

PRINCIPAL'S SABBATICAL REPORT
Warren Hawke
Governors Bay School
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“How schools sustain the improvements in teaching and learning made through an ICT Contract once funding ceases.”

Acknowledgement

I would like to thank the Board of Trustees of Governors Bay School for supporting my request to apply for and take sabbatical leave. I would also like to thank those whom I discussed my concept planning and also who helped to distribute my questionnaire. Most importantly The Ellesmere Principal's Association and The Canterbury Primary School's Principal's Association. I would also like to thank my wife Joy with whom I shared ideas, discussed drafts and fine tuned the writing both at the research stage and in the final draft. Finally I would like to thank those principals who were able to find time to complete and return my questionnaire, and those who were available for indepth discussion. This has provided me with not only a wealth of information but a positive outlook and certain vitality from which to write this paper.

Sabbatical Intention

The aim of this sabbatical was to ascertain from schools who have finished an ICT contract how successful they are in:-

- a) Maintaining the initiatives that they have introduced as a result of involvement in such a contract.
- b) Further developing new teaching initiatives based around ICT.
- c) Maintaining or continuing to enhance teaching practices utilising ICT.

Teachers need professional development in order to bridge the gap between the presence of computers in school, and the effective use of information and communications technology for learning” (Jacobsen, 2001)¹. Traditional technology workshops have been

ineffective at bringing teachers technology skills to a level that promotes the integration of technology and curricula, (Mouza, 2002)

Background and Rationale

Governors Bay School is currently in its final year of a three year ICT contract as a part of the Selwyn ICT cluster of schools. Such a contract has provided many new learning opportunities for staff through the use of a significant amount of additional funding. The contacts made through a cluster membership have become an important part of this development process. As a Principal I am interested to see how such a development might continue in the future when there is no additional funding to support such a structure and perhaps such staff development.

The 2007 ICT Strategic Framework for Education's vision is to “improve learner achievement in an innovative education sector, fully connected and supported by the smart use of ICT”.

For primary schools this means;-

- focussing on outcomes rather than technology
- recognising that the design, development and implementation of ICT is dependent upon people.
- the maintenance of a cooperative culture with communities that support and nurture innovation, creativity and the sharing of ideas and practices.

The use of ICT in schools is about improving teaching and learning through the multifaceted use of this very powerful tool. ICT plays a valuable part in a number of different ways:-

- Through planning, teaching, assessing, recording and reporting based around a Student Management System.
- Through the provision of high interest learning, recording and the presenting of findings and/or information utilising such tools as:- on line resources, email, blogging, wikis, photography, animation and video to list but some.

It is important to note the impact of continual change associated with technology and the opportunities and challenges that such an environment therefore provides.

Being involved in an ICT contract working within a cluster of schools can be a rewarding experience in a positive and supportive atmosphere. Indeed the term 'Learning Community' fits well with this concept and organisation. As with any staff or school development programme the goal is to improve teaching and learning and in this case through the better use of ICT. The Cluster Model has several distinct advantages in that it enables schools to:-

- set the direction that the cluster wants the development to take.
- work at a pace which suits individual staff members.
- work within the confines of their equipment capability.
- make use of the skill and experience set within the cluster.
- utilise development in groups of teaching levels e.g. Junior, Middle, Senior school across the cluster.

Utilising ICT as an Effective Teaching and Learning Tool

Technical mastery of ICT skills is not a sufficient precondition for successful ICT in teaching, whilst this is necessary successful teaching will not necessarily follow.

Teachers require extensive, ongoing exposure to ICT to be able to evaluate and select the most appropriate resources Trucano (2005).

How is it then that ICT can improve teaching and Learning?

To answer this question it is necessary to investigate the qualities of the professional learning opportunities that lead teachers to interpret and utilise the available understandings and skills in ways that lead to positive student outcomes?

If all teacher development with ICT is based on sound pedagogical principles then it should follow that such development will have greater effect in improving both teaching and therefore learning outcomes.

It is important to define what is meant by 'sound pedagogical principles'

#1 Pedagogy, to quote Mortimer (1999), 'is any conscious activity by one

person designed to enhance the learning of another'. While pedagogy can be a personal matter it is more often conceived of as the art or science of teaching; a set of principles and practices to improve learning. Educational technology, refers to the sound use of any technology to support and improve learning.

