Yes, in general Dan uses a wide range of strategies in his daily life including why and what questions, using previous experience, thinking and planning, asking for help and persistence. The video catches some of this.

(Dan’s Mother, Jonathan Rhodes Kindergarten report, p.17)

**Complexity of thinking**

The notion of identifying higher and lower order thinking was also implicit in the number of studies that looked at the complexity of children’s thinking in e-learning contexts.

In their grounded analysis of the complexity of thinking demonstrated in 60 randomly chosen learning stories on activities involving ICTs, for example, the Pukerua Bay Kindergarten teachers found evidence in over half of these stories of:

- increased ownership by children, self-documentation and self-assessment
- increased attention to detail in observing and talking about their artwork and flora and fauna
- engagement in enquiry for longer periods of time
- more complex articulation of their understandings through reflective and informative narrative.
- increased cognitive risk taking and flexible thinking (Pukerua Bay Kindergarten report p.21-30).

Riversdale Kindergarten, by contrast, analysed their learning stories in a less grounded way and used more traditional ‘levels of thinking’ framework to analyse complexity in children’s storytelling based on:

- making connections between the concrete and the abstract
- vocabulary extension
- children revisiting their learning
- thinking progresses from gathering to processing to applying information
- and children thinking about their thinking by reflecting on their work.
Learning story – Paige's paddock

On this particular day I noticed her building quite an elaborate construction using the duplo and animals. I sat down with her and started talking with her. She explained to me about the work she was doing with the duplo. Her explanations were very detailed so I asked her to hold her thoughts for a moment while I got my pen, paper and the camera. I remember the smile she gave me as she sat and waited for me to return. When I returned I quickly wrote down her words and took photos myself. I took the photo’s myself so I didn’t interrupt the flow of her story.

As she was telling me her story I told her that I had horses too. She smiled but did not enquire about them. She was very absorbed in what she was doing and telling me about what her horses needed. At the end of the session I put the photos on power point and made the book using her words.

When Paige came to kindergarten I read the story back to Paige. This was her response:

“I’ve made a paddock for my horses. They have water and grass to eat. They need a gate to keep them in. It pens and shuts. There are some safe jumps for the horse.

I’ve got a dog.

That’s me with a dog and my friend Tessa.

She is coming to look at the horses.

I have put water in the trough.

I have a friend Amanda, and she has horses at her house. She has a gate so they can’t get out.

She has a house for the horses but it doesn’t have a door.

I’ve got a goat at the paddock. He pushes me when he is hungry.”

After sharing the story I gave her the book to take home and put a copy on the bookshelf for the children to share. During the weekend Paige made me two amazing pictures and made herself a book that she shared with me. In the book she had written her own words so she could read me the story herself. She asked me to come and sit with her so she could read it to me. She had drawn some lovely pictures and written letters. The letters represented words. As she read to me she pointed to each letter as if it was a word.

“Once there was a tallest flower. It should be big cause it has lots of water.

There is a spider on the web but he is making it big. The web is finished.

Then there was big flowers, but different flowers coming up.

Then a fairy comed.

The End.”
I told her that I was very impressed with her storytelling skills. The look of pride on her face was priceless. Paige shared the story with a relieving teacher. I was impressed to hear her telling the same story and pointing to the letters as she spoke. … She displayed a real understanding that letters represent words. Paige went on to make and write several stories for her family. … This gave her the opportunity to share her ideas and thoughts with other people.

**Teacher’s analysis – Page’s paddocks**

Paige’s confidence and self-esteem was unlocked through the e-book. It was also because a teacher had understood and applied notice, recognising and responding as part of assessment in a timely way. If the making of the book had been left for more than a day or the stories and pictures put into a learning story in her profile, I doubt it would have had the same effect.

**Abstracting – connections between abstract & concrete**

Paige illustrated this indicator when she understood that she could be an author and made her own book at home. While she didn’t use ICT to create the book, we know that when Mum was shown how to, she showed Paige, then she was able to do this at home.

**Children develop and acquire vocabulary**

Paige’s vocabulary was enhanced as she expressed her own words to create her stories. She used a variety of tenses and descriptive words that she may not have used in her everyday speech. The books gave her the opportunity to experiment with language. Paige also displayed an understanding of the elements of a good story. All her stories had a beginning, middle, and an end.

