

---

# ICT and the greatest technology

## *A teacher's mind*

Ann Hatherly

**M**y three years as national team leader of the Early Childhood Education Information and Communication Technology Professional Learning (ECE ICT PL) programme has given me plenty of time to observe and puzzle over the inclusion of Information and Communication Technology (ICT) in programmes for children up to six years old. As we all know, the basic components do not come cheaply. Due to the speed of technological advances and the technical intricacy with which they are made, the average lifespan of most hardware is approximately three years. Equipping a centre with useful ICT requires a very different budgeting mindset than (say) purchasing a set of wooden blocks, which could be expected to last indefinitely and require next to no maintenance. It is important that discussion and debate about the contribution of ICT to teaching and learning is ongoing, and this article is an attempt to foster just that.

ICTs do have certain seductive qualities. The resources themselves are visually appealing and clever, and can make us feel good about working at the cutting edge of innovation. In the excitement to get on board with new technologies, a considered evaluation of their merits is often overlooked. Many centres appear to be less discerning about the added value of ICT hardware than they would be about similar spending on less glamorous resources. It is worth remembering that many of the advantages attributed to ICTs can also be achieved through other means in a “good” early childhood programme. For instance, an electronic whiteboard that costs thousands of dollars can be used in a way that serves no greater purpose in terms of learning opportunities for children than a magnetic board story.

There are, however, potential benefits offered by current ICTs that are not so easily replicated through other means. It is for this reason they can no longer be regarded as a luxury accessory, nor can their inclusion in

an early childhood programme be left to chance. Their propensity to work well in visual and, increasingly, oral modes makes them particularly well suited—some would say tailor-made—for early childhood settings. Indeed, it is hard to imagine documented learning stories having the same impact without the easily constructed visuals facilitated by digital technologies. Within a curriculum that places high value on responsiveness, the speed with which technology allows us to create and share is ideal for meeting young children’s desire for immediacy.

Another argument for the inclusion of ICT is that it has the potential to encourage and support the kinds of activities associated with the new learning emphasis of the 21st century. I say “potential” because, just as with any equipment, like blocks, books, trolleys or swings, these resources are only as good as the teachers who work with them. Put another way, the greatest technology available is the teacher’s mind.

As technology becomes more accessible, and its communication function expands, increasing numbers of children are coming to centres with their own Internet presence already—photos on Flickr, family YouTube videos and relationships with extended families and friends maintained through blogs and Skype. Yet how much are teachers aware of these “funds of knowledge” that children bring with them? As each year passes it becomes more important that teachers take time to find out about and engage with children’s virtual lives, just as they do with other areas of experience and expertise children bring.

The ECE ICT PL programme is an initiative that is funded by the Ministry of Education. It emanates from *Foundations for Discovery* (Ministry of Education, 2005a), the framework for development of ICT in early childhood settings. Its origins can also be traced to the government’s broader *Digital Strategy* (Ministry of Economic Development, 2004, p. 4), “aimed at creating a society where ICT gives everyone the power to create,

---

... there is little to be gained from polemical debates about whether or not ICT has a place in early childhood education (ECE). Rather the important question is what kind of place should ICT have and how should it be used by children and teachers to promote the goals of the curriculum?

---

access, use and share information so that individuals and communities can achieve their full potential". There are 67 services nationally participating in this programme, which provides for professional learning programmes rather than funding for equipment. At the time of writing this article, most are in their third and final year, while a small number are engaged in a shorter one-year programme. The services include playcentres, kindergartens, a home-based group, private and community-based childcare centres and a hospital-based medical service. Each service is undertaking a self-chosen investigation using an action research approach to supporting change that involves data gathering, analysis and synthesis.

There are three goals for this professional learning:

- to increase ICT capability (skills and confidence)
- to transform pedagogy
- to enhance learning for children.