Such principles would therefore include activities as:-

- Matching the content and delivery to the needs of individual students#
- Utilising collaborative learning, promoting the principles of constructivist theory where students work together to construct knowledge. #
- The development of strong literacy skills so as to be critical in determining the validity and reliability of information found on the internet and other media.

All too often it seems that an ICT activity can be produced from a “bag of tricks” without first defining, describing or laying a platform as to how, why, or when, such an activity could be meaningfully utilised as a high interest and most effective learning activity.

There are also be issues around classroom management and use of equipment that must be considered. Is it reasonable or possible to expect a class of twenty five pupils take advantage of a useful ICT resource with access to one or two workstations?

An acceptance of a learning environment, thoughtful use of groupings, buddy systems or tutors can assist once a teacher has evaluated the quality of such a resource or activity.

A complete set of effective principles can be gained from Alton- Lees research 'Best Evidence Synthesis' (2003). I have chosen to select those which I see as relating directly to ICT use and therefore having a positive impact in this area.

The ten research-based characteristics of quality teaching derived from the research are generic in that they reflect principles taken from research across the curriculum. How the principles apply in practice is, however, dependent on the curriculum area, and the experience, prior knowledge and needs of the learners in any particular context.

The ten characteristics generated out of the synthesis which relate directly to ICT use or how it might be effectively included in classroom practice are summarised below.

1. Quality teaching is focused on student achievement (including social outcomes) and facilitates high standards of student outcomes for heterogeneous groups of students.

2. Pedagogical practices enable classes and other learning groupings to work as caring, inclusive, and cohesive learning communities.

The learning community concept has arisen out of the research literature and denotes both a central focus on learning and the interdependence of the social and the academic in optimising learning conditions.

The practical nature of how ICT is utilised in class and group work with an Inquiry Teaching Model fits well with this characteristic. This therefore relates positively to how ICT is or could be effectively used.

Research-based characteristics

- Pedagogical practices create an environment that works as a learning community.
- Student motivation is optimised and students' aspirations are supported and extended.
- Caring and support is generated through the practices and interactions of teacher(s) and students.
- Pedagogical practices pro-actively value and address diversity.
- Academic norms are strong and not subverted by social norms.
- The language and practices of the classroom are inclusive of all students.
- Teachers use class sessions to value diversity, and to build community and cohesion.
- Teaching and tasks are structured to support, and students demonstrate, active learning orientations.
- Teaching includes specific training in collaborative group work with individual accountability mechanisms, and students demonstrate effective co-operative and social skills that enable group processes to facilitate learning for all participants.

- Students help each other with resource access and provide elaborated explanations.
- Pedagogical practice is appropriately responsive to the interdependence of socio-cultural and cognitive dimensions.

These characteristics do not focus on or mention ICT as a teaching resource, they are about best practice and therefore highly relevant to the inclusion of ICT in classroom programmes. ‘Teachers pedagogical practices and reasoning influence their use of ICT, and the nature of teacher ICT use impacts on student achievement’ Trucano (2005).

3. Effective links are created between school and other cultural contexts in which students are socialised, to facilitate learning.

4. Quality teaching is responsive to student learning processes.

Research-based characteristics are specific to curriculum context and the prior knowledge and experiences of the learners.

- Teachers have knowledge of the nature of student learning processes in the curriculum area, can interpret student behaviour in the light of this knowledge and are responsive, creative and effective in facilitating learning processes.
- Examples of teaching approaches that are intended to exemplify this characteristic include the Interactive Teaching Approach in science education.

5. Opportunity to learn is effective and sufficient.

Research-based characteristics

- Quality teaching provides sufficient and effective opportunity to learn.
- Curriculum enactment has coherence, interconnectedness and links are made to real life relevance.
- Curriculum content addresses diversity appropriately and effectively.

- Quality teaching includes and optimises the effective use of non-linguistic representations by teacher and students. (This assumes the concurrent and rich use of oral language and text as central to literacy across the curriculum.)
- Students have opportunities to resolve cognitive conflict.
- Students have sufficient and appropriate opportunities for practice and application.

6. Multiple task contexts support learning cycles.

Research-based characteristics

- Task cycles match developmental learning cycles of students.
- Task cycles enable students to engage in and complete learning processes so that what is learned is remembered.
- Optimal use is made of complementary combinations of teacher-directed groupings, co-operative groups, structured peer interaction and individual work (including homework) to facilitate learning cycles.

