffing and students, thus creating a virtual community of practice where the benefits to all involved are greater than the sum of the individual contributions”.

There are approximately 15 e-learning communities actively operating within New Zealand, with more schools considering joining or forming an e-learning community (Allot-McPhee, personal communication, August, 2007). All participate in the delivery of and access to online classes through the VLN (www.virtuallearning.school.nz). In 2009 there are 252 schools and 154 e-teachers participating in the VLN. There are 1401 student enrolments and 212 classes (Reisch, personal communication, March 2009).

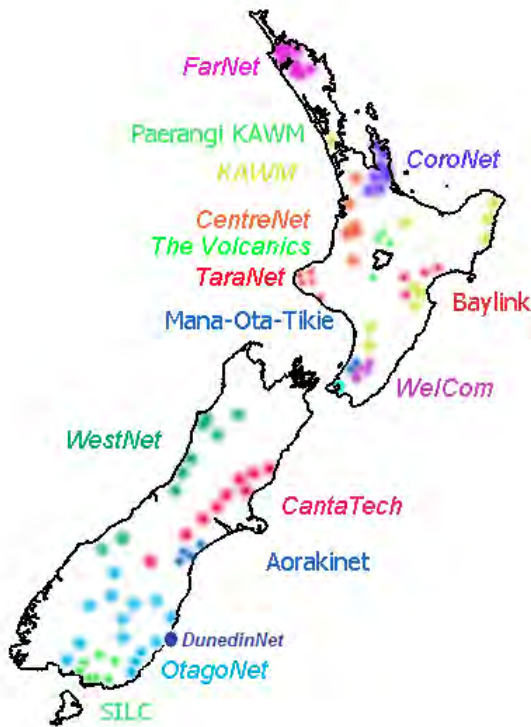


Figure 2 E-learning clusters 2009

Source: www.virtuallearning.school.nz

The growth and development of these e-learning communities has been ‘organic’; practice has been shared amongst the communities by osmosis—not by design. Schools have seen the possible opportunities and collaborated to enable those opportunities with (until recently) little formal national coordination. They follow a similar learning/teaching model, in which video-conferencing sessions are scheduled to a national timetable, and students work independently during their non-contact time to complete work that many access through web-based learning management systems. Students continue to interact with their teacher and their class members through these online learning environments, email, and (sometimes) instant messaging and text messaging. Most follow a contributed staffing model whereby schools that contribute a class to the national network are able to access other classes from that network for their own students. All clusters have a priority enrolment for students from their own schools before they enable access to students nationally.

Students in small rural schools now have as much choice as those in large city schools. Access to distance learning through video conferencing offers senior students more choices for subject selection. In some schools this has led to the retention of students who might have previously left the district to attend secondary school. It has also led to the retention of teachers because they are able to teach in their chosen areas of expertise (Baldwin, 2006). There is also a higher level of support than is possible through The Correspondence School (Baldwin, 2006), as well as increased student motivation (Browning, 2005). The ability to see your teacher and peers every week can enhance the 'social presence' of participants and make the learning experience more positive and enjoyable (Walsh-Pasco, 2005; Mason, 1994). Social presence is one of the four main factors affecting teaching and learning effectiveness in video conferencing and is "defined as the extent to which a communication medium allows the actual physical presence of the communication partners to be conveyed" (Short et al., 1976 in Chan, Tan, & Tan, 2002, p. 280).

The increased collaboration between schools has been a goal and a positive outcome for many schools participating in e-learning clusters (Browning, 2005; Waiti, 2005). The New Zealand Council for Educational Research (NZCER) has been commissioned by the MOE to explore students' experiences of learning in virtual classrooms. Results from this research will be available in September 2009.

Common issues

The logistics of a shared timetable, organisation, communication, and coordination between e-teachers, students, and schools within and across clusters has been challenging for schools. These challenges are being addressed as clusters develop procedures and protocols to govern the way they operate. Technical barriers are a concern for some schools that have yet to develop a robust network infrastructure, have access to reliable technical support, or access to true broadband speeds.

Video conferencing brings a higher workload for e-teachers. Teaching itself is a more intense experience during a videoconference lesson than in a traditional lesson, and more time is needed for adequate preparation (Walsh-Pasco, 2005). Having appropriate release time and support for developing online courses is critical for teachers. One key to this is the need for professional development (Blomeyer, 2002). Professional development needs to be ongoing to help teachers make the transition to online teaching, and pedagogical training is as important as technical training (Waiti, 2005).

Becoming an online teacher brings the same stress and workload as being a new teacher again (even for those teachers with years of experience), and is in itself a rigorous professional learning opportunity. Teachers will need to learn new teaching strategies, adapt curricula, develop technical skills, and become familiar with a very different learning environment.

