
Final Report

21st Century Learning Challenge

A collaborative project across four regions to demonstrate the pedagogical benefits of being linked to the Kiwi Advanced Research and Education Network (KAREN), delivering the National Education Network (NEN).

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A collaborative project across four regions to demonstrate the pedagogical benefits of being linked to the Kiwi Advanced Research and Education Network (KAREN), delivering the National Education Network (NEN).

EXECUTIVE SUMMARY

The National Education Network proof of concept (PoC) was undertaken in the second half of 2008, involving a selected number of schools located throughout New Zealand. The goals of the project were to demonstrate that...

- A new PoC school, after being connected, is able to articulate the benefits of being connected.
- A new PoC school can point to one or more specific activities that have been made possible by being connected.

This report outlines the elements of the proof of concept programme and commentary about the technical aspects, student/learner experience, professional development, and service provision on KAREN, delivering the National Education Network (NEN).

This written report is supplemented by a website developed specifically as a place for sharing the case studies of schools on the pilot. (<http://www.core-ed.net/karen>).

A number of key intra and inter-school pedagogical and system benefits of being connected to the advanced network were identified through the project. While the number of schools participating in this trial was small, the insights provided through their experiences provide some clear directions for the future in terms of practical implementation, and for further research and evaluation, as noted in the key findings, project team commentary and recommendations sections of the report.

Crucial to the success of this project has been the following aspects;

- The high level of willingness of teachers, particularly in the final term of the school year to trial new approaches, make connections with other learning organisations and manage technologies.
- Technical and educational competence, knowledge of the education sector and the flexibility to respond to changing requirements, school schedules and technical support or advice for technologies utilising KAREN.

The evaluation project provided an opportunity to reflect upon and articulate ideas, project outcomes and the perceived benefits the NEN connection had for schools and their students.

The benefits of having been connected in this proof of concept phase are positively and clearly illustrated by schools in the activities and benefits table on page nine and case studies section of this report. The quotes on the following page illustrate the general optimism and enthusiasm of the teachers involved in the 21st Century Learning Challenge.

The key personnel implementing, managing and collating the report on this project were Derek Wenmoth and Suzi Gould. CORE Education project team roles have required both technical and educational competence, knowledge of the education sector and the flexibility to respond to changing requirements. It is acknowledged that many people have contributed to this project report in various capacities and they are listed in the project contributor's table at the end of this report.

KAREN, NEN Teacher Quotes:

“The benefits of connecting to KAREN are immense; students and staff can reach the resources of universities in New Zealand, Australia, and the United States; show maps and satellite footage to Geography classes using Google Maps; and collaborate via high definition videoconferences with other students around the world.”

Jason MacDonald, Director of ICT Services, Kristin School.

“We do have a lot of other assessment tools. But let’s face it, this is assessing in a smart way using technology - Why not?”

Julie Peterson, Head of English, Christ’s College

“At the moment we are facing a chicken-and-egg scenario, in that we need more schools and universities to be connected in order to be able to connect and collaborate on an ongoing basis. However, we have many ideas for further video conferences to continue to enhance the learning opportunities for our students.”

Tony Bigby, Network Administrator, Kristin School

“We have had high-speed Internet access for twelve months and use Google applications for all of our word processing and presentations and Excel and it has been no drama. We use Google applications for portfolios too - kids drop in swimming videos, artwork, student management summaries, e-asTTle pdf results and a lot of other stuff.”

Ian Lambie, Primary School Teacher, Appleby School

“We in the mathematics department are very excited about it. I think there is huge potential for this, the boys will benefit from e-asTTle.”

Dirk Gildenhuys, Head of Maths, Christ’s College

“Feedback from teachers has been very positive; being able to link with experts from different organisations will be beneficial for teaching programmes and student learning.”

Mike Pallin, Assistant Principal and International Student Manager, Wellington College

“There was a lot of interest in the desktop video conference project made possible on KAREN throughout the whole school. The teacher, Colleen Dalley, was very motivated. She supported students to lead the conferences. Although there were some technical frustrations it was worthwhile for them to exchange ideas, get instant responses and see and speak with students from another school, in another island.”

Stephen Lewis, Principal, Hunterville Consolidated School

1. BACKGROUND

CORE Education is a not-for-profit educational research and development organisation with an international reputation for the support and promotion of the use of new technologies for learning across the education sector.

CORE Education was approached by REANNZ to help the NEN schools realise value from their NEN membership once they were connected as part of the NEN proof of concept.

PoC Programme Focus

The original idea submitted for this programme was to work with some of the teachers in each of the schools connected to KAREN in the PoC to focus on a “challenge” in terms of...

- Their personal use of the advanced network for professional learning or resource sharing etc;
- The innovative use of ICTs with students as part of planned teaching and learning programmes; or
- Collaborating with other teachers and/or another class to participate in a learning activity.

The term “21st Century Learning Challenge” was therefore proposed as the title for the project.

Each of the participating teachers was to be encouraged to incorporate some use of the advanced network into their currently planned classroom programme. The idea was to reduce the burden on teachers to try to accommodate something that is seen as “additive” to what they are currently doing, and focus instead on using the ICTs to enable or empower something they are already planning.

The role of the project team was to...

- (a) Help establish ‘connections’ among those connected to KAREN, and to promote participation in learning communities and a culture of learning across the advanced network, so that teachers may effect change that achieves better access to learning opportunities and outcomes for learners.
- (b) Support schools/teachers with advice and guidance in relation to the specific activity(ies) being carried out
- (c) Gather evidence of the benefits to schools of being connected to the advanced network.

2. PHASED APPROACH

The PoC project operated in four key phases:

1. Preparation

CORE Education identified and communicated with teachers who were incorporating some form of ICT, new to them or their school on the advanced network, into their currently planned classroom programme. Where appropriate during this phase, various forms of professional development and/or advice and guidance were provided.

2. Implementation

Implementation of a *proof of concept* is always a challenge in the context of the reality of busy classroom life. To this end the activities carried out recognised:

- That classrooms are time-poor environments and that the final term of the year is particularly busy. Setup time was minimized, certainty of technology working as expected maximized and projects focused on using the ICTs to enable or empower something schools were already planning.
- That teachers and students exploring new technologies required ready access to subject matter expertise to demonstrate understanding of the context in which the technology is being used
- That the operational reality includes direct relevance and linkage to the key drivers of curriculum and assessment outcomes.