7. Curriculum goals, resources including ICT usage, task design, teaching and school practices are effectively aligned.

Research-based characteristics

- Curricular alignment: The use of resources, teaching materials and ICT is aligned with curriculum goals to optimise student motivation and accomplish instructional purposes and goals.
- Curricular alignment optimises rather than inhibits critical thinking.
- ICT usage is integrated into pedagogical practice across the curriculum.
- Quality teaching is optimised when there is whole school alignment around evidence-based practices.
- Whole school alignment optimises opportunity to learn, particularly in language immersion, literacy, ICT, social studies and health.
- Whole school alignment enables a common language, teacher collaboration and reflection and other synergies around improving teaching.

- Whole school alignment minimises disruptions to quality teaching and sustains continuous improvement.
- School policies and practices initiate, and support teachers in maintaining, school-home partnerships focused on learning.

8. Pedagogy scaffolds and provides appropriate feedback on students' task engagement.

Research-based characteristics

- Tasks and classroom interactions provide scaffolds to facilitate student learning (the teacher provides whatever assistance diverse students need to enable them to engage in learning activities productively, for example, teacher use of prompts, questions, and appropriate resources including social resources).
- Teaching develops all students' information skills and ensures students' ready access to resources when needed to assist the learning process.

9. Pedagogy promotes learning orientations, student self-regulation, metacognitive strategies and thoughtful student discourse.

Research-based characteristics

- Quality teaching promotes learning orientations and student self-regulation.
- Teaching promotes metacognitive strategy use (e.g. mental strategies in numeracy) by all students.
- Teaching promotes critical thinking.
- Teaching makes transparent to students the links between strategic effort and accomplishment.

10. Teachers and students engage constructively in goal-oriented assessment.

Research-based characteristics

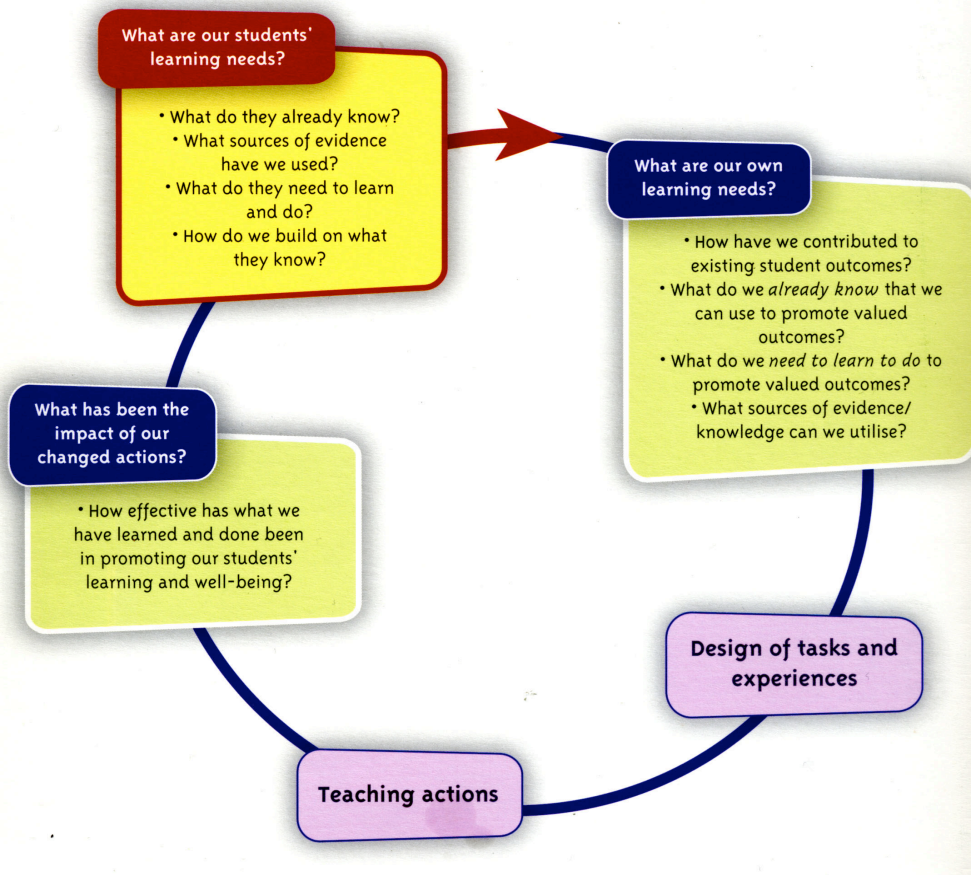
- Assessment practices improve learning.
- Teachers and students have clear information about learning outcomes.