An online class is more open and transparent than is teaching inside the four walls of the classroom—teachers are open to the scrutiny of others not only within their school, but across other schools as well. There is a need to have good systems in place to support teachers to ensure the provision of quality teaching. Jeffares (2006) says, “(i)n order to better support our eTeachers it is necessary ... that eTeaching be part of their performance appraisal, that they engage in ongoing professional development during the year and that we carefully guard their non-contact time” (p. 2).

There is a need for better on-site student support in many schools. In-school support is important to the success of secondary-school e-learning students. “Students need a place of supervised study where they have an adult taking an interest in their work and helping them to solve any problems they may have, helping them to organize their time and stay on task. They also need access to computers and other resources to support their learning” (Jeffares, 2006, p. 1).

All schools have a designated VC coordinator whose role it is to liaise with e-learning students, teachers, NZQA, and institutions. They organise supervision for assessments, provide access to learning materials, and are the main point of support for students. Although they provide a valuable administrative service, they do not provide the level of *learning support* that is really needed. A good model of student support can be found at Roxburgh Area School where they have established a Learning Centre and appointed *mTeachers* (Mentor Teachers) to work with students who are not in a face-to-face class (Pullar & Brennan, 2007).

Sustainability is an ongoing issue. All clusters struggle to find renewable sources of funding. So far, funding has been accessed from short-term contestable sources such as community trusts and MOE initiatives (ICT Professional Development funding, Collaborative Innovations funding, Extending High Standards Across Schools and, more recently, e-learning Cluster Leadership funding). “Funding eases the development of the distance education enterprise by putting in place basic people and organizational support services or by funding the development of new courses” (Meyer, 2002, p. 5).

This type of funding has been crucial for the establishment of New Zealand e-learning clusters, but clearly this is not sustainable in the long term. Part of the funding issue lies in the provision of shared staffing across schools, and the funding formula attached to students. Most of the secondary-school e-learning communities participating in the VLN work on a 'tatau tatau e' system based on the good will of all those involved. Teachers are contributed to the e-learning faculty, and students access the courses with no money changing hands. As enrolments continue to grow nationally and the collaborations between different schools and e-learning communities 'cross-fertilize' at a growing rate, the simple exchange of students and teachers will not be adequate to ensure fairness and equity across all schools. In 2005, Browning requested that the MOE actively address the development of a suitable funding model. So far there has been no change to the funding models.

As well as reliable funding, there are a number of success factors that would ensure the sustainability of e-learning clusters. They are: strong leadership, with school principals committed to and actively supporting the cluster; the development of a shared vision and a plan on how it will be achieved; a cluster culture where every school collaborates for the good of the whole group; quality teachers who also have a commitment to e-learning, and the appointment of staff specifically to coordinate e-learning in their schools; and support from the MOE for improving infrastructure, providing broadband, and professional development (Browning, 2005).

Future trends

Video conferencing and e-learning in New Zealand schools has the potential to offer more than simply widening the curriculum choices of students. There are opportunities for students, teachers, and the wider community to connect with others and engage in a diverse range of activities limited only by our imagination. (For examples of these activities see <http://bardwired.blogspot.com/search/label/video%20conferencing>.) Students are already engaging in digital conversations with experts and joining virtual field trips. Teachers are tapping into a wider network of expertise through online professional learning opportunities such as workshops, curriculum support meetings, and conferences. A range of initiatives are currently being trialled and supported by the VLN. The National Library is trialling professional development for teachers in the use of their online resources. Te Kete Ipurangi (TKI), the online learning centre, has a schedule of digital conversations to familiarise teachers with the TKI site and resources found there. Music tuition has been trialled successfully and is continuing, with schools in remote locations

having access to the expertise of tutors from the Canterbury School of Music. Sport and Recreation New Zealand (SPARC) has linked expert coaches to schools and regional coaches. In kura kaupapa, a project started in 2007 and continuing into 2009 is evaluating the effectiveness of online learning environments using LAMS, Moodle, and Adobe Connect to support student learning outcomes in bilingual educational settings. A growing number of tertiary organisations offer courses to schools and their local communities through the VLN. In 2008, Otago Polytechnic, WINTEC, and Telford Rural Polytechnic offered 26 courses ranging from Apiculture to Early Childhood Education. NatColl has recently offered courses in digital media. The wider community is beginning to come on board, as is a group of Dannevirke farmers who are studying with video conference support through Crown Agriculture Research (Reisch, 2009).

There will be a rise in the number of urban schools that become involved in the VLN, which has so far been over-represented by rural schools. In 2009, DunedinNet schools began teaching and learning online, as did Wellington High School. Schools see the VLN as an opportunity to personalise learning by providing more tailored and flexible learning pathways for their students. A small number of primary schools are beginning to tap into the VLN, engaging their students in digital conversations and exploring the sharing of teachers to provide language learning for year 7 and 8 students. These learning opportunities reinforce the core elements outlined in the revised New Zealand curriculum.