Key activities of the project team included

- Participation in video conferences to provide support to teachers
- Implementation of planned collaborative activities within each school context, introducing a variety of technologies as appropriate
- Collation of data from various projects including video artifacts and links to the KAREN wiki
- Working alongside schools and content providers the project team helped facilitate the provision of equipment, venues and technical support
- Making connections between schools and organizations to make these activities a success
- Visits to each of the participating schools by one of the project coordination team.

3. Celebration

At the conclusion of the exploration and trials of the technologies the groups were brought together via videoconference on the KAREN Bridge to celebrate their achievements. The focus was on 'telling the story' of their collaborative activity as well as showing the evidence of the final product, the NEN evaluation project website containing case studies and artefacts.

The celebration was shared with the other regions both synchronously (via video conference) and asynchronously (in an online environment incorporating links to video, audio and other artefacts). The initial intention was to invite more schools/organisations on KAREN and the Minister of Education plus other dignitaries. However for a variety of reasons, including the fact the new government had just been installed and project timeframes were confronting, the decision was made to limit participation in the celebration to representatives from participating schools and organisations plus REANNZ and the Ministry of Education.

A large number attended the Celebration Video Conference, demonstrating the capacity of KAREN and the developing NEN for making such high definition, multi-point video conferencing possible.

Members of the following schools and organisations participated in the celebration:

- Appleby staff and students
- Kristin School
- Christ's College
- Wellington Girls College
- Wellington College
- Correspondence School
- Point England Primary School
- REANNZ
- The Wellington Loop
- Ministry Of Education
- AARNET representatives (Australia)
- National Library of New Zealand
- CORE Education
- University of Canterbury

4. Reflection & Evaluation

A critical component of this project is to report on and transfer the considerable qualitative findings that have emerged. The project team, via contributors input, have acted as primary knowledge transfer agents.

Reflections were collated and are presented in two ways:

2. A website containing case studies, including video interviews of each participating school and their activity(ies) <http://www.core-ed.net/karen/index.html>
3. This final summary report addressing the two key goals of the project and providing recommendations about how this activity may be sustained.

3. ACTIVITIES AND BENEFITS

The following table illustrates some of the specific activities made possible by being connected to KAREN, and the benefits realised.

Activities	KAREN's Contribution	Benefits
Use of Google docs for word processing, presentations and spreadsheets etc. and for e-portfolio development.	<p>KAREN provided the capacity for whole classes of students to work on their Google Documents simultaneously</p> <p>Access to "virtualized/cloud-based" services (in this case, Google docs) as part of the REANNZ on-net partnership with Google.</p> <p>Capacity of KAREN to cope with large amounts of data for personal e-portfolios, including swimming assessment videos, school reports, summary sheets from school management systems, e-asTTle pdf result forms plus other learning artifacts.</p>	<p>Student access to their documents and portfolios from anywhere and at any time, using browser access and not dependent on installed software.</p> <p>Enabling home-school communications between/among learners, parents and school staff.</p> <p>Long term access to personal documents – no longer dependent on school-based storage, archiving and document portability.</p>
Use of e-asTTle as an assessment tool to establish learning outcomes and set future goals for individual students.	<p>Access to a high-speed network made accessing and piloting the web-based version, e-asTTle, feasible.</p> <p>e-asTTle tests were quick to load for both teachers and students on the network. Schools were unlikely to have used e-asTTle without access through the advanced network.</p>	<p>Reduction in time spent setting up, marking and reporting on learning assessments. Consequence is a more rapid impact on teaching and learning programmes.</p> <p>Increased number of concurrent users are able to access a complete the e-asTTle online assessments.</p> <p>e-asTTle tests are marked online relieving individual teacher interpretation therefore gaining more consistent, valid assessment data.</p> <p>Students enjoyed this type of assessment more than the paper-based approach, and results are used within their e-portfolios to establish learning outcomes and set future goals.</p> <p>Reports and results are used to discuss performance and the steps to take with students, parents, and boards of trustees to improve teaching and learning.</p>
IPTV	<p>For Christ's College to distribute IPTV beyond the College it has been essential to be on KAREN, allowing them to put out more data streams without congestion on their network. Schools connected to KAREN through the National Education Network can tap into high speed and high quality delivery of IPTV. Six schools are currently accessing IPTV via Christ's College and KAREN.</p>	<p>Capturing and re-broadcasting multi-language IPTV opens up a world of learning to languages students. It means that students are learning languages from native speakers plus exploring the culture and current events of the countries where the studied language is spoken.</p>

Activities	KAREN's Contribution	Benefits
High definition videoconference music lessons and performance. ("musicGrid")	<p>Enabled students in remote locations to learn, practice and to play an ensemble together.</p> <p>Speed advantages enable participation in HD video conferencing, and capacity advantages of being able to involve large numbers of simultaneous users.</p>	<p>Provision of specialist teaching for students who would otherwise not have access.</p> <p>Raising the profile and level of performance of music in schools.</p>
National Library Advisory Services to Schools.	<p>Provides high quality videoconference interactions with teachers (and students).</p> <p>Enables sharing of print, video and web-based resources during through the presentation.</p> <p>Ability to record sessions for later review by teachers who were unable to attend live sessions.</p> <p>Resources available to schools as part of REANNZ's on-net content partnership.</p>	<p>Cost efficiencies to National Library advisory services.</p> <p>Opportunities to expand the services provided as a result of reduced time involved in travel etc.</p> <p>Greater number of schools having access to and awareness of the services, collections, and online catalogues appropriate for their students and subject areas, leading to greater use of NZ's digital resources.</p>
Use of Google Earth to provide virtual learning experiences.	<p>Speed advantages on KAREN when accessing and refreshing and updating Google Earth was more immediate</p> <p>The capacity advantage is that a large number of concurrent users were able to access Google Earth</p>	<p>Large numbers of students were able to access Google Earth with more immediate response.</p> <p>The ability to utilise the advanced features of Google Earth in a real time environment.</p> <p>High level of student engagement through participation in virtual tours.</p>

NB - case studies from participating schools are included at the end of this report.

4. KEY FINDINGS

This initial trial of the NEN concept demonstrated a number of key intra and inter-school benefits to schools of being connected to the advanced network. While the number of schools participating in this trial was small, the insights provided through their experiences provide some clear directions for the future in terms of practical implementation, and for further research and evaluation.

Value of an external facilitation/evaluation team

One of the things that became evident as the evaluation team spoke with the various participants was the extent to which those who are currently involved within the school represent the 'early adopters', characterized as those who are willing to 'give things a go' and who are generally optimistic about what can be achieved. These people invariably 'go the extra mile' to make things happen, and are not generally put off by technical or infrastructural difficulties; instead they work to find ways of solving these issues. The benefit of working with an external evaluation team was that it provided an opportunity for these people to reflect on what they'd been doing, and to extract ideas they had about the benefits the connection to the NEN had for their schools and their students. In most cases, the articulation of these ideas and perceived benefits had not been recorded in any formal way before.