**Revisiting**

With the support from her family, Paige was able to revisit her learning many times at home. The family listened to and appreciated her stories and she was encouraged to make stories for her Dad to read to him when they spent time together.

**Thinking goes from gathering to processing to applying**

Making books at home for friends and family showed that Paige was able to take the knowledge she had learned at kindergarten and apply it at home.
Children thinking about thinking

Paige understood that the letters she had written represented the words of her story. Every time the story was read she pointed to the same letter and said the same word. …

She was able to think about the reader and write a story for them.

"I really like making stories. I made a book for Dad and I read the special words. I wrote a special letter for Sohum and I am the only one who can read my words."

(Riversdale Kindergarten report, p. 7-8)

Through this framework they identified not just cognitive but also metacognitive outcomes. Metacognitive outcomes were often taken as any form of reflective comment made by children about their own work, but especially those comments that addressed the process rather than just the product of their learning. Similar outcomes were identified by several other services, most notably in Geraldine Kindergarten's study of their children’s ‘Habits of Mind’.

Stimulating wondering

Children also wonder about things they have no way of seeing ‘in person’ and this is an area of strength for the ICT tools, the resources of ‘YouTube’ and Internet sites are rich in opportunities for modelling and teaching not only wondering behaviours, but some effective ways to research.

(Pukerua Bay Kindergarten report, p.16)

Several reports provide evidence that ICTs can be used in a variety of ways to contribute to children’s ‘wonderings’, and to their implicit theory-making. Examples are cited of ICTs:

• ‘kindling’ wonder (eg making a movie of a Māori legend generating an interest in other Māori legends – Otatara Kindergarten)
• being an enabler to enquiry (eg using digital microscopes to see things previously unseen – Campus Crèche Preschool)
• being a medium through which they can express and make visible those wonderings (eg the “accurate” artwork in children’s presentations on flora and fauna – Pukerua Bay Kindergarten).
Encourage formal enquiries and the ongoing pursuit of interests

Yes, 'hands-on' is great, but YouTube video files can be the next best thing if live chaffinches or rattlesnakes, live sharks or crocodiles aren't just handy when curiosity or teachable moments are evident.

(Pukerua Bay Kindergarten report, p.16)

Associated with the notion of wondering is the outcome of children pursuing those wonderings and making them the stimulus for ongoing enquiries, often on their own initiative. The reports from Yendarra Kindergarten, Peachgrove Kindergarten, and Campus Crèche Toddlers, for example, all relate instances of children using digital microscopes as a way to transform wonder and interest into more “meaningful engaged work across the curriculum” (Pukerua Bay Kindergarten report, p.10).

Yendarra Kindergarten, for example, cite the following instance of Arapeta, who found an insect of interest to him in his garden and turned this into a full-scale formal enquiry:

In response to Arapeta’s insect find in the garden, the teacher supported by the digital microscope, and insect and wildlife book, encouraged him to match what he saw under the microscope with what he could find in the book. After moving between interest in what he saw magnified and the variety of pictures in the book he identified the insect correctly and named it. Over several days of investigating, collecting, practising the techniques needed to focus the microscope correctly, and discussing insects’ habitats and eating habits, Arapeta began to widen his inquiry to plants and other items. His unprompted descriptions of these magnified images drew comparisons with other knowledge he had. Describing a magnified leaf as, “It’s like a turtle back”, and physically demonstrating what he was saying.

(Learning Story. Yendarra Kindergarten report, p.18)

Teaching strategies that ‘worked’

The visual nature of ICT magnifies, highlights and clarifies events for children that can only be seen gradually, or not by the naked eye. For example, Zachary seeing the caterpillar hatch out of the egg on the video clip.

(Pukerua Bay Kindergarten report, p.11)

The pedagogical strategies that the services found worked in fostering thinking and enquiry-learning outcomes, included:

- engaging with children using invitational rather than closed questioning techniques
- consciously asking children about their thinking processes
• creating a special language for discussing thinking and enquiry with children ("I'm a perseverer. Sarah's not, she's a risk taker!" – Geraldine Kindergarten report.)
• videoing children solving problems and analysing the video later, as much of their thinking and enquiry habits are invisible in the moment
• having the ICT visible and accessible in a designated space
• giving children control over how much/how little ICT they choose to use
• children having ready access to digital cameras and printers with which they document their own learning
• children and teachers working collaboratively and not leaving the computer or ICT to be a ‘babysitter’
• established frameworks for identifying thinking levels can be variable in how easy or difficult they are to apply.
Learning outcomes related to children’s agency as learners

The concept of ‘agency’ in the education literature usually refers to the extent of autonomy, control, independence or authority that an individual has, or exercises, in a social setting. It thus refers to the extent to which individuals in educational contexts are seen, or see themselves, as ‘in charge of their own destiny’ as learners and/or teachers.