While the first of these has been a necessary and significant part of the ECE ICT PL programme, it is the second and third goals that I will focus on in this article, because these are where the greatest promise (and challenge) lie for the justification of ICT use in early childhood programmes. It is true that developing skill levels and confidence—adults' and children's—in using ICT is both rewarding and motivating, which surely enhances any place of learning. In the ECE ICT PL programme, these were the aspects most frequently and enthusiastically described by teachers when they were asked about the changes that this programme has made in their centre. However, ICT capability in an educational setting only becomes of substantial value when it is linked to a purpose, and that purpose rests upon enhancing the quality of teaching and learning.

It is fair to say that ICT is an area that attracts almost as many doubters as it does doers. On the one hand, there are those who argue that ICTs take children away from direct experience as a source of learning and encourage a sedentary passive lifestyle, hardly what is needed given the increasing child obesity statistics (Monke, 2006). On the other, there are the advocates who say that today's children are born into a digital environment (Yelland, 2007). It is part of their life and world, and to ask them to leave this at the centre gate is simply untenable. This is especially so given *Te Whāriki* (Ministry of Education, 1996), which places significant value on the "funds of knowledge" that children

bring to early childhood services from their homes and communities. However, as Brown and Murray (2006) suggest:

... there is little to be gained from polemical debates about whether or not ICT has a place in early childhood education (ECE). Rather the important question is what kind of place should ICT have and how should it be used by children and teachers to promote the goals of the curriculum? (p. 44)

Any useful probing into the value of ICT requires simultaneous consideration of what is important for children growing up in our 21st century world to be learning. Yet, it is perhaps human nature when making such assessments to tend to concentrate on the gadgets and what they can do rather than on the more intangible elements associated with how knowledge requirements have changed. Largely because of technology, knowledge today is no longer as static, trustworthy and unproblematic as it once was. It therefore requires a different skill set to make good use of it. To illustrate this through a specific example, compare the role of a reader accessing information from published sets of encyclopaedias with accessing information from the online Wikipedia. In the former, appointed writers held the authority on what knowledge was valid and delivered this to readers who were (mostly) grateful but passive consumers. Wikipedia, on the other hand, relies for its survival on the contributions of ordinary people, and also on readers making informed judgements about the authenticity of the contents. Here readers cannot afford to just be consumers of knowledge; they need to be active critics, evaluators and even contributors.

It is new demands like these that have led writers such as Yelland (2007) to suggest that the 21st century calls for different curriculum priorities. The emphasis for learning needs to shift from knowledge acquisition to knowledge generation. In such an approach to practice, a premium is put on activities that engage children in thinking, creating, problem solving, designing, remixing, inquiring, critiquing, communicating and making connections. It is worth noting here that the recent schools document, *The New Zealand Curriculum* (Ministry of Education, 2007b), reflects this shift of emphasis, particularly through the attention given to key competencies. While these dispositional attributes can be part of every area of the curriculum, communication technologies—digital cameras, Skype, blogs

and digital storytelling software to name a few—expand opportunities to function in these knowledge-building ways. However, how well this happens will depend on the adults who work with children putting as much, if not more, professional learning time into understanding these pedagogical drivers as they do into selecting equipment and increasing their skills in using ICT. As Bolstad (2004, p. 5) suggests, ICT matters because it offers considerable opportunities to transform “the activities, roles and relationships experienced by children and adults in early childhood settings”. Yet without an ongoing willingness to scrutinise one’s habits of practice for their ability to nurture 21st century learning priorities—a process that takes courage—the contribution of ICTs is likely to fall well short of Bolstad’s promise of transformation. When we focus just on “the tools” rather than “the teach”, ICTs are no more than jazzy and expensive alternatives to existing resources.

The investigations undertaken by services participating in the ECE ICT PL programme have highlighted a number of areas where the addition of ICT has been particularly compelling for supporting knowledge-building learning intentions. By focusing on just two examples in this article I am in no way suggesting that these are the only ways in which ICT contributes to the quality of experiences, roles and relationships. They are, however, areas where the presence of ICT appears to provide additional dimensions—and therefore richness—not easily replicated through other means within the programme.