Another benefit of working with an external facilitation/evaluation team was in the ability the team had to 'cross-fertilize' ideas, make connections and to co-ordinate some of the activities that occurred. This included in some cases liaising with others to make equipment available or to advise on technical requirements to make what the schools did have work effectively. In the longer term, this level of 'connectedness' may grow within a community of practice as the various individuals and groups become aware of what others are doing and a sense of shared practice emerges. In the short term this will take further facilitation and encouragement.

Benefits of being connected

It is widely recognized that the tangible benefits of any form of innovation within the education sector will take time to be realized¹, and that a true assessment of such benefits would involve a variety of qualitative and quantitative strategies over time.

Within the constraints of this project, the evaluation team focused on observations and interviews with participating teachers, service providers and students, to gain insights into what some of the immediate benefits were perceived to be. These findings are summarized below in two broad categories, (a) pedagogical benefits, and (b) system benefits.

(a) Pedagogical Benefits

What was focused on here are the benefits perceived by teachers and learners to have directly impacted on the nature and quality of teaching in the classroom, and consequently, on the learning experience of students.

¹ For a list of types of tangible benefits that could be explored see the JISC briefing paper; *Exploring Tangible Benefits of e-Learning: Does investment yield interest?*, published April 2008. Available online <http://www.jisc.ac.uk/publications/publications/bptangiblebenefitsv1.aspx>

i. Speed/capacity

In all of the cases cited in this pilot the immediate benefits reported by teachers related to the capacity of KAREN in terms of bandwidth providing both speed of access and the ability to cater for volume of traffic. Speed was a benefit in terms of some of the video conferencing activities (e.g. MUSICgrid etc), allowing for high definition, (almost) instant responses and interactions, while volume was a benefit in terms of simultaneous whole class access to applications such as Google Earth and e-asTTle. In each of these cases teachers reported that without access to KAREN these activities would not have been possible.

ii. Visualization

A number of teachers and students highlighted the fact that the applications they used provided for a much greater degree of visualization (e.g. Google Earth) in the context of what they were studying. Teachers pointed to the benefits of incorporating access to applications and resources that are rich in multimedia and visualization opportunities into their work with students, particularly where this could occur spontaneously and on-demand.

iii. Personalization

Although we have a long way to go yet in terms of online applications and environments that cater for truly personalized learning, the capacity of KAREN allowed for the individual needs of learners to be catered for in terms of individuals in classes working on a variety of tasks requiring online access to tools, and not being constrained by limitations of bandwidth. In addition, the ability of individuals to initiate and manage their own collections of learning artifacts in the form of an online portfolio, complete with tools for creating content is now possible as a result of the capacity of KAREN. This was evidenced in those schools making heavy use of Google Docs and other online

iv. Collaborative activity

There were several instances of classes working collaboratively using wikis and Google Docs, often with several groups within a class using these tools without the constraints imposed by bandwidth. The fact that these tools could be used at the speed of student thought and contribution, and not delayed with waits for data to upload and screens to refresh, was reported as a considerable benefit – to the extent that some teachers reflected on how this was opening up new opportunities for them in the way they structure their in-class and out of class learning and engagement with students.

v. Access to resources

Participation in learning can often be inhibited through lack of access lack of access to resources that are engaging, relevant, current and/ or authentic. A key thing here is the ability to make these resources available directly to students – whether they are at school or working from home or elsewhere, rather than relying on teacher-only access to a limited number of physical resources limited in terms of location and cost. In several of the PoC projects we saw evidence of the benefits of KAREN in providing access to these sorts of resources, including the DTV off-air recordings distributed from Christ's College, access to the video material from e-Cast used by the Correspondence School, sharing of expert music teaching demonstrated by MUSICgrid, and access to the TED talks speaker demonstrated by Point England.

(b) System Benefits

System benefits impact at a whole school or system level. In considering the system level benefits of any innovation it is necessary to consider what the current areas of

concern or constraint may be at a system level within the schooling process, for instance;

- Recruitment and retention of staff in specialized areas
- Resource access and management
- Assessment and reporting, record keeping and portfolios etc
- Student engagement, personalization – including access to breadth of curriculum
- Parent and community participation
- Globalization, competition
- Dissemination of change (curriculum, assessment etc) and professional learning
- ICT infrastructure and services support, maintenance and implementation

Although more difficult to clearly measure within the scope of this project, there were several key things that emerged as areas of potential benefit, and these would certainly be worth having as a focus of any future

i. Classroom management

Many studies have shown that classroom management is a key concern when it comes to using ICTs in education. The limitations of access to ICTs, access to the network/internet, just-in-time technical support, and the constraints imposed by poor bandwidth all contribute to frustrations teachers experience in trying to manage the use of ICTs in a regular classroom. Computer labs provide one solution to the problem, but in turn limit the opportunity for students to use ICTs on-demand or spontaneously. The experiences of teachers in the pilot point to significant advantages in terms of the number of students that are able to access networked resources simultaneously, as well as the quality (and reduced technical difficulty) of the provision.

ii. National networking

To date schools (and teachers) have tended to operate in isolation in terms of a range of areas, including decisions around curriculum development, ICT support and infrastructure, professional development, resources, and management systems etc. There are a number of initiatives that have been established in an attempt to address some of these issues, but most of these are perceived to be external to the school and therefore require some level of abdication of control or responsibility. The links made between and among teachers in schools in the PoC project, and the resulting PD opportunities, sharing of ideas and expertise as well as the development of projects point to national networking benefits of being connected to KAREN.

iii. Resource sharing

The development, sharing, storage and management of resources for learning is an issue that is now well beyond the capability and resources of individual schools and is best addressed at a system level. Previously the limitations of bandwidth and cost of storage made national level solutions expensive and unmanageable, but with the capacity provided by KAREN these limitations are no longer an issue. The experiences of schools accessing the DTV programmes from Christ's College and the video material from e-Cast are examples of these benefits being realized in the PoC.

iv. Time management

The use of e-asTTle as a means of providing valid, standardized measures of achievement is seen by most at a school and system level as a very useful thing to do for a whole range of reasons. Many schools have had experience of using the paper-

based version of assTTle finding it very beneficial, and were looking forward to using the online version with the promise of it cutting down on the time it takes for teachers to re-enter the submissions etc. Unfortunately the experience of most was frustration at having to arrange for students to complete the assessment over an extended period of time as more than just a handful completing it at once was too much for the network. Over KAREN this issue was solved, enabling whole classes to complete the assessment simultaneously and for results to be provided to teachers almost immediately, enabling them to work with the results to plan for the 'next steps' for learning in very reduced timeframes. The benefits of this at a system level are in supporting data-driven decision making, and ensuring all students receive a high quality education and reducing disparity in achievement.