When Te Whāriki talks, therefore, of children being or becoming “confident and competent learners” and of their being “empowered” as learners, or when the NZ Curriculum talks of “managing self”, “contributing and participating”, or when educationalists generally talk of “child-centred learning” and of teachers being “the guide on the side not the sage on the stage”, they are essentially discussing issues of the power relationships that exist between learners and teachers in services and schools. They are discussing where the locus of ‘agency’ might lie in any educational activity or context.

It is also a common claim in the literature on e-learning and new technologies in education that a major affordance of such technologies is to provide rich opportunity for learners to follow their own interests, to learn relatively independently, and to control and manipulate information in ways not previously practicable.

It is hardly surprising then that a common and prominent theme in the services’ reports was to investigate and identify learning outcomes related to their growing sense of themselves as learners, the relative dependence or independence that they exercised in their learning, and the extent to which they were willing and able to self-assess and self-improve in activities involving the use of ICTs.

The projects

Outcomes for children related to their sense of agency and empowerment as learners featured incidentally in many of the services’ reports. However, studies that particularly focused on such outcomes included investigations of how ICTs might be used to encourage children to ‘drive their own learning’ or follow their own interests (Rangitoto Kindergarten, Campus Creche Preschool, Eastbourne Barnados Early Learning Centre), to self-assess and set goals (Bayfield Kindergarten, Onehunga-Cuthbert Kindergarten, Lucknow Kindergarten, Greenhithe Kindergarten), and to be critically reflective (Halfway Bush Kindergarten).

Three prominent themes related to children’s agency emerging from the reports were:

- Empowering children as learners
- Becoming an ‘expert’
- Self-assessment and self-critique
Empowering children as learners

I typed out my story all by myself. Aren’t I clever!
(Greenhithe Kindergarten report, p.1)

A number of the studies identified learning outcomes related to the children being empowered as learners through their ICT activities. Some of these reported this as:

- an awareness of themselves as learners, indicated by instances of children showing a sense of accomplishment and pride in their work
- being able to document their learning in their own language
- expressing a desire to use the ICTs again and again or to revisit ICT-generated products.

Other services reported this self-awareness as a learner more in terms of the children showing independence and autonomy in their ICT related work, indicated by instances of children spontaneously choosing to use ICTs in their play and becoming more knowledgeable about software than their teachers.

Becoming an ‘expert’

Many of the reports commented on children building a sense of their own ability from the activities that went beyond pride in their work to involve them in becoming the ‘expert’ who shared their knowledge or expertise with others in the service, became more socially aware as a result, or simply ‘came out of their shells’ more in a social sense.

Tony’s first interest involved his bringing into Kindergarten a cicada he had found. From this small beginning, Tony progressed to being a leader amongst his peers in the use of the digital microscope, and a teacher of Comic Life not only his peers, but also adults and student teachers.

(Greenhithe Kindergarten report, p.11)
Often this ‘becoming the expert’ involved them becoming the service’s acknowledged technical expert with respect to a particular ICT or piece of software – as in Lucknow Kindergarten’s learning story of Gerard the digital microscope expert, or Campus Creche Preschool’s Press ‘photographers of the day’. But there was also evidence of children becoming the acknowledged service expert in content fields as well – as in Rangitoto Kindergarten’s stories of ‘Lucas the Bird Watcher’, ‘Cameron the Palaeontologist’, and ‘Leo the Bug Man’.

We learnt together, children, teachers, family and the wider kindergarten community. Leo’s enthusiasm and curiosity was infectious. He led a complex and fascinating investigation. ICT did not just answer Leo’s questions and sustain his inquiry, but provided him with the opportunity to drive his own learning, collaborate with his peers and teachers, take on a strong leadership role and the motivation to try out new activities.

From Leo’s interest, many other children experienced, discovered and explored the natural world around them, ICT played a large role in this very exciting project and the indicators of: child driven, sustained inquiry, self efficacy, shared meaning making with other children, and shared meaning making with family/whānau were all evident. ICT was indeed a tool that ‘empowered children to drive their own learning.