### Using ICT for fostering children’s thinking, reflection and creativity

The role of ICT in allowing children to revisit learning has been highlighted through exemplars published in *Kei Tua o te Pae Assessment for Learning: Early Childhood Exemplars* (Ministry of Education, 2005b, 2007a, 2009). Although revisiting learning has always been possible through storytelling, art and film photography, the immediacy with which children can access visual texts through digital alternatives has led to this activity gaining greater prominence in early childhood programmes. Being able to reconnect with past experience is thought to help memory development and encourage metacognitive processes such as interpretation (Rinaldi, 2001). Siraj-Blatchford and Siraj-Blatchford (2006) suggest that communication technologies can serve to encourage processes of

reflection by affording children the opportunity to distance themselves from their everyday “hands on” activities. In a New Zealand investigation of how ICT contributed to complexity in children’s imaginative play, Marks (2006) found that:

Being able to watch themselves in movies and experiment with the cameras and software inspired the children to introduce new ideas and props into their play and to listen and accept ideas from other children. They stayed in roles for longer periods of time, ideas became more complex as they created new stories for their play which in turn impacted on the amount and characteristics of language, planning and co-operation.

A number of services in the ECE ICT PL programme are investigating ways in which their use of ICT can enhance deeper thinking for children. At the kindergarten that four-year-old Adia attends, one of the strategies the teachers are trialling as part of such an investigation is the making of e-books (electronic books) with children. For Adia, who took up the suggestion that she could photograph the mouse house she was making out of blocks and create a storybook on the computer, the technology offered her a chance to stand back and visualise her work through the lens of another medium. Impressed by the strategy Adia adopted, her teacher, Anne, wrote:

As she saw the photos appear, Adia excitedly talked about what was happening. As Adia was talking she was getting more ideas about what would come next in the construction of the mouse house. At this point she gave Zoe [another child] the camera to take the photos because she was busy constructing her ideas and adding to the mouse house.

The technology enabled Adia to visualise the next step in the construction, and she responded by returning to the mouse house to make additions and modifications. This sequence happened several times. Each time Zoe took more photos, Adia returned to the office to have the photos inserted and to continue her story, with Zoe joining her.

Adia’s teachers, together with their professional learning facilitator, had constructed indicators of deeper thinking. For them, adding the use of the computer and camera highlighted two

of these in particular: “thinking goes from gathering to processing to applying” and “making connections between concrete and abstract”.

The important point here, however, is that none of this would have happened without a, personal shift in thinking about what makes learning powerful on the part of Adia’s teacher, Anne, who, previous to the ECE ICT PL programme, would have taken the photos herself, believing that young children could not be trusted to use expensive equipment. In her words:

[This was] a very big move for me. The children show respect for the camera. They always put it back when they have finished.

By adding technology *and* reconsidering her own views of what it means to be a teacher, Anne enabled Adia to practise many of the knowledge-generating skills valued for 21st century learning. Adia was at once a designer, visualiser, director, remixer (subsequent “improved” mouse houses were created with reference to the previous e-books), story creator, collaborator and critic. Could Adia have practised these same roles without the technology? Quite possibly yes, although it is hard to imagine how the immediacy with which she could switch from the one representation to another and back again could be replicated to such good effect. Perhaps the more useful question is, *would* she have done so? Her teachers felt this was unlikely, for once Adia knew what she could create—animated books, valued by her extended family and her teachers—this fuelled her motivation to produce further incarnations of her treasured mouse house with the blocks.