v. ROI on infrastructure

Schools are increasingly putting the cost of investing in and maintaining their own ICT infrastructure under scrutiny. There are numerous examples reported regularly of investments in ICT that appear not to be being used as intended – often for the reasons outlined earlier. In addition, the overheads created by each school managing and maintaining their own management systems is diverting resources away from areas of more direct benefit to students. By creating opportunities for schools to take much of this overhead out of their direct environment and instead subscribe to a shared service provides huge benefits in terms of quality of provision, reduced downtime for maintenance and upgrades and support of teaching and learning programmes.

vi. Home-school links

Life-long-learning recognizes that learning is no longer bound by the time or place of a traditional schooling. Establishing home-school links is also identified as being significant in terms of the development of learners and the dispositions leading to life-long learning. Access to learning opportunities from home as well as school over an advanced network will significantly improve students' abilities to engage in learning in an ongoing manner, no longer constrained by the limitations of the school timetable, and will also allow opportunities for parents and caregivers to participate in and support the learning of their children.

vii. Teacher workload

Teachers also are realizing the benefits of working from home or other places, and not being bound to working within the school environment in order to access the resources required to assist them in planning and implementing programmes of learning for their students. In addition, access from home allows greater participation in professional learning networks contributing to teacher growth and development.

5. PROJECT TEAM COMMENTARY

Key findings have been gathered from a wider audience than schools contributing case studies, as listed in the table of contributors. The key findings are grouped as follows for comment, significance of early adopters, shared understandings, relationship management, professional development/capability building and delivery management.

Significance of the early adopters

- It is not just aptitude in utilising technology but attitude that is required.
- Nurture experts or those with attitude including senior managers, principals and boards of trustees.
- Early adopters should be viewed in terms of technicians as well as teachers, working in partnerships
- Develop communication models and change frameworks
- Encourage early adopters to spread their learnings and enthusiasm (e.g. Wellington College brought along a new HOD to every VC event).
- Respected people, opinion leaders, try out new ideas, to be provided a vehicle for communicating benefits and the ever-expanding base of content, services, applications, data and collaboration partners directly accessible over KAREN.
- We worked on the trial with early adopters – informative at a range of levels however not everyone will perform at this level and as we move beyond to other schools different strategies need to be adopted – one early adopter's size does not fit all.

Shared Understandings

- Need to work towards clarifying and agreeing upon the understandings regarding what the NEN actually is and the development.
- Explicit end-to-end view of the network, the NEN and how it affects schools including costs.
- More informed rationale for the provision of services to schools (including content)

Relationship Management

- Greater clarity around roles
- Importance of independent facilitators providing support and guidance, (technical and pedagogical, coherence, promoting NEN activities) for all users of NEN
- Facilitation or brokerage between and among organisations, schools and service providers
- More effective communication strategies to share what is available on the NEN
- Showcase use of services and benefits to schools within specific context

Professional Development/Capability Building

- Providing schools within the gear and access only does not make for effective teaching alone.
- It requires specialist input and expertise in an ongoing manner/overtime

- This could effectively be achieved over the network using the tools, facilities and services the network
- Includes capability building across all NEN users schools, service providers and support personnel

Delivery Management

- New members to the network require induction into NEN, including a tour of the content and service provision with details on how to access these, beyond the KAREN wiki.
- The service providers need to know how to engage with schools through the network

6. RECOMMENDATIONS

The key findings recorded in the previous section provide an optimistic view of the benefits of being connected to KAREN, and the writers of this report subscribe to the view that connection to an advanced network is highly desirable, if not absolutely necessary, for schools to accommodate the learning needs of both students and the teaching professionals within them.

That said it is important to recognize that within the PoC trial there were also difficulties experienced that could prevent or inhibit the full potential of these benefits. We have addressed some of these problems and concerns through the recommendations that follow:

Continuation of the NEN

Recommendation: *That the National Education Network continue to be resourced and developed.*

The continued development and support of the NEN is clearly important to enable the vision of a “connected education” sector to be realised. The benefits to the education sector of the innovative work currently demonstrated within individual schools and at a “local loop” level can only be realised through the provision of a National Education Network.

Adding schools to the NEN

Recommendation: *As schools are added to the network we recommend a triangulated rollout or connection process for KAREN delivering NEN, involving technicians, school leadership and pedagogical experts. The concerns of all three must be addressed to promote the valuable off-net content providers and partnerships KAREN provides and stimulate NEN.*

For two of the evaluation project schools organizations the benefits of KAREN have not been fully realized due to internal infrastructure or network issues. Correspondence School has internal network issues that are being investigated. Hunterville School resolved sound quality issues with REANNZ support but are not yet able to maintain consistent connections for desktop video conferencing – they “drop out” of the conference room. As referred to earlier it is an ‘early adopter’ involved in this project who is positive about the initial project and outcomes for students and therefore determined to troubleshoot this.

Technical capability must not only be ensured prior to connecting with KAREN but support provided for reviewing the implementation and initial proof of concept projects undertaken.

Some informal debate is underway as to who drives change and initiates KAREN participation within a school or organization – is it, or should it be, teachers/users or technicians. As technicians monitor networks and trends they are aware that faster, reliable networks and partnerships are needed now and increasingly in the future. However this type of access is required to enhance teaching and learning and embrace *21st century pedagogies therefore the impetus to participate lies with teachers and school management. As generally there exists a ‘latency of adoption’ when new ways of thinking or technologies emerge it is a worthy discussion to have as to who leads the charge and to avoid technicians plugging in to KAREN with nowhere to go.

Promoting the NEN Concept

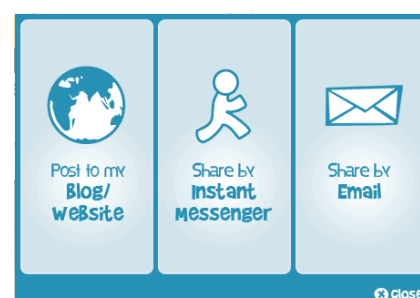
Recommendation: *A well thought out strategy for promoting NEN needs to be developed so that all stakeholders within the education community are working from a common point of understanding as they seek to engage with it and the benefits it provides.*

Schools were able to articulate the benefits of being connected to KAREN, delivering NEN and specific activities that have been made possible by being connected.

