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Digital technologies for innovative research networking including research to inform educational innovations in twenty-first century learning

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Abstract

The New Zealand Collaborative Action and Research Network (NZCA&RN) has attracted an unusually strong gathering of researchers working on innovations with digital technologies in education. The inaugural symposium proceedings (Davis, Fletcher, Morrow, McGrath and Somekh, 2009) included experts in technology and teacher education, e-learning and distance education (Davis; Lai & Pratt; Mackey; Morrow); Multiuser Virtual Environments (Atkins), ePortfolios (Lamont; Davis).

In our view it is essential that New Zealand researchers have the opportunity to respond to these rapid advances using these technologies as an engine to enhance the networking of research. Our inaugural symposium used REANZ video conferencing to engage with researchers internationally and a Blog to promote networking. The inaugural NZCA&RN symposium co-chairs, Niki Davis and Bridget Somekh, brought with them lively links with international networks including the Society of Information Technology and Teacher Education and the International Federation of Information Processing educational research working group. These international networks and our parent CARN advocate for increased digital equity in the rapidly changing educational ecologies of the twenty-first century (Davis, 2009).

This paper will identify our research and action by continuing with its mapping and identification of why these NZCA&RN approaches matters in our diverse ecologies, with an emphasis on what should happen next. It will also stimulate increased application of digital technologies for collaborative action and research networking in CARN, especially in NZCA&RN.

Introduction

In May 2009 we established the New Zealand Collaborative Action and Research Network (NZCA&RN) hub through the medium of [an invited research symposium and associated Blog](#) stimulated by Visiting Professor Somekh (2009), a founding member of the global [Collaborative Action Research Network](#). Our networked learning community is in the form of “power networking” (Castells 2001) and designed to change the way we perceive, organize, manage and consume educational research within diverse Action Research traditions complemented by sympathetic

approaches, including those associated with Kaupapa Maori approaches. In addition, NZCA&RN includes unusual strength in research in teacher education and in the applications of digital technologies.

Our goal through NZCA&RN is to advance educational research and practice in New Zealand and internationally; and to map the diverse territory and identify the puzzles, dilemmas and contradictions among communities, practitioners, scholars and academic leaders and to inform action. It was essential in this conception that we honour the many ways of knowing and being within New Zealand, which is an increasingly bicultural nation, by opening the symposium with the understanding that Kaupapa Maori and diverse Action Research approaches, while different are not incompatible. Within both approaches researchers are expected, by their communities to have some form of critical and historical analysis of the role of research in a range of dynamic contexts and sites (Macfarlane 2009). Thus a metaphor which has come to dominate is braided rivers emerging from individual mountains and flowing into the seas that drift around the world.

Our NZARE symposium aims to expose the strong flows of our braided rivers of collaborative action and research networking. Together we will identify what is important and what should happen next. This paper is a discourse to uncover why and how the application of digital technologies is relevant to NZCA&RN within New Zealand and to CARN on an international scale. To do this we clarify our contrasting experience and perceptions of the affordances and challenges of digital technologies.

We also recognize that digital technologies and action research are part of our identities (Davis & Morrow, 2010, in press) and that virtual environments have become real locations for education and training, creating new blended and hybrid ways to teach and learn (Mackey, 2009; Compton, Davis & Mackey, 2009; Morrow & Bagnall, 2009). Thus our action and research will be applied in virtual environments too. Indeed, the anthropologist Michael Wesch (2009) argues compellingly on YouTube and elsewhere that “the machine is changing us.” We see the New Zealand Collaborative Action and Research Network as a strong and vibrant community of researchers who will help to identify and map these changes.

Digital technologies that we used while creating NZCA&RN

Given this nation’s strong scholarship and teaching of Action Research in the area of ICT and e-learning, Niki Davis and Bridget Somekh proposed that digital technologies be a particular strength of NZCA&RN and this was accepted at the inaugural symposium. The inaugural symposium attracted leaders of ICT and e-learning in New Zealand, including Clare Atkins, who leads New Zealand’s major educational project in Second Life (SLENZ, 2009), and who has proposed a CARN community within second life. We also used digital technologies to increase the reach of our NZCA&RN agency, including the Blog mentioned earlier and a video conference link to Chris Bigum in Australia to launch the *Handbook of Educational Action Research* during the symposium.

We argue that the processes that were employed not only facilitated the mapping of NZCA&RN territory but also can be seen as compass that could guide others who wish to form similar research networks (Fletcher, Davis & Groundwater-Smith, 2009) and we will present that view at the New Zealand and Australian associations for research in education. In addition this paper expands on the tools and contexts provided by information and communication technologies in the twenty-first century.