- Students have a strong sense of involvement in the process of setting specific learning goals.
- Pedagogy scaffolds and provides appropriate feedback on students' task engagement.

In designing a teaching unit or programme with ICT as a resource a teacher could study characteristics of “Best Evidence...” and the “Knowledge Building Cycle “ below.

Careful consideration of the needs of their class, including those factors listed in the synthesis which are useful and/or relevant will help to ensure that quality teaching and learning occurs. Effective teaching practice however must permeate all that a teacher does and include all ‘best evidence’ characteristics not just those listed that might relate to the effective use of ICT in classrooms. A combination of ‘ Best Evidence...’ with the ‘Teacher Inquiry and Knowledge- building cycle’ (Timperly et al 2007) using ICT as a classroom resource should have positive outcomes for learners.

**Teacher inquiry and knowledge-building cycle
to promote valued student outcomes.**



A good staff development programme will create an excitement about learning to learn. The question is how to keep momentum, not merely maintain previously learned behaviour. Century and Levy (2002) define sustainability as “the ability of a program to maintain its core beliefs and values and use them to guide programme adaptations to changes and pressures over time”. Such a definition is most relevant in the field of ICT in teaching as by its very nature ICT continues to change and grow in what it is able to do and/or offer both teachers and students.

Findings

Survey Data from Sabbatical Research

1.1 *Schools involved in the study*

Sixteen schools took part in this study. They are schools that have been a part of Ministry funded contracts in ICT which lasted for three years and have since finished their involvement with the contract. The schools were either full primary or contributing schools. No Intermediate schools chose to take part.

The study was based around ten questions which schools were expected to answer. Some questions asked for Yes/No answers whilst others asked principals to choose from a selection and offer other ideas when needed. While most principals answered most questions not all answered each question. The fact that some questions could require more than one answer was planned for.

It was interesting to note that of the sixteen schools involved fifteen schools have managed to build on or sustain a focus in this area, one school has not.

1.2 *Building on or Sustaining a focus*

Most schools chose to do build or sustain their focus by utilising a number of different staff development initiatives. One school maintained their focus by using one initiative.

These initiatives included:-

- a planned process of development funded by the school.
- through attendance at courses for some staff.
- through attendance at conferences
- by combining with other schools and employing a facilitator

Other initiatives provided included:-

- by employing a facilitator
- by making sure we include elements of ICT into our termly “Theme” programme
- by ensuring we include it regularly in staff PD planning.

Below Fig 1, represents the number of schools that selected each option, it includes

the fact that some schools chose more than one staff development activity.