(Rangitoto Kindergarten report, p14)

**Self-assessment and self-critique**

Several reports provide evidence of ICTs being used in a variety of ways to encourage self-assessment and reflection. Greenhithe Kindergarten, for example, analysed their learning stories for evidence of children engaging in self-assessment in the forms of “making their own judgments about their achievements”, of “knowing what they are good at”, and of “seeing mistakes as part of the learning process”. Onehunga-Cuthbert, Lucknow and Greenhithe Kindergartens all paid particular attention to children’s goal setting in ICT-based activities.

Although the services talked of children’s self-assessment in terms of both self-affirmation and self-critique in their commentary, instances of children being self-critical were much less in evidence than instances of their being self-proud. This may partly reflect the teachers’ frequent concern not to pathologise their children’s learning when representing it in learning stories, and it may be that the children were legitimately positive about themselves. But it may also reflect the inherently ‘hidden’ or ‘unobservable’ nature of reflection, and especially critical reflection, as a phenomenon to be identified. Simply citing instances of children ‘revisiting’ ICT generated work or ‘retelling’ their stories, for example, would not itself provide convincing evidence of children being critically reflective, whereas instances of their subsequent editing, changing or making improvements to that work or those stories, might.
An example of these issues at play, and some of the teachers’ techniques for fostering more critical forms of reflection, can be seen in the incidents cited below, from Halfway Bush Kindergarten’s study:

The teacher support became more precise as the children became more aware of their own photography successes and began to critically reflect. An example of this was when Brayden took a photo where the child’s head was missing. He showed the photo to the teacher. She verbally prompted him “We can't see Emily's head!” This allowed Brayden to become aware of getting all of Emily into the photo. “I can take another one!” Brayden responded.

Another example of this was when Emily photographed her name. She looked at the photo and reflected that not all the letters of her name had been captured in the photo. The teacher verbally prompted Emily by asking her “What's happening here?” This reminded Emily from previous experience when she had discovered that by standing back to take the shot; she could get the whole of her name in. “I need to stand back to get it all in” was Emily's reply as she tried again, this time positioning herself so that she could achieve what she wanted.

As the children began to become critically reflective and chose specific images to capture, the verbal prompting from teachers changed for these children who had advanced to this stage in their journey of digital photography. Teachers were now encouraging children to reflect on their photography by asking questions about why or why not the child liked a certain photo. For example, a photo that was too bright to see properly. The teacher discussed with the child why this might be. It was recognised that the sun shining in the window caused this to happen and the photo needed to be taken in another direction. This type of verbal prompting allowed the child time for reflection. Children were still supported to try again and have another go.

(Halfway Bush Kindergarten report, p.19)

Teaching strategies that ‘worked’

Through [our] providing Sapphire with the means and the ‘space’ (not interrupting her, just standing back and offering assistance if and when required), Sapphire began to really explore the digital camera and became extremely creative with her photography.

(Greenhithe Kindergarten report, p.7)

Most of the recommendations made about this aspect of their teaching concerned providing children with the time, space, and trust they needed to learn about and use the technologies for themselves. The specific pedagogical strategies recommended to foster children’s agency in learning included:

- giving the children the technology to use themselves – trusting them with it
- giving children enough time and space to self-assess
- moving away from ‘leading’ the children to become followers and co-learners alongside the children – being the silent observer and listener
• role-modelling the use of the technology
• judicious use of open-ended but targeted verbal prompting
• thinking about what is meant by *critical* in ‘critical literacy’, ‘critical reflection’, and ‘critical thinking’.
Learning outcomes related to culture and cultural values

[All children are to be] given the opportunity to develop knowledge and an understanding of the cultural heritages of both partners to Te Tiriti o Waitangi

(Ministry of Education, 1996, p.9)

A number of services focused their enquiries on learning outcomes related to issues of cultural knowledge and cultural values, especially Māori and Pasifika cultures. These enquiries were about using ICTs to enhance te reo Māori or language knowledge, but in part they were about using ICT-based activities to raise cultural awareness, and for some, even more importantly, about using ICTs to encourage cultural values and children's sense of their own cultural 'ways of being'.