In terms of vision we want to see learners who are 'connected', 'actively involved' and 'lifelong learners'. We want to improve competencies such as 'managing self' and 'participating'. We want to develop a curriculum that embodies principles such as 'learning to learn' and 'community engagement' and we also want to foster values such as 'innovation, inquiry and curiosity'. An environment such as the Virtual Learning Network allows students to develop their own learning pathways, to self-manage, to connect and to collaborate with others. (Bolton & Roberts, 2008, n.p.)

Another trend already making itself felt is the adoption of a range of technologies (as well as or instead of) video conferencing to support online learning. Adobe Connect, a web-conferencing tool, is widely used by Southland schools for their online classes alongside audio conferencing. An ever-growing swag of Web 2.0 tools, such as wikis, blogs, and podcasting, are being added to the e-teacher toolkit—along with Skype, IM, and text—to

communicate with students. Most e-learning clusters and schools have provided learning management systems such as Moodle or KnowledgeNet, and teachers are actively developing online spaces for their classes. With professional learning support, e-teachers are now able to choose the most pedagogically appropriate tool and don't need to simply rely on their once-a-week video-conferencing session to interact with their students.

A significant trend of distance learning is the convergence of face-to-face learning with distance learning (New Zealand Ministry of Education, 2004).

The technologies and methodologies used in distance learning are increasingly being used in face-to-face teaching, so that on-campus students' learning is often augmented by the use of web-based materials and multimedia presentations (Lai, Pratt, & Grant, 2003, p. 14).

What is evolving is a new form of 'blended education'. In the future, teachers may or may not be in the same physical location as their students, and ICT will be an integral part of virtually every lesson (Browning, 2005, p. 3).

This trend toward blended education is of particular importance to all New Zealand schools, especially those that are embarking on distance learning through video conferencing as they struggle with the issues outlined above.

Conclusions

Tension is being felt in schools now, as the flexible, self-directed and open nature of distance learning crosses over into highly structured, timetabled, current traditional school settings. Distance learning cannot be simply overlaid onto existing school systems. Schools will need to transform to assimilate the traditional and 21st century models to better meet the changing needs of our students. The transition is not a simple one and will require a high level of leadership, commitment, and support, and an understanding that it is not a technological shift that will enable this—but a pedagogical shift.

Systems need to change at a school level: they also need to change at a national level. As e-learning communities have grown over the intervening years, many of the issues that they encountered have been common to all and, with the increased collaboration between e-learning communities in the provision of distance education, these issues have wider implications for the national network as a whole. Secondary school e-learning communities

have now matured to the stage where they need to develop a more structured, cohesive, arrangement than is currently in place.

After a decade of innovation in the use of telecommunications technologies (first audio-graphics, then video conferencing) in some of our smaller secondary schools we are at a point where we must move from a 'cottage industry' approach to something that is more systemic. (Wenmoth, 2006, ¶ 2).

Without losing local autonomy, e-learning communities need more centralised coordination and governance as well as the provision of adequate resourcing and sustainable funding models in order to continue to lead the way in the e-learning landscape. Planning is currently underway amongst the Mahi Tahi group to form a national organisation with a view to sustaining growth and development of the VLN community. Discussions have begun on the development of a charter and the possible structures and roles of a national organisation. The challenge for every school that is part of this network is that they will each need to commit to sustaining this organisation from their own school's resources, because there will be no further MOE funding for cluster leadership.

The purpose of a new independent organisation would be to provide guidance and support (especially for new schools and emerging clusters), address issues of sustainability, lead national educational activities (such as digital conversations, scholarship mentoring, and gifted and talented programmes), provide a national voice for clusters, take over development of the VLN website, foster innovation, facilitate collaboration and the sharing of ideas through a coherent network, and provide professional growth for e-teachers and cluster leaders (Allott-McPhee & Pullar, 2009). When a sustainable national network can be assured, we will have an economy of scale that allows for the effective use of resources through collaboration and sharing within a network that is shaped and driven by the schools themselves. Most importantly though, our students will continue to benefit from an enriched and extended curriculum that caters for their individual learning pathways within a ubiquitous and flexible learning environment.

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Biographical note



As one of the first graduates of Massey University's Distance Learning Bachelor of Education programme, Rachel has first-hand experience of the value of ICT in teaching and learning. She has actively pursued this interest by continuing postgraduate work in the area of learning and educational technologies and in her career pathway as BardWired ICTPD Facilitator, and in her current role as ePrincipal for TaraNet.