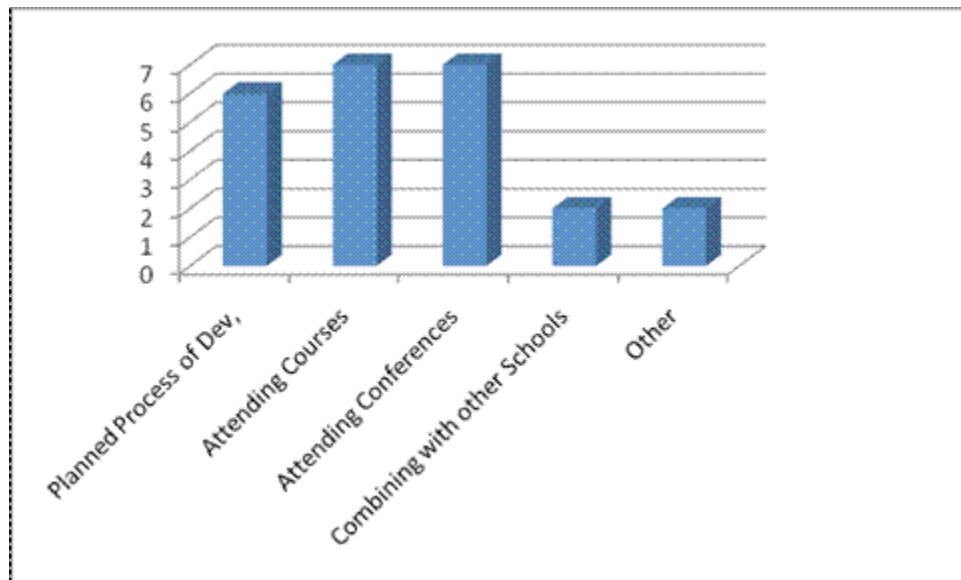


Figure 1

1.3 *Making use of a staff member as an ICT Resource Person.*

The ICT Project Model that many schools have been involved in makes use of a delegated teacher to help lead staff through most or all of the upskilling that occurs. Of the sixteen schools in the study thirteen schools continued using this ICT resource person whilst three schools no longer used such a staff member. Note one school that stated ‘sort of’ was included as a yes. Of the thirteen schools utilising this staff member eight of these schools do provide their teacher with some specialist assistance.

Such assistance is provided by/through:-

- *Having access to PD when they feel that they need to upskill. However one facilitator is so far ahead of the staff as a specialist he is highly sort after by other schools.*
- *Three schools stated that there is technical help provided. For one this included SMS help as well.*
- *One school stated that the Board Chair helps out with the website and technical problems.*
- *No one readily available in the area of one school.*

1.4 Finance, Recognition and Funding

Six of the schools paid this staff resource person additional salary in the form of either full or part management units. Seven of the schools did not pay additional additional salary.

One school had secured additional funding from another Ministry Contract to support this continued development this was the 'Enhancing High Standards' contract. Two other schools managed to secure some funding from other sources including grants, shopping competitions and securing funding gained from having International Students in the school. This left thirteen other schools in the study with no additional funding yet still continuing with a commitment to carry on with this development.

Source(s) of such funding:

A community trust grant put three additional work stations in each class.

Westfield shop for your school helped us get some equipment, the rest the board funded.

Another school used money from international students to fund ICT

1.5 ICT and Strategic Planning

Half of the schools in the study linked ICT in class programmes with objectives in their strategic plan.

Comments related to this included:-

Ensure that funds are available to update technology by preparing long term ICT replacement of technology plan.

Work towards updating school website to provide more information to parents and which allows children to communicate with each other and home via the web.

Provide learning experiences that challenge children to build their skills in technology.

Not specifically this year because it is embedded in all we do.

Raise student achievement with a stimulating curriculum that extends all children to the best of their ability.

To implement our ten year plan and investigate ways of creating extra funding for extra and co-curricular activities with the best staffing.

1.6 *Linking ICT Development with Attestation and or Appraisal*

Nine schools in the study continued to link ICT development with part of their teacher attestation and/or their school appraisal process.

1.7 *Linking ICT in class programmes to improvements in learning for pupils.*

A question in the study asked principals to respond as to how they saw ICT impacting on learning in their schools. Ten principals responded that pupils demonstrate a highly motivated approach to their learning. The overall findings are graphed in Fig 2. Many principals saw impacts in several different ways. Some also stated alternative impacts which have been listed in italics.

Possible answers provided by the questioning included

- A highly motivated approach
- Increased responsibility for their own learning
- Increased focus in working independently.
- An aptitude which continually moves their learning on.
- Improved assessment results from topics studied.

Other examples provided by the principals themselves included:-

- *Great engagement in topics with more willingness to share their findings and share in an increasing variety of ways.*
- *Anecdotal only*
- *More on task behaviour*
- *A greater focus on thinking skills and scaffolding for next step learning.*
- *Children now more motivated by using inquiry methodology.*
- *We see elements of all of those listed. The main change is the greater focus on thinking skills and scaffolding for next step learning.*
- *Student use of active boards and laptops is highly motivating.*

- *A desire to learn more, sharing of new knowledge and enthusiasm to help others gain new skills.*
- *Through our inquiry approach new knowledge is presented in a variety of different ways.*
- *Parents interest in what is happening in the classrooms.*
- *Parent information evenings are held and parents have hands on experiences of working with equipment to show them what their children are able to do.*