### ICT: The capacity to expand children’s worlds in new ways

We hear and read much about how communication technology has shrunk the world. A message that once took weeks to cross the globe now takes seconds by email or instant messaging. Distant friends and relatives can “drop in” to a celebration at the click of a mouse, and, thanks to high-speed Internet, colleagues can live thousands of miles apart and still function effectively as a team in many professions. Conversely, it can also be said that technology expands our world by connecting us meaningfully with others beyond our immediate environment. Importantly, this

works as well for young children as it does for adults because of ICT's capacity to use oral and visual means to relay messages. The argument that computers necessarily distance children from real experience and therefore are of dubious value no longer holds water in the Web 2.0 world. When your grandparents happen to live in India and you are in New Zealand, being able to talk to them, see them and show them what you get up to through Skype is real. It is also likely to make the times when you do meet them face to face more meaningful because of the relationship you have established.

There are also sound educational reasons for valuing activities that engage children in networks both within and beyond their immediate environment. Storing large amounts of knowledge just in case it is needed does not make a lot of sense in a globalised, information-rich world. Jenkins, Clinton, Purushotma, Robison and Weigel (2006) point out that the ever-expanding use of digital technologies is creating more participatory cultures, where learning takes place through networking and collaboration. As Claxton (2008) puts it:

Very rarely is there a block of 24 carat timeless wisdom, sitting on a nearby shelf, ready to solve your problem. In today's knowledge economies, the norm is for people to get together and make much of the 'knowledge' they need on the spot, in the context of the specific, complicated, not-quite-like-anything-else problem they are trying to tackle. (p. 76)

In Claxton's view, learning environments should therefore focus on experiences that promote network formations, both internal (in the brain) and external (with people, places and things). As with all learning, encouraging these habits when children are young is likely to be more beneficial. The play-based programmes that operate in most early childhood settings, guided by *Te Whāriki* (Ministry of Education, 1996), provide a good foundation for the kind of knowledge-building approach advocated by Claxton. Now, new technologies potentially enable this networked learning to involve others far beyond children's immediate community, giving them access to new points of view and experiences. Compared to "old technologies", such as letter writing, these new communication tools offer an immediacy that many children find compelling. As they engage with others, they are learning about the very different

protocols needed to communicate with a virtual audience—skills that will be handy in this increasingly global environment.

Several centres in the ECE ICT PL programme have trialled ICT tools for the purpose of fostering connections with their communities. Initially the focus was local and aimed at strengthening relationships with the families using the particular service. However, the growth of interactive Web applications has opened up enormous opportunities to link children and centres with the wider world in ways that were unimaginable just a few years ago. In particular, interactive publishing tools such as blogs, and free downloadable applications such as Skype, have found favour with centres keen to promote peer-to-peer sharing.

At Manaia Kindergarten, which is situated in a rural community in Northland, the teachers chose to research the effectiveness of blogging for connecting children with the wider world. After careful attention to managing the risks of working in cyberspace, they created a public blog for the centre which children and teachers contribute to almost on a daily basis. Through this they have developed many relationships beyond their immediate community, including one with Spring Trail Kindergarten, an early childhood centre on the outskirts of Chicago. The learning through this connection has been rich and varied for both centres—from things as simple as appreciating time differences to finding out that animals that commonly exist in one location are absent in the other.

When the children at Spring Trail Kindergarten blogged about the squirrels they were studying, the Manaia children told them that New Zealand does not have squirrels in the wild. Surprised by this, the Chicago children posted a toy squirrel, along with some books, to Manaia Kindergarten. Soon after the squirrel arrived, Nutkin's Blog was started, which tracked the adventures of the toy squirrel as it went home and on holidays with different children. This provided the children from Chicago with a rich insight into everyday life for children in New Zealand. Cindy, the Chicago teacher, had this to say about the learning that ensued:

My students learned so much from blogging with Manaia Kindergarten as well as through Nutkin's Blog! We really looked forward to seeing where his next adventure would take him. We not only enjoyed the videos but would often pause them in order to take in the environment

in the background. We noticed the mailboxes looked totally different than the ones we have here in the U.S. The concept of Nutkin going up into the mountain areas made us all long to switch places with him. My kids were constantly saying how 'lucky' Nutkin was to be in New Zealand. We learned that although English is spoken there, it doesn't sound the way we are used to hearing it. Certain words are different and we'd try to figure out what those words meant. We often found ourselves commenting on the fact that our seasons were opposite, and that we didn't necessarily celebrate all the same holidays. Even the word 'Holiday' has a different meaning.