The goal of enabling Māori individual and collective cultural identity, where Māori children have access to a world (historically, contemporarily and futuristically), which is Māori, necessitates a regeneration of te reo Māori. It is not enough to simply learn about Māori – a bit of poi and haka here and there and to know that 'ma' is white – but to live as Māori, creating meaning out of life as Māori.

(Skerrett, 2007. P.8)

The projects

The culture-focused studies included investigations of children using digital recorders and cameras in conjunction with live performances to practice and capture their pepeha, make movies of Māori legends and hold a gala movie evening for parents and whānau, and use digital stories in te reo Māori as learning resources.

All found that, provided the appropriate general pedagogical strategies were also in place, ICT-based activities resulted in observable cultural learning by the children. Key themes emerging from the studies related to cultural learning outcomes and included the use of ICTs to foster children's:

- language acquisition and use, specifically of te reo Māori and Samoan
- awareness of specific cultural protocols and customary practices
- cultural values, for example, as embodied in tino rangatiratanga and whakawhānaungatanga
- cross-cultural learning – learning about other cultures.
**Cultural learning outcomes**

**Language acquisition and use**

Several services looked at how providing ICT-produced visual and other resources fostered language acquisition in te reo Māori. The teachers at Te Rau Oriwa Early Learning Centre, for example, mapped both the vocabulary and complexity of expression of several of their children as they used Kid Pix and digital cameras as part of writing and recording their pepeha.

They found that the reo the children used was a mixture of simple vocabulary in a mix of English and te reo Māori (“click the putiputi”, “my maunga is pongo”, “I’m drawing you whaea to hoe my waka”– p 35) and complex sentences all in Māori (“Titiro whaea , kei te mahi porowhita i runga te rorohiko.” Kei te karakara ahau te porowhita – p 43), with an emphasis on the former.

They also found a mixture of vocabulary about the computer software itself (colours, how to do things on screen etc) and vocabulary related to the pepeha (what or who should be in a pepeha, its sequence etc). The combination of textual, spoken and visual cues afforded by the Kid Pix software were seen as the key technology-based factors in prompting this language use.

**A learning story: Zedakiah's pepeha**

Zedakiah wanted to do his pepeha. Whaea set up Kid Pix for him. He started off doing his maunga, he chose the tools he wanted to draw his maunga with. He chose kahurangi to draw his maunga, while he was drawing his maunga he was saying “Ko maungatautari toku maunga.” “Whaea my rakau needs to go on to my maunga.” He chose the stamp tool and chose the rakau he wanted to use. Then he asked whaea. “Kei whea a Tama-nui-te-ra?”

Whaea and Zedakiah looked through the stamps to look for Tama-nui-te-ra. Then he saw the marama, and put the marama in his pepeha.

He sang the waiata ‘aue to ra’ while he was drawing. Whaea showed him how to save his picture. Then he asked to do his awa. He chose the tool and different textures, for his awa; he said his awa while he was drawing.

“Whaea my awa’s got a tuna in it.” so he used the stamp tool for his tuna. For his waka he chose the spray paint tool and parauri for his waka. Whaea asked, “What are you drawing?” Zedakiah said, “I’m drawing you whaea to hoe my waka.” Then he drew his whānau his mum, dad and him, he chose purple for mum with spikey hair, blue for dad and red for himself. Whaea supported his drawing by using te reo for his picture for the basic body parts."

(Th Rau Oriwa Early Learning Centre report, p.28)
Awareness of specific cultural protocols and customary practices

The most common example of incorporating ICT activities to reinforce awareness of and participation in cultural practices and customs was in relation to children’s pepeha. Both Te Rau Oriwa Early Learning Centre and Yendarra Kindergarten made a particular study of how ICTs could be used by teachers and children to develop or perform their pepeha. Yendarra reported as one of its key findings that the focus on this as the context within which Kid Pix and other technologies were used had helped children, among other things, to “make links within a whakapapa whānau”, to develop an “awareness of and taking part in protocol and customs for particular occasions”, and to take “responsibility for carrying out inclusive routines.” (Yendarra Kindergarten report, p.22)

Other activities and ICT resources were found to help children make meaningful connections between cultures and to revisit cultural concepts and stories over time. At Otatara Kindergarten, for example, the focus was on learning Māori legends through making their own films of such legends. “For some time after the movie night” their teacher recorded, “children wanted to recreate the whole Mataukauri story whenever they were outside (as the movie was set within the natural features of the kindergarten playground)” (Otatar Kindergarten report, p.17).