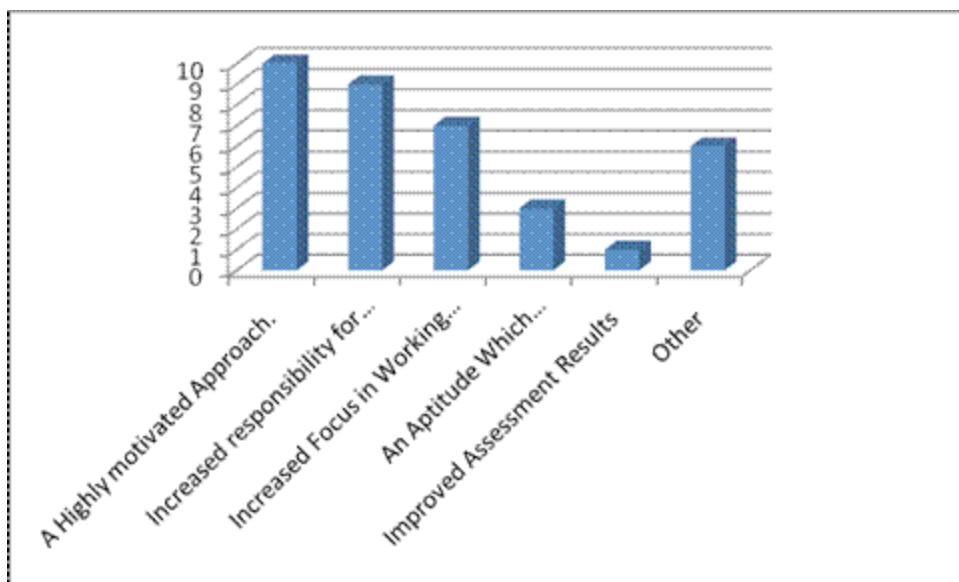


Figure 2

Nearly all items listed encompass those factors which help to build or are a part of a positive learning environment. Only one school responded that ICT has a positive effect demonstrated through improved assessment results. 'It is simplistic to judge sustainability on the basis of improved student outcomes. Focussing on test scores can lead to a narrow and impoverished curriculum.' Timperly et al 2007

1.8 *Linking ICT use with Inquiry Learning*

Fifteen schools in the study continue to link ICT use with an 'Inquiry Learning' approach in topic studies?

One principal stated that he was not a great enthusiast for the 'Inquiry Approach' more focussed on goals, task, success criteria approach.

1.9.1 Changes in teaching and learning since completing the contract.

Most principals were enthusiastic about the continued use of ICT in their schools Teaching and learning ideas relating to ICT that have been modified or introduced since finishing the ICT contract include:-

- *A lot more visual, hands on with ICT equipment.*
- *Students have greater ability to share their learning to a global audience through wiki and blogging.*
- *Students have greater knowledge of how to search for and sift through information online.*
- *One school commented that they have an expected toolbox including use of ICT and Thinking Skills which is sequenced across all age groups.*
- *Site based curriculum, various tools including our inquiry model.*
- *We try not to be too slavish to the idea of using ICT's in everything we do rather we treat them as tools that may be the most appropriate to use in particular contexts. However we do try to use the pedagogical approach that underlie their successful use in a wider range of contexts.*
- *ICT now integrated and seen as a tool rather than a subject to teach.*
- *The learning from ICT has not really been about ICT use it has been about developing effective pedagogies for 21 Century learning and understanding best practice. We have introduced many initiatives which have their roots in the ICT contract but are not related. Inquiry Learning, Children leading Learning, Information Literacy Skills, Thinking Programmes, Taxonomies of Learning, Multiple Intelligences and Learning Styles, Self regulated learning and more.*
- *Use of LEARNZ, effective use of digital cameras, students creating blogs, Using wonderings, Developing and using school learning model, List of expected ICT competencies at each level, Using graphic organisers, Teacher use of computer for planning, Using Inspiration/kidspiration, Sharing children's work.*