Valuable partnerships have been formed through this project and seeds sown for future collaborative projects. However many participants in the trial were unclear about the concept of NEN, the NEN architecture and delivery of the National Education Network. Many believed that NEN was a service and that 'stuff' existed on NEN but they did not know where or how to get at it. We believe that more work is needed to encourage members of NEN to further explore off-net and on-net content provider benefits, contribute case studies and develop collaborative projects through NEN.

Perhaps a 'word of mouse' strategy could be developed to promote activities or resources on NEN e.g. You find out online that NEN and the University of Canterbury Music Department are offering a video conference lesson and QA session with a clarinet expert. NEN users could then choose to share this information, via word of mouse, among their own learning community or networks by clicking on one of the options to the right.

Image credit: www.vouchermate.co.nz



The value of external facilitation and community

Recommendation: *That support for some form of external facilitation for schools on the network is provided in the short term, leading to the development of a community of practice that can become self-sustaining.*

As outlined in the section 4 on key findings, one of the things valued by teachers and which appeared to help accelerate participation in the various projects and activities was the provision of some level of external facilitation for schools entering the network. In addition, schools that are already part of an advanced network or local loop generally have a greater understanding of the benefits of high speed networks and well developed learning communities and partnerships.

As more schools are joined to the network it appears that some form of support for external facilitation of activity across and among the network should be manifest. This could be provided in two ways:

1. Through direct interactions and interventions (e.g. online projects, professional development sessions, advice and guidance etc) with schools and teachers, and
2. The development of a community of practice, providing opportunity for other leaders and facilitators to emerge from within the community, leading to a sharing of ideas and experiences and ultimately to greater levels of sustainability within the network.

7. PROJECT CONTRIBUTORS

Name	Organisation/Role
Dave Clough	REANNZ
Alan Sylvester	Wellington Loop Project Co-ordinator
Mike Pallin Matt Sutherland	DP, Wellington College ICT Manager, Wellington College
Amanda O'Connell Kerry Wheelan-Jones	The Correspondence School eLearning manager, Correspondence School
Jason MacDonald Andrew Churches	ICT Co-ordinator, Kristin Curriculum and e-learning, Kristin
Charles Newton Geoff Scrimgeour	Principal, Nayland College, The Loop , co-ordinator
Ian Lambie Gerald Baldwin	Teacher, Appleby School Principal, Appleby School
Dorothy Burt	Pt England Primary School
Ruth Elmy Celia McKechnie	Educational co-ordinator for the Nelson Loop based at Nelson Girls HS: oversees services for schools
Paul Rodley	Director of eLearning, Christ's College
Colleen Dalley Steven Lewis	Huntermville, Teacher Huntermville, Principal
Allan Sylvester	The Wellington Loop
Howard Baldwin Eddie Reisch Mark Horgan Douglas Harre	Ministry Of Education
Nick Cross and team	AARNET representatives
Geraldine Howell Linda Forbes and advisers	National Library
Merryn Dunmill	University of Canterbury
Derek Wenmoth Suzi Gould	CORE Education

8. CASE STUDIES

The following participating school case studies are also included on the project website.

- Appleby School
- Christ's College
- The Correspondence School
- Hunterville Consolidated School
- Kristin
- National Library
- Point England School
- Wellington College
- University of Canterbury

<http://www.core-ed.net/karen/>

NB: This link is only valid until the site is transferred to REANNZ for uploading to their online content

Physical Location: Richmond, Moutere Highway

Website: www.appleby.school.nz

Description:

Appleby School is a rural four teacher primary school located 8 minutes drive from Richmond on the school bus, catering for years 1-6. Appleby School gives children a quality education in a caring supportive environment and have an enthusiastic staff catering for academic, sporting and cultural excellence.

What did they do?

Appleby School utilised KAREN to access Google applications and e-asTTle. They have created e-portfolios including assessment summaries from e-asTTle, summary sheets from the school management system plus student work and videos. These tools delivered via KAREN enable Appleby to communicate between school and home including their parents more deeply in their school learning community.

Learning for students and teachers

A key benefit for teachers at Appleby is the reduction in time spent setting up and marking learning assessments using this tool. e-asTTle tests are marked online relieving individual teacher interpretation therefore gaining more consistent, valid assessment data. Teachers at Appleby commented that their students enjoyed this type of assessment because “they like anything if it is on the computer” and results are used within their e-portfolios to establish learning outcomes and set future goals. Specific data can be shared with parents and used as a tool to communicate students’ development and ways that they can be supported to progress their learning, both at home and school. By using Google applications, student portfolios can be accessed anywhere, anytime, from any computer that has Internet access. The Google-based portfolios provide a way of communicating frequently with both the learner and their parents. “We have educated parents on how to read the e-asTTle data and parents enjoy being able to get specific feedback and share in their child’s learning. In a way it is like holding ongoing student led conferences,” says teacher Ian Lambie.

KAREN’s contribution

During the pilot Appleby staff and students have ‘hammered the system’ to see how many concurrent users they can have accessing e-asTTle. And it has passed the test for their school, with whole classes accessing the e-asTTle tests at one time. They would not be able to utilise Google applications for all of their word processing, presentations and spreadsheet work without the network capacity provided by KAREN. They use Google applications for their e-portfolios too, including swimming assessment videos, school reports, summary sheets from the Appleby school management system, e-asTTle pdf result forms plus other learning artefacts. Both students and parents use the school’s Google accounts intensively after school from home.

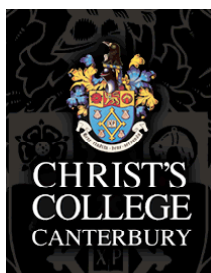
“We have had high speed Internet access for twelve months and use Google applications for all of our word processing and presentations and Excel and it has been no drama. We use Google applications for portfolios too - kids drop in swimming videos, art work, student management summaries, e-asTTle pdf results and a lot of other stuff,” says Lambie.

Future Focus

More of the same! Appleby wants to continue to make use of the bandwidth they have and increase the community relationships being developed.

They have also redeveloped their schools assessment plan and e-asTTle has become a standard part of that. Teachers regularly use pre and post-tests with students in English and Maths using e-asTTle tools.

“Our next step with Google portfolios is to educate parents on how to drop comments on to those portfolios and reports and start to encourage teacher interaction with parents commenting digitally. So in effect rather than have two student led conferences a year we can have multiple a year - digitally,” Lambie says.



Physical Location: Christchurch Central

Website: <http://www.christscollege.com/>

School Description:

Christ's College is an independent, Anglican school for boys from Year 9 to Year 13, with a roll of 660 (220 boarders and 440 dayboys) located in central Christchurch.