At Otatara Kindergarten, YouTube was also utilised to search for other Māori myths and legends for children to watch and reinforce this awareness and connection making.

Cultural values

Most of the evidence provided in the studies related to the learning of language and cultural customs, but there is some evidence of ICT-based activities encouraging children to live their cultural values both within and outside the service. For example, in a learning story on one child’s ongoing use of the digital microscope in his enquiry into insects from his garden, his teacher commented: “Some of the old people say that the tohunga used to think like the creatures around them, the birds, the animals and maybe even the worms! That’s the way they got to know what all the creatures around them needed” (Yendarra Kindergarten report, p.19).

Yendarra Kindergarten also gathered evidence from whānau on whether or not the children were incorporating what they were experiencing through their pepeha and karakia activities at kindergarten in their home environment. Even though only two of the children came from homes where these may have been practiced, they found that all of the seven children studied spontaneously sang waiata from the service at home, and about half used karakia from the service for food, said their pepeha in Māori, used basic Māori greetings, and incorporated Māori words learned at the service in their home conversations.

It was commonly reported that services incorporated cultural ‘values’ in their use of ICTs through:

• integrating the use of te reo Māori in conversations with children whenever they were using ICTs
• drawing children’s attention to those values in their conversations when they were using ICTs
• choosing Māori content and themes for ICT activities
• building Māori customs (mihimihi, karakia, pepeha etc) into the daily routines of the service. The role of ICTs in this regard was mostly to provide the opportunity or stimulus for such discussions and demonstrations rather than being inherently ‘value-friendly’ activities in themselves.

Cross-cultural learning – learning about other cultures

Both Yendarra Kindergarten and Otatara Kindergarten commented in their reports that their focus on Māori language and cultural activities in the service was in fact an example of cross-cultural learning, as most of their children were from non-Māori backgrounds. At Yendarra Kindergarten the majority of children were Pasifika and at Otatara Kindergarten the majority were Pākeha. The cultural learning involved in their children’s use of ICTs, then, was learning about their own culture for some, and about another culture for most.

Teaching strategies that ‘worked’

Sometimes the increased use of te reo Māori occurred more or less spontaneously in response to the ICT activity or the ICT-generated resource. Both Yendarra Kindergarten and A’oga Fa’a Samoa’s studies cite examples of spontaneous use of Māori language and custom being ‘taken home’ from the service, and Otatara Kindergarten’s and Te Rau Oriwa Early Learning Centre’s both cite examples of this observed in the services.

For the most part, though, such learning was the result of a combination of direct teaching and the affordance of the medium. The teachers at Te Rau Oriwa Early Learning Centre, for example, found that it was only when they themselves concentrated on using te reo Māori to converse with the children as they wrote their pepeha on Kid Pix, and when they used open-ended rather than closed questions, that the children’s use also increased.

This included the kaiako having to familiarise themselves with the Māori words for the technology jargon, and the appropriate words for the particular piece of software being used (terms like ‘click’, ‘save’, ‘drawing tool’ etc).

Recorded reflection of a teacher at Te Rau Oriwa Early Learning Centre

This afternoon I took the opportunity to work with a child that was using Kid Pix. The child was already exploring tools and icons with the programme. I sat down and was speaking to the child in English, then one of the kaiako (teachers) said ‘korero Māori’. I replied by saying ‘ae’. Then from that moment on I was dumbfounded and numb, because I realised that I didn’t know how to korero Māori in the context of Kid Pix. I said ka pai, he aha tenei, but I was just asking closed questions that were not getting the child or myself anyway in ways of opening up a conversation of communication.

This experience disturbed me. I need to be playing the part of using te reo Māori with interactions with tamariki. I can implement te reo Māori within the other areas of the daily programme, but I felt this was a challenge that I needed to overcome. I then asked another kaiako for help ... I asked her to look at the Kid Pix instructions that are translated in te reo Māori, and then korero and interact with a child that is at the computer working on Kid Pix.

(Te Rau Oriwa Early Learning Centre report, p.15)
The Te Rau Oriwa Early Learning Centre also found that using the digital camera to make images of themselves performing the actions appropriate to things like parts of the pepeha and incorporating these into ‘how-to’ sheets for the children, assisted in independent practice and performance of their pepeha.