- *We have a contract each student signs each year with the parents on how the internet and equipment will be used.*
- *Thinking skills programme and Inquiry Learning process have been further developed and shared with the community, booklet on these has been printed and all families have a copy,*
- *Parent evenings held each year to ensure parents know what and how we do things in the classrooms.*
- *Curriculum plan has been written and is being followed for the second year- in line with the revised curriculum, have our vision statement presented visually – artistic children worked with a teacher to come up with a design and then an artist put it together for us – fantastic step as the kids have real ownership of it, now we need to get the younger ones and new students able to articulate it.*
- *The very first step was to switch from dial-up to broadband (we are only talking 3 ½ years ago). Then, the next step was to get laptops for all our teachers (when I arrived and the ICT contract had been finished for nearly a year, only one teacher and the principal had laptops – how can you do an ICT contract as a teacher, without a laptop???)
Then we have learnt how to (begin) to use the laptops – for some teachers as a teaching tool, for others, just beginning to use a laptop fullstop was and still is a huge learning curve. We are working hard on using it as a teaching tool too.*
- *We have installed data projectors in each classroom and have purchase 10 mini laptops that are in two pods of 5. These are able to be used in classrooms and we now have wireless access throughout the school.*
- *Our teachers make increasing use of the internet and interactive sites on the net for teaching. We are just beginning to load links to relevant sites onto our school website, so that teachers and children and families can easily link to stuff we are focusing on at the time.*
- *We use the NZMaths website – learning objects – most days.
Our children also use a range of spelling websites for their spelling practice.*

- *We draw attention to interesting web links in most newsletters and are always trying to encourage children and families to use the web at home.*
- *We are beginning to encourage children to write onto the computer as their first draft when it is appropriate (children are often rostered on to the computer in writing time) rather than word-processing an already written piece of work simply for publishing purposes.*
- *One principal stated that he was unsure as there has not been a focus on ICT since they started working at the school.*

2.0 ICT as an important teaching and learning tool for 21st century education.

All principals surveyed thought that ICT as a teaching learning tool was either important or most important. Their responses are shown in Fig 3.

This response is also reflected positively by the high number of schools that had a commitment to maintaining ICT development in some way.

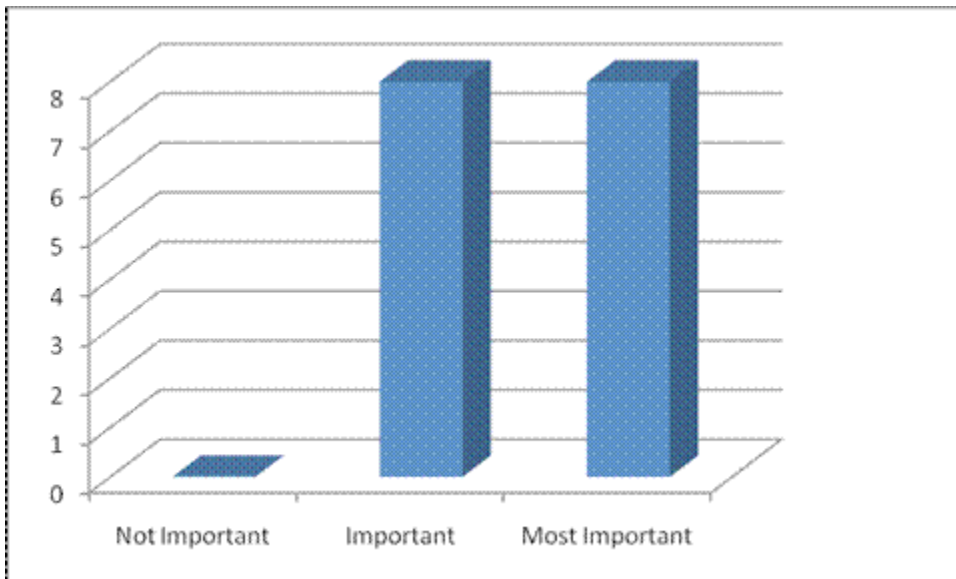


Figure 3

Comments made by principals that relate to this include:

- *The pedagogy behind it is important.*
- *Our main focus is on teaching and learning in literacy and numeracy. Our focus on ICT sits below this.*

- *ICT is the tool of the future. It is important that children have equal opportunity to learn. It enables creativity and the full use of thinking tools/key competencies.*
- *These children are digital age kids they know nothing other than continual digital images from birth – TV, Cell Phones, computers. We cannot expect them to learn in the same way we have in the past as their lives are different to ours.*
- *ICT comes into all curriculums to a greater or lesser extent.*
- *Most communication is by email.*
- *In Inquiry based learning students have ready access to current knowledge through websites.*
- *The competent use of ICT is within our school vision. Parents believe that it is important for children to be able to use 21st Century tools. It is a teacher focus.*
- *My major concern is the mix of attitudes despite the intense support that teachers have had. These derive from:-*