The College believes their success can be attributed partly to their process of assessing, then meeting the needs of each boy, and maintaining a close eye on his ongoing level of achievement. Christ's College understands that good teaching and learning is not just about assessment, it is about classroom connectedness, and capable, inspiring teachers.

What did they do?

Christ's College undertook two proof of concept projects as a part of the trial. The first was a trial of e-asTTle for both Maths and English, and the second involved the distribution of foreign language television programmes captured off satellite.

The online learning and assessment tool, e- e-asTTle, allows teachers and school leaders to set tests that are aligned to the curriculum when they want and at the level they want; and to measure student progress over time. Currently e-asTTle is available to assess reading, writing, maths, pāngarau, pānui and tuhituhi for years 5–10 and curriculum levels 2–6. Christ's College has been using the non-electronic version of the system, asTTle and wanted to explore the advantages of the web based version. The College began the trial with two English classes and four Maths classes of 25 students at year nine and ten , one class at year nine and one at year ten utilising the eAssTLe testing system and the high speed access, KAREN.

Christ's College have a large satellite dish that captures a range of channels from Chinese television through to French TV 5 Monde through to Deutsche Welle German TV. Using decoders and a number of computers they stream these into the classrooms. Christ's College found the channels to be such a fantastic learning resource, particularly for languages teaching, that they wanted to share this rich media content with other schools.

Currently six schools on KAREN, through the National Education Network, have taken up the offer of Deutsche Welle German TV. The receiving schools can access a live feed and visit the Deutsche Welle website to look for particular episodes to plan for upcoming lessons.

Learning for students and teachers

The e-asTTle pilot provided significant learning opportunities for staff at Christ's.

With pen and paper based asTTle limitations exist such as time consuming assessment preparation in terms of administration and marking plus it the tests are very paper heavy. The beauty of e-asTTle is that teachers can design and review the test, feeling confident they have developed quality assessments. The test can then be administered relatively easily and is self marking on line – not only that but full reports are generated.

Some initial problems relating to logging-in of students, and the fact that the student management system would not 'talk' to e-asTTle so details had to be entered by hand, were resolved through the efforts of the Christ's ICT team.

As a result of this Students are now able to login and complete e-asTTle tests quickly. They connect with the process and found this form of testing almost enjoyable. Students liked the fact that they sat the test and then could review the report immediately and receive feedback on their progress. Parents are finding the testing useful, as similar areas for growth or development are made visible in e-asTTle. English Head of Department, Julie Peters finds the reports an excellent tool for examining and reviewing progress and teaching strategies with her teachers. The reports and results can then be used to discuss performance and the steps they're taking with students, parents, and boards of trustees.

Capturing and re-broadcasting multi-language IPTV opens up a world of learning to languages students. It means that students are learning languages from native speakers plus exploring the culture and current events of the countries where the studied language is spoken.

KAREN's contribution

asTTle, in its paper based format, had limitations to roll out within Christ's College due to the demands on teacher time. Access to a high-speed network made accessing and piloting the web-based version, e-asTTle, feasible. On the network e-asTTle tests were quick to load for both teachers and students. A number of students or concurrent users are able to complete the e-asTTle tests. Speed to access is not an issue on KAREN.

For Christ's College to distribute IPTV beyond the College it has been essential to be on KAREN, allowing them to put out more data streams without congestion on their network. At Christ's College the Internet is coming in one way however it is not the Internet that distributes IPTV. The TV channels are travel out to other schools via a very high-speed one-gigabit network, KAREN, to the national backbone. This means that if schools are connected to KAREN through the National Education Network they can tap into high speed and high quality delivery. "I think the quality particularly for video and for languages is important. Similar sorts of things can be achieved via the internet but nowhere near the quality or crispness and lets face it our students are used to portable devices, high quality television and games at high quality. I don't think we should be skimping on that quality. I think that is essential," said Paul Rodley, Director of eLearning.

Future Focus

Christ's College are hoping to take the results of the e-asTTle trial and evaluate it further. They anticipate that all year nine and ten English and Maths classes will be assessed using e-asTTle. Individual teachers will shape the use of this assessment tool. It does not need to be something that is prescribed for them. e-asTTle has the potential in terms of supporting teachers to design a test to support the development of targeted learning programmes.

"We do have a lot of other assessment tools. But lets face it this is assessing in a smart way using technology- Why not?"

Julie Peterson , Head of English

"We in the mathematics department are very excited about it. I think there is huge potential for this, the boys will benefit from e-asTTle."

Dirk Gildenhuys, Head of Maths

In the future Christ's College would like to explore other IPTV options. Placing set top boxes at home and feeding those streams directly into students' televisions at home is currently being investigated. The school is aware that sharing video can incur large data costs however where students are connected using a common ISP (Internet Service Provider) as the school this will reduce the cost to almost nothing. There has also been demand for French TV and an application is currently in progress to very soon be able to push out this out to schools on KAREN.

There is also potential to pull rich media resources from other high-speed networks that have effectively paired with KAREN, it doesn't just have to be languages. One thing the school would like to see developed is an educational IPTV system.

Physical Location: Based in Wellington, working nationally.

Website: <http://www.correspondence.school.nz/>

Description:

As New Zealand's largest school, and one of only a few national schools, The Correspondence School (TCS) touches almost every community in the country. Our students study at early childhood, primary and secondary levels, and we have students with special education needs.

Our vision is to be a leader in personalising learning, working in partnership with families, whanau and communities to offer students the best opportunity to achieve their potential. We are vital and integral to the New Zealand education system.

The Correspondence School has around 450 teaching and support staff based across three sites in Wellington. The School is divided into three wahanga (divisions): Learning and Delivery, which includes all teachers; Design and Quality, which is concerned with the production and distribution of teaching and learning resources; and Capability Services, which includes Enrolment Services, Finance, Human Resources, and the Information Resources Group.

What did they do?

KAREN provides access to large repositories of knowledge. The Correspondence School utilised one of these repositories, e-Cast.

Developed in New Zealand, e-Cast Education is a powerful on-line teaching and learning tool. It provides real-time and real-life teaching resources through recorded and live videos streamed and downloaded material from over thirty domestic and international television channels. The Correspondence School have select relevant content from this service partner to include within their teacher presentations and student learning programmes.

Learning for students and teachers

A key benefit for teachers at the Correspondence School is being able to include relevant, up to date multi-media in the delivery of their learning programmes to teachers and students. Programmes can be viewed and assessed online. The teachers can download a high quality copy to their personal computer or local network where it can be edited or kept for immediate or future use.