Some brief notes on the ICT tools that came easily to hand in the setting up of NZCA&RN follow before we discuss a few in depth. Email was an indispensable tool to raise awareness of our aim to set up NZCA&RN and seek consensus. Although the telephone and site visits were essential they would have been time and resource intensive alone. In only two weeks we had national consensus that NZCA&RN was welcome and that it would be possible to host a meeting with participants across the country. This was despite the increasing problems of spam and related filtering of messages. Our

second major tool was the use of word processing, spreadsheets and desk top publishing to collect, select, edit and publish the symposium proceedings and manage the organization. These office tools were adequate for our size at this time and we expect that we may need to scale this up as have done larger professional associations. The Association for the Advancement of Computing in Education led by Gary Marks was an early leader of such applications and, through her leadership in the Society of Information technology and teacher Education, Niki Davis is conversant with them.

NZCA&RN has also adopted web 2.0 tools, starting with a Blog, see <http://nzcarnresearchsymposium.blogspot.com/>. The simplicity of publishing news items to keep web savvy participants and others informed has been welcomed, but it remains challenging to encourage more participation from those who are less aware and proficient with 21st century applications. We expect that similar and greater challenges with more advanced tools such as a MUVE (see later), including the learning curve required to become familiar with moving one's avatar in a virtual world.

We have already started a blend of these tools and media within our face to face meetings at our symposium. For example, Clare Aitkin's poster was displayed only on a computer and included the presence of her avatar. In addition, video conference was used to bring in a participant from Australia and greater use is planned in future (see later).

On the web NZCA&RN has a static web site under development to complement its Blog and this will be linked within the global CARN web site. Through our web presence we hope to develop and support a strong community interested and involved in collaborative action and research. Recognising the value of shared ideas, experiences and interests, we plan to explore digital tools for networking (e.g. social bookmarking, social networking) that will support the aims of NZCA&RN and create an effective and efficient avenue for communicating.

Currently as we write Bridget's Keynote speech at the international CARN conference in Athens is being captured on digital media for reuse in a planned networked event across New Zealand in March 2010. Two members of our NZCA&RN are present to add the regional/local dimension, namely Angus Macfarland and Gina Haines. In March 2010 NZCA&RN will have a synchronous meeting in at least three locations – the three sponsoring universities where we will play Bridget Somekh's keynote and debate the issues that she raises. We also plan to link the locations into a national event using videoconference and stream it into Second Life.

Opportunities and challenges of ICT tools for action and research

This section takes the opportunity to consider some of the information and communication technologies that are likely to be important in NZCA&RN. We have chosen three: videoconference, MUVE and ePortfolio. The inaugural symposium linked with Australia using video conference and more links are planned across New Zealand for a nationwide meeting in March 2010. Multiuser virtual environments will be a location for some NZCA&RN meetings and also a new site to research. Electronic portfolios are collections of reflections and artefacts that provide action researchers with an extraordinary insight and NZCA&RN may consider an organizational ePortfolio as a form of illustrative map of action and research. Together these tools offer even more exciting opportunities for NZCA&RN and CARN.

Video conferencing

The key affordance of video conferencing is its ability to host a meeting in more than one location so that participants can see and/or hear each other and the resources that they wish to present. In this way it overcomes the barrier of distance, and it is easy to conceptualize because participants assume it is similar to meeting face to face. The feeling of presence depends on a range of factors, among which sound is the most important both in terms of clarity and lack of delay. Given the reduction or absence

of non-verbal communication, additional careful planning of the event including the choreographing of interactions is much more important than for similar face-to-face events.

The general concept of video conferencing can be seen as comprising three broad categories of video conferencing possibilities. Full video conferencing, such as that used in the NZCA&RN launch to link to Australia, is the most sophisticated, complex, resource intensive and expensive. Desktop based conferencing services (e.g. Skype) is the least complex and least expensive. In between these two are web conferencing packages and services (e.g. Adobe Connect, Elluminate and Evo). For any of these to work effectively there is a need for sufficient compatible bandwidth between the linked venues. Desktop based conferencing requires a webcam and microphone while web conferencing requires access to specialist software and/or a connection to a server hosting the software. Full video conferencing requires specialist cameras and microphones, projection screens (either specialist or large televisions) and other technologies. New Zealand AVCC provides guidance on the layout and technical considerations on its web site (AVCC, 2009).