Otatara Kindergarten teachers similarly found that their children’s moviemaking activity, while it clearly enhanced some children’s te reo capability and “made them familiar with a number of different Māori myths and legends” (p.16), was not without its logistical difficulties from the teacher’s point of view.

The major outcome staff wished to achieve was to see an increase in children engaging in te reo and contributing in a real and meaningful way. …

Like any good movie, a lot of takes were shot and a lot of footage landed on the cutting room floor before the final result was achieved. Having to go over and over the story and re-shoot scenes endless times didn’t seem to worry the child actors. Being involved in the whole drama was what they wanted.

Trying to capture raw children’s dialogue was a challenge though, and eventually had to be abandoned. To ensure that the movie did have an element of te reo, I borrowed a table microphone from Otatara Kindergarten School. Then I got the children with the speaking parts into the office and voiced over the raw audio. Again, through the magic of iMovie, as many attempts as was necessary could be made until the whole thing sounded right. At the same time, I got that group of children involved in selecting the special effects (which were sourced from Google Images or You Tube) and in producing a screaming girl special effect.

(Otatara Kindergarten report, p.29)
They concluded, like others, that their moviemaking activity provided one high impact focus on te reo Māori, but was likely to have its long-term effect only in combination with other reinforcements and as part of a package of learning activities that complemented ICT activities with other non-ICT based activities.

*It is debatable whether there was any immediate, measurable increase in mana reo, but this is something which is being supported by other ongoing activities (daily music and movement and staff interactions)… If anything it has been the increase in the visibility of te reo amongst the school community that has been most notable.*

(Otatara Kindergarten report, p.29)
Using ICT to encourage children’s creativity

Creativity is not easily defined. However in general terms it involves a capacity to take what we have and transform it into something of value that is new or original. Most agree that creativity is associated with imagination and inventiveness; attributes, which as humans we are born with but that either flourish or wither depending on the environmental conditions experienced by individuals. Environments that encourage playfulness, risk taking, openness to multiple perspectives and collaboration are more likely to draw out creativity in children than those which are underpinned by conformity and control.

In today’s world, digital technologies and new media are frequently associated with creative people and creative activities. Therefore we could expect that these tools would make a strong contribution both to learning how to be creative and highlighting learning through being creative in early childhood education contexts.

In reviewing the potential of ICT to support creative endeavour, Loveless (2002) highlights a number of features, which can be exploited to support creative processes. ‘Provisionality’ is one of these. This describes the way in which ICT allows users to make changes, try alternatives and keep track of evolving ideas. Other features include ‘speed’ and ‘automatic functions’, which Loveless suggests enable tasks such as “storing, transforming and displaying information” to be done by technology so that users can revisit, interpret and reconstruct activities. By defining first the features and then how these can be applied, Loveless again reminds us that ICT alone does not give rise to creativity, it is what people do with it that does.

The projects

Just two of the services made enhancing creativity the specific focus of their investigation, although many more used ICT in ways which either enabled children to create original work or documented examples of children’s creativity as a valued aspect of learning. The two services looked at how complexity and confidence in the creative arts could be enhanced by using ICT.

Using the Internet as a source of provocation for developing ideas

Concerns are sometimes expressed that it is too easy to go to the Internet to find answers and this discourages children from problem solving and thinking independently. While this might have merit in some situations, there were examples from several services that demonstrated the opposite was true. Using the Internet thoughtfully provided children with alternatives and new ideas to consider. In short, it facilitated their creative endeavour by adding complexity to their own work.
Often images on the Internet inspired children’s artwork, as the following example demonstrates:

For us, being creative was not just about children accessing information, it was what they then did with it.

ICT seems to engage children more than traditional resources used for research. Previously adults were having to mediate the resources (e.g., teachers choosing books and videos). The value of ICT is that it is more immediate, more visual and children are able to access it independently.

ICT also provides access to a world of current information that would be impossible to provide in a centre environment. For example, for Aiden and Jorja the Internet provided images when drawing that they based their artwork on. They were able to navigate the sites independently, choosing the images they wanted to draw. They made decisions about what to do with the information they had learnt about masks. They went onto the site over and over again examining the masks in great detail and noticing new details each time, and adding these details to their drawings. Their confidence was increased as they were in charge of their own learning and the realism and visual nature of the images seemed to inspire them to draw.

While services continue to use books as a source of inspiration, it seemed that the Internet often provided a more comprehensive and versatile resource for non-fiction information than the service could ever hope to have in a book collection.