KAREN's contribution

e-Cast material is available 'on-net', i.e. reachable directly over KAREN at very high speeds and without the usage and bandwidth limitations of 'off-net' destinations. This means that the school does not have to access e-Cast via their ISP lowering the cost of accessing high quality multimedia resources for their teachers and students.

Future Focus

Staff at the Correspondence School want to encourage more teachers to utilise this rich resource and add to their existing library of subject relevant digital resources.



Hunterville

Physical Location: Hunterville, Manawatu-Wanganui

Website: www.hunterville.school.nz

Description: Hunterville School is a year one to eight school with 204 students. At Hunterville School the focus is developing a rounded education with high levels of competency in reading, writing and arithmetic and promotion of sport as part of that education. They are proud of their students' achievements both in and out of the classroom.

What did they do?

Year eight Hunterville students utilised desktop video conferencing technologies via KAREN to interview and carry out a 'push play' survey with Appleby School students in Richmond. The students they interviewed are part of an eight-piece rock band called Appleby Sticks. The band not only participated in the interview and survey, they also staged a live gig via videoconference for the Hunterville students.

Learning for students and teachers

Hunterville students developed surveying and interview skills and were able to conduct these with a wider geographical audience via videoconference. The students, supported by their teacher, developed desktop videoconferencing skills and were able to use new communication technologies.

Hunterville have investigated, with the support of REANNZ, sound quality issues they initially experienced. These were caused by feedback due to poor microphone quality and Hunterville now look forward to clear, simultaneous conversation with their new microphone. They also acknowledge the appropriate technologies such as high spec desktops machines, good microphones and sound school network infrastructure required to implement desktop video conferencing.

"There was a lot of interest in the desktop video conference project throughout the whole school. The teacher, Colleen Dalley, was very motivated. She supported students to lead the conferences. It was worthwhile for them to exchange ideas, get instant responses and see and speak with students from another school, in another island."

Stephen Lewis, Hunterville, Principal

KAREN's contribution

Desktop video conferencing is a cost effective option when supported by high bandwidth. The desktop video conferencing allows collaboration opportunities with schools and institutions such as the National Library and Te Papa, with direct links to the advanced network in the future.

Without KAREN a small rural school like Hunterville could not have considered

- a) Collaborating with students in the North Island without the advanced network to transmit the large volumes of data required for videoconferences.
- b) Participating in the national trial of KAREN and contributing lessons learnt to be applied in the development of equipment standards and network testing for New Zealand schools in the future.

Future Focus

Huntermville teachers and students are enthusiastic about the potential of desktop video conferencing in the future. They would like to expose their students to other schools and experts that are available on the KAREN. (see the [KAREN wiki](#) for a full list of content resources and partners on KAREN) Huntermville plan to continue the technical trials to minimise the issues and frustrations, such as 'dropping out' of the videoconference room, experienced in their first two conferences.

Physical Location: Albany Highway, Albany

Website: www.kristin.school.nz

Description:

Kristin is an independent co-educational school of about 1400 students, from NE to year 13, on Auckland's North Shore. Established in 1973 Kristin School is a recognised leader, nationally and internationally, in the use of Information and Communication Technologies (ICT), to improve the learning and teaching processes at all levels of the school. In 1996, they were the first school to introduce the use of laptop computers to all students at Year 7.

What did they do?

Kristin students participated in the first New Zealand Schools High Definition Video Conference Music lesson and performance with Canterbury University and Christ's College in Christchurch. Merryn Dunmill of the Music Education Research Centre at Canterbury University initiated the project titled "musicGrid". It involved two students from both Kristin School and Christ's College receiving a lesson from Mark Walton, Director of the Christchurch School of Music. Following the lesson, despite their different locations, they were able to play an ensemble together.

Staff and students at Kristin also enjoyed the benefits of using a variety of the Google applications over the advanced network. A Junior School teacher used Google Earth as a part of an Ancient Civilisations study, while other teachers used Google Docs for collaborative work among whole classes at a time. Using Google earth, some of the more adventurous students were able to use the Google Simulator to "fly" into the environment of Darfur they were studying

Learning for students and teachers

Students participating in the online music lesson saw many benefits from the experience. The two students from each school; Antoni Tisot and Jonathan Sampson from Kristin and Justin Standing and Danny Lee from Christ's College were understandably impressed with the experience. "The video conference was far greater than I anticipated. It was amazing how effective it was. Despite using technology, a personal connection with the tutor was easy and the quality was not taken out of the lesson at all. The tutor was able to not only accurately scrutinize articulation, but even the tone of my playing. It's really exciting to see the development of such technology which will allow for students to have direct access to tutors from anywhere in the world", said Antoni.

"Today's live communication was eye opening in that it showed the possibility of communication with people who we would never meet otherwise. The sharing and comparison of assignments or work, for any subject, is now possible. This could prove useful in improving the quality of our work," said Jonathan.

KAREN's contribution

Staff at Kristin are enthusiastic about the benefits of using KAREN, both in terms of the speed advantages that are offered to enable participation in HD video conferencing, and in the capacity advantages of being able to involve large numbers of simultaneous users.

"The benefits of connecting to KAREN are immense; students and staff can reach the resources of universities in New Zealand, Australia, and the United States; show maps and satellite footage to Geography classes using Google Maps; and collaborate via high definition video conferences with other students around the world," says Jason MacDonald, Director of ICT Services at Kristin.

Future Focus

The ICTS team at Kristin believe that the musicGrid project is a perfect exemplar and a trial case for the Ministry of Education to look into. "At the moment we are facing a chicken-and-egg scenario, in that we need more schools and universities to be connected in order to be able to connect and collaborate on an ongoing basis. However, we have many ideas for further video conferences to continue to enhance the learning opportunities for our students," says Tony Bigby, Network Administrator at Kristin School.



Physical Location: Glen Innes, Auckland

Website: <http://www.ptengland.school.nz/>

School Description:

Point England School is a contributing school (NE-yr.6) located in Glen Innes, Auckland.

Their mission is working in partnership with their community to build a path to success for the children they share.

What did they do?

On November 11 2008 the Year 5 and 6 extension group enjoyed the opportunity to Video Conference with Josh Klein in California. As part of the school-wide environmental inquiry topic "Go for Green" Mrs Tele'a and her students had watched his TED talk and started to find out more about crows. They found it really interesting that Josh was trying to find a way to live with these pesky birds and find a use for them instead of just trying to get rid of them. Everyone thought his vending machine for crows was a great idea.

Pt England School students also participated in another round of Rock Our World in Term 4 of 2008. Students shared their music, learning and movies with students from Canada, New Hampshire USA, Italy, Poland, China, Peru and Delaware USA.