Each of these services can permit multiple participants to connect with each other in real-time using video and audio and resources accessed on or through a computer. However, all videoconferencing services have challenges, often related to technical requirements such as broadband access and availability of correctly configured cameras, microphone and computers including lighting and seating in multiple venues and possibly multiple time zones. The clarity of the video and audio, the number of participants who can effectively be involved and what other functionalities are available depend largely on the price and complexity of the package being used. It is also difficult to duplicate the networking opportunities that can arise through the provision of food and drink at a face to face meeting. In addition, due to the expense of the technologies facilities are expensive, so food and drink are unlikely to be welcomed into those rooms. Prior to meetings it is highly recommended that test links are performed across the multiple locations to ensure they are compatible.

Videoconferencing is also valuable within approaches to research. A common element in educational research is the use of individual or group interviews. Videoconferencing allows these to be conducted without a researcher travelling to the site, which can be a great advantage. For example, in a 48 hour period recently Keryn Pratt spent seven hours travelling, and spent two nights in a motel, to conduct approximately two hours of interviews. With the variety of videoconferencing technologies now available, it seems that in many cases these may provide the opportunity to conduct these interviews without the costs involved in travelling. Past experience of interviews via videoconference (Lai & Pratt, 2005; in press) has shown that these can be effective, although the affordances and challenges associated with these technologies need to be considered in making this decision. Niki Davis also successfully applied the web and multiple media for interviews of teacher educators spread across Europe (Davis, 1997)

Multiuser virtual environments (MUVES)

The multiuser virtual environments (MUVES) such as Second Life (Second Life, 2009) offer an opportunity to engage with a number of global communities of practice. Both the action research and more particularly the education communities in Second Life are strong, active and include a number of respected academics particularly from the US and the UK. At a local level, the Second Life group of Kiwi Educators brings together those with an interest in the use of MUVES for education in New Zealand and has resulted in some useful collaborations, interesting discussions and friendships.

Participation in the virtual world is through an avatar operated via desktop computer linked to the web. Following an intensive induction, many participants identify closely with their avatar and become highly engaged in the virtual worlds, which is one reason why the software and service of Second Life is an apt name. However it is important to note that, while Second Life is free to use, it requires reasonably good computers and very good broadband and there are some institutional challenges in making it available on campus.

Second Life has been the venue for a number of successful academic conferences which have attracted a large number of participants, e.g. Second Life Best Practices in Education Conference which has been held annually since 2007 (SLBPE, 2007).

The SLENZ project (SLENZ 2009), funded by the TEC Encouraging and Supporting Innovation Fund identified a number of issues around the use of MUVes such as Second Life, particularly in the need to identify the ways in which such an immersive, engaging, collaborative and experiential environment could be best utilised for tertiary education (Salt, Atkins and Blackall, 2008). Early results from the SLENZ project are promising. Lemon and Kelly (2009) report a higher level of engagement with material and a higher level of achievement for those Foundation for Living students who used Second Life as a learning medium. The use of and evaluation of the resources built by the SLENZ project team will be much more widely used in 2010 and a more comprehensive evaluation is planned. However, these results are generally in keeping with both anecdotal and published international studies and the use of MUVes for education seems to be a rich opportunity for research and discovery.

There are a number of ways in which both NZCA&R research and researchers could benefit from the use of a multi-user virtual environment such as Second Life. One obvious thing would be to establish an 'inworld' group for NZCA&RN members. These groups, which cost around \$0.40NZ to establish, can be set for open or closed membership and provide a natural means of communicating with the community of practice within Second Life. They provide a means of disseminating news, information, informal discussions (using text or voice) and for global networking and friendships within the community. The group community can also provide an immediate network of mentors and support for those people new to virtual environments.

A community group is also the obvious starting point for arranging a series of regular meetings and discussion forums. These can range from small informal conversations through project meetings to full 'lecture' type addresses by international researchers. It is increasingly common to see one-off lecture or seminar events advertised by leading researchers or educators in certain fields. This can allow an international audience to benefit from the presentation of leading researchers.

Second Life can also provide an inexpensive means of streaming real-world events into a shared virtual space that can be viewed by any SL 'residents' enabling participation at events for those unable to attend in person. It is both possible and common for such events to provide a means of communication between those in the real and virtual worlds thus allowing full interactive participation for all attendees. For the individual, there is no cost associated with these activities apart from usual internet usage and the purchase of a headset, while for the event organisers, there will be some additional technical set-up required.