“Churn” – i.e. teachers coming and going and a lack of continuity in the staff

Some teachers remain set in their ways

Some keen young things get the wrong idea and let the ICT drive the learning instead of the other way around

Shallow learning intentions related to ICT are evident in some uses

*The school has funded an ICT suite – this leads to its own unique emerging pedagogy, where the teacher becomes the focus, sharing what **THEY** know rather than coming from strong learning intentions and clear success criteria.*

It all requires really strong leadership and monitoring of what is happening.

Implications

This study demonstrates that there is a real commitment by most schools to continue to develop and utilize ICT as an effective teaching and learning tool once a school moves out of a contract. It is also noteworthy that schools were proactive tackling every day issues relating to the provision of such equipment and the continued up skilling of their teaching staff. How they go about this process can be problematic because of the lack of highly skilled resource people available and the high costs involved in hiring such a

facilitator if one is available. The experience gained through working in an ICT contract and the links made with other schools during this development can be invaluable for the continued growth and resourcing of ICT as a teaching/learning tool. An interesting observation made by some principals related to how much further schools have moved that were involved in the contract at a later stage rather than those who managed to win a position in the first intake. Whilst this is difficult to confirm it is important to note once more the dynamic nature of ICT and just how quickly both hardware and software can and does change.

Sustaining the Change

Educating students for a world where ‘the only certainty is change’ is a difficult proposition. Maintaining this change as an institution takes skillful leadership. For as a school moves off one staff development focus it inevitably moves onto another. Many schools have found it necessary to become involved in two Ministry funded contracts at a time in an attempt to keep pace with such things as:- AtoL, The Numeracy Project, The Literacy Project, Education for Sustainability, Gifted and Talented, Enhancing High Standards. Often such developments have taken place at the same time as the introduction of a new Student Management System, or even the planning of a new school curriculum. It is therefore most important that this ‘sustainability process’ is:-

- embedded in the management practices and therefore culture of the school.
- based on sound pedagogical principles
- focused on effective teaching that continues to lead to improved student learning.
- integrated into any existing school improvement efforts, (O’Connell, Chadwick & Anaru, 2007)
- part of an ongoing cycle, with a focus on continuous improvement which ensures that decisions made about change, emphasis and/or development are well informed.

There are additional challenges such as changes in staffing, budget restrictions and lack of expertise available at an advisory level. The goal is to utilize leadership and expertise to ensure that sustaining change is or becomes a natural part of how a school operates.

Benefits and Conclusion

Evidence gained from this study clearly demonstrates that most schools previously involved in an ICT contract have continued to

- Maintain the initiatives that they have introduced as a result of involvement in such a contract.
- Further develop new teaching initiatives based around ICT.
- Maintain and/or continue to enhance teaching practices utilising ICT.

In some of the schools there has been a conscious effort at management level to ensure sustainability occurs by linking this change to attestation and appraisal, and/or strategic planning. For some teachers there are still issues around just where ICT sits as a teaching and learning tool. These teachers may be young, be new to a school and have had no previous experience with an ICT contract. In cases like this sustainability is about support so that some of the best features of traditional teaching and learning will not be wasted and the potential for a new pedagogy of ICT in teaching can be optimised. 'Ongoing teacher training and support is critical to the successful utilisation of ICTs in education' Trucano (2005). In the future to achieve the potential of using ICT in education we must continue to reflect on why and how we can use it and analyse effective ways of improving it so that it can have the greatest impact on learners. Its importance and involvement in the everyday lives of people and therefore learners is yet to be realised.

The information and evidence gained in this study has given me confidence to move forward with ICT once our involvement with the contract finishes. Links will be made to sound pedagogical principals, embedding staff development and continued interaction with other schools so that we will continue to change and make gains to make the best possible use of this powerful resource.

'Only when we adopt a multilevel systems approach to change then we will be able to move past the plateau and onto into sustainable systemic innovation.' Fullan (2005)

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Abbreviations

AtoL: Assess to Learn Project

LEARNZ: An acronym for *Linking Education & Antarctic Research in New Zealand*
A virtual field trip teaching resource that now covers much more than Antarctica.