Learning for students and teachers

After finding out about crows the extension group used one of Tony Ryan's Thinkers Keys, the B.A.R. key, and tried to adapt the vending machine by making it Bigger, Adding something and Replacing something. So when they got to meet Josh via Skype, after they had chatted to him for a bit, they tried out their B.A.R. thinking on him and asked him what he would do if he used the B.A.R. key. They also asked him how he would deal with the pesky magpies in the school field at Pt England School who dive bomb kids and teachers when they are annoyed.\

The students thoroughly enjoyed video conferencing with students from other countries and finding out about what school and life is like where they come from. As part of this project they had a film festival and the students worked in groups to create independent movies around the 'Green' theme.

KAREN's contribution

Staff and students at point England School are high-level users of ICT across all curriculum areas, and make extensive use of online projects and communications. Before being connected to KAREN, the experienced difficulties in terms of securing a high-speed connection to the web, and their previous link to the Rock Our World project had to be done from a nearby church hall where connectivity was better. The school now has connectivity to KAREN through a radio connection over the "last mile" that allows them to participate in these activities from within the school.

Future Focus

Point England students plan to enter the Rock Our World event again next year, and are already in communication with Google to find if they can engage with another live link with a TED Talks expert, All are very excited about the opportunities this technology affords and are keen to make good use if it in as many ways as they can.

**Physical Location:**

Wellington Central

Website: <http://www.wellington-college.school.nz>

Description:

The Wellington College mission is to inspire students to develop their talents, to reach well beyond the ordinary, and to acquire a life-long passion for learning.

What did they do?

Wellington College teachers utilised video conferencing to meet with the National Library advisers to discuss and view nineteenth century resources available to teachers and students and boys' reading habits and potential selections and resources.

Learning for students and teachers

As part of the National Education Network trial participating schools such as Wellington College are developing their video conferencing infrastructure and discussing the impact on pedagogical teaching and learning through this medium.

The National Library is one of the country's richest sources of digital content and services, teachers were astounded at the high quality of digital resources now available to them and their students. History teachers were able to discuss and review the resources with an adviser in real time, remotely with the use of the high-speed network and video conferencing technologies.

KAREN's contribution

Both the National Library and Wellington College are KAREN members. Therefore not only can they utilise the KAREN High Definition Video Conference bridge but also the National Library resources, which are available 'on-net' i.e. reachable directly over KAREN at super speeds and without the usage and bandwidth limitations (and sometimes cost) of 'off-net' destinations.

Having participated in the National library video conference via the KAREN bridge Wellington College are aware of the [services, collections, and online catalogues](#) appropriate for their students and subject areas.

They recommend schools [explore the content and services](#) available on KAREN nationally and 'on-net' via peering relationships with national organisations and the rest of the world's research and education networks.

Future Focus

Wellington College will continue to explore and develop networks with experts, resources and other schools available via videoconference. They would like to form a stronger partnership with the National Library to developing learning programmes and case studies utilising the digital resources available.

“Feedback from teachers has been very positive, being able to link with experts from different organisations will be beneficial for teaching programmes and student learning,” Mike Pallin.

Assistant Principal and International Student Manager



Physical Location: University of Canterbury, Christchurch

Website: www.merc.canterbury.ac.nz

Description:

The National Centre for Research in Music Education and Sound Arts ([MERC](http://www.merc.canterbury.ac.nz)) serves as the national hub for the coordination of and contribution to research in music education and sound arts. MERC is devoted to developing the national and international profile of music education in Aotearoa New Zealand through its activities, partnerships and collaborations in particular with the subject association ([MENZA](http://www.menza.org.nz)), Music Education Advocacy Trust ([METANZ](http://www.metanz.org.nz)), Christchurch School of Music ([CSM](http://www.csm.ac.nz)), [Ministry of Education](http://www.moe.govt.nz), and the new Arts Hub Aotearoa ([AHA](http://www.aha.org.nz)), a UNESCO/UC Asia Pacific Arts Education Observatory.

What did they do?

Mark Walton, Musical Director of the CSM, delivered master classes from the University of Canterbury to Kristin and Christ's College clarinet and saxophone students. These schools were the first to be connected to the New Zealand Schools High Definition Video Conference trial for the establishment of the National Education Network (NEN). Merryn Dunmill of the Music Education Research Centre at Canterbury University initiated the project titled "musicGrid".

The first school to be taught music through KAREN was Christ's College where two students based at Christ's learned from Mark Walton, based at the University of Canterbury. Two students at Kristin observed this lesson until their own lesson was taught to them, using the same music yet differing parts. Christ's College students observed the Kristin students during their lesson. The ultimate goal was to create a four-part ensemble requiring multi point, synchronous conferencing so finally, all three locations attempted to perform together to play the catchy arrangement created by Mark Walton.

The individual schools' videoconference sessions using KAREN were high in quality. However, when the schools tried to play the music together the slight latency of around half a second, created havoc. Even the slightest latency is problematic for time-based, synchronous musical performance, which requires imperceptible latency for musicians to successfully, and musically play together.

Learning for students and teachers

Students participating in the online music lesson saw many benefits from the experience. The two students from each school; Antoni Tisot and Jonathan Sampson from Kristin and Justin Standring and Danny Lee from Christ's College were understandably impressed with the experience. "The video conference was far greater than I anticipated. It was amazing how effective it was. Despite using technology, a personal connection with the tutor was easy and the quality was not taken out of the lesson at all. The tutor was able to not only accurately scrutinize articulation, but even the tone of my playing. It's really exciting to see the development of such technology which will allow for students to have direct access to tutors from anywhere in the world", said Antoni.

“Today’s live communication was eye opening in that it showed the possibility of communication with people who we would never meet otherwise. The sharing and comparison of assignments or work, for any subject, is now possible. This could prove useful in improving the quality of our work,” said Jonathan.

The scope for music and performing arts students to share their creative and performance works through this technology is very exciting. Peer mentoring, teacher moderation, and collaborative arts projects are now possible between schools across New Zealand.

KAREN’s contribution

Through KAREN, the capability to exchange artistic practices with other communities is likely to enrich lifelong learning and cultural understandings between people of all ages, no matter the time, place, or circumstance. More equitable access to high quality music tuition is now possible for any institution connected to KAREN.

Future Focus

It is conceivable in the near future that music students in our schools and tertiary institutions can connect and mentor each other not only within and across New Zealand, but also throughout the Asia Pacific region. The development of creative cultural projects using KAREN could see New Zealand grow new research and creative industries.