NZCA&RN networks could also be supported by complementing the Second Life community with other forms of social media. Many Second Life groups also have a presence on Facebook, Ning or LinkedIn networks or through googlegroups and many also support blogs while members of the community may well use Twitter as a means of keeping each other abreast of new and interesting developments in their fields.

e-Portfolios

e-Portfolios are increasingly being adopted in a range of educational settings for a variety of purposes including learning, assessment, presentation of achievement, and personal professional development (Stefani, Mason, & Pegler, 2007). In terms of learning and personal development, e-portfolios can have a key role in supporting individuals to reach their full potential by promoting the development of lifelong learning skills such as reflection, self regulation and collaboration (Lamont, 2007). The advancement of 21st century educational technologies has focused attention on the e-portfolio as a powerful learning tool, and has prompted many authorities to consider the benefits (Fox, Britain, &

Hall, 2009). Fox et al. (2009) identify some additional key components of an e-portfolio, which are essential for our conception of an e-portfolio: author ownership, where the user can maintain a personal lifelong record of learning; interoperability, allowing the user to transfer their e-portfolio from one environment to another; and confidentiality, where students have the opportunity to think critically about their work and to speak openly about their progress in a secure environment.

Mahara (<http://www.mahara.org/>) is a fully featured open source electronic portfolio, which was developed in 2006 by the New Zealand e-Portfolio Project funded by the New Zealand Tertiary Education Commission's e-learning Collaborative Development Fund. Mahara is a web-based e-portfolio, designed for tertiary education as a learning portfolio which is constructivist in nature (Stefani et al., 2007), with the emphasis being on the ownership and lifelong learning and development of the user. Mahara was designed with accessibility, ownership, interoperability and transferability in mind, and includes collaborative and communication tools. Mahara is currently being used within teacher education programmes in Massey University, the University of Canterbury, Auckland University of Technology and Victoria University. It is also being piloted with some New Zealand secondary school students (Fox et al., 2009). The design features support ongoing collaborative approaches to action and research to which NZCA&RN aspires.

Within the context of action research and related approaches, the e-portfolio has the potential for practitioner and researcher ownership of a lifelong virtual private space for: setting and reviewing goals; reflecting on actions, learning and progress; engaging in professional critical dialogue; disseminating knowledge; and showcasing skills and dispositions. This virtual space can be accessible from anywhere; and the user can select particular aspects to share with individuals and communities of practice. The virtual space also allows for recording emerging knowledge, skills and ideas privately until such time as they are mature enough to share with others, or be dismissed or laid aside to return to at a later date. An e-portfolio tool therefore, has great potential to enhance collaborative action and research networking, and to navigate the 'braided rivers' of action research approaches and 'whanau of interest' (Macfarlane, 2009).

However it is important to note that the issues identified by Margaret Lamont (2009) when implementing ePortfolios in teacher education are also likely to apply to their use in research too. These include equitable access and development of a shared vision of purpose among the NZCA&RN communities of practice.

Online journals and related interaction

Conducting research is only part of the process; it is also important to share the results. In New Zealand we have a journal/magazine dedicated to sharing research on ICT in New Zealand schools. The journal established by Wing Lai called *Computers in New Zealand Schools* is turning into an open access online journal from December 2009. It includes articles with a practitioner basis from teachers and researchers. To take advantage of being online interactive features will be added with more being developed over time.

Niki Davis has experience of online and carefully networked journals through the *Society of Information Technology and Teacher Education*, which has established the online journal *Current Issues in Technology and Teacher Education* at <http://www.citejournal.org> under the leadership of senior editor Glen Bull. Bull, Willis and Bell (2000) describe their design of this journal and its interactivity and the complementary article Willis and Bull (2000) put this in the context of scholarly publishing. It is interesting to note that the interactive features have not been as successful as envisaged although the journal itself and the network of organizations behind it have been an outstanding success.

Continuing action and research on online journals that extend scholarly interaction are a topic well worth pursuing within and beyond NZCA&RN.

Concluding remarks

The collaboration on this paper has prompted us to bravely envisage the application of these technologies to support the growth of NZCA&RN. Communication technologies of videoconference and MUVes offer exciting possibilities as well as challenges. Our greatest challenges will be to ensure equitable access and development of a shared vision of purpose among the NZCA&RN communities. While this was raised by Margaret Lamont in relation to ePortfolios, it is essential to work on for any of the applications discussed.

We hope the NZCA&RN symposium at NZARE will stimulate us to start the visioning process as well as mechanisms to increase access through collaborative partnerships. The national meeting planned for March 2010 will provide an opportunity to put them to the test and stimulate further development.

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