I could go on for days with all the wonderful things we learned about the New Zealand culture just by watching Nutkin's adventures. We had so many unplanned and exciting learning opportunities. The children would help me compose comments which also provided real world learning opportunities, we would often collaborate to find just the right way to say what we were thinking.

Even the process of gathering 'squirrel related' things to send over was fun and exciting. The children learned that everyday things we take for granted (as in the squirrels) are not common at all in other parts of the world. It prompted them to wonder what they had that we didn't and we created a video asking things about New Zealand. The whole experience turned out to be something far bigger and better than I could have imagined!

What this example shows is that learning need be no less real in a virtual world. It is hard to imagine that this level of interest would have been possible without the blog, and its ability to show video and operate in real time. However, in the end, it is the teachers who must be credited for their vision, and their understanding that in today's world knowledge is generated through collaboration with others.

### Final comments

ICTs are often praised or maligned as if they alone determine the quality of experience that results from their use. It is crucial to see them

for what they are: neutral objects that have no inherent pedagogical value until people get involved. Yet, too often, when debating ICT use in educational contexts, the human element is only lightly examined compared with the in-depth analysis of the merits of equipment.

In the last 20 years technological advances have transformed our world socially, politically and economically. As a result, priorities for learning and teaching have changed too; the emphasis shifting from “what to learn” to “how to learn”. As Atkin (1997, p. 5) puts it:

In a world rich in information technology, the authority of the teacher no longer lies in being the one who knows. Rather it is in being the one who knows about knowing and learning ...

The degree to which ICTs—or any curriculum resources for that matter—extend the reach and depth of learners depends on the motivation and courage of teachers to examine their own educative purpose—philosophy and practices—against the backdrop of a technology-rich world, where knowing how to access and generate knowledge is everything.

### Acknowledgements

My thanks to the teachers and families from the following services for giving permission to use their stories and examples: Riversdale Kindergarten, Napier; Manaia Kindergarten, Parua Bay, Northland; Spring Trail School, Carol Stream, Illinois, USA.

I also acknowledge the Ministry of Education’s funding support for the ECE ICT PL programme.

### Related links

- Manaia Kindergarten blog  
<http://manaiakindergarten.blogspot.com/>
- Spring Trail School blog  
<http://kdgroom102.blogspot.com/>
- ECE teacher’s reflective blog  
<http://www.ictece.blogspot.com/>
- Ed Talks (videos featuring teachers talking about ICT use for teaching and learning)  
<http://edtalks.org/play.php?vid=140>  
<http://edtalks.org/play.php?vid=152>  
<http://edtalks.org/play.php?vid=219>

### References

Atkin, J. (1997). *Enhancing learning with information and communication technology: Promises, pitfalls & practicalities*. Retrieved 11 June 2009, from [www.learningtolearn.sa.edu.au/Colleagues/files/links/EnhancingLearning.pdf](http://www.learningtolearn.sa.edu.au/Colleagues/files/links/EnhancingLearning.pdf)

Bolstad, R. (2004). *The role and potential of ICT in early childhood education: A review of New Zealand and international literature*. Wellington: New Zealand Council for Educational Research.

Brown, M., & Murray, F. (2006). ICT and young children: Laying the foundations for the digital future. *Computers in New Zealand Schools*, 18(2), 43–48.

Claxton, G. (2008). *What’s the point of school? Rediscovering the heart of education*. Oxford: Oneworld Publications.

Jenkins, H., Clinton, K., Purushotma, R., Robison, A. J., & Weigel, M. (2006). *Confronting the challenges of participatory culture: Media education for the 21st century* [White paper]. Available from The MacArthur Foundation: <http://www.digitallearning.macfound.org/>

Marks, C. (2006). *Imagined possible selves*. Retrieved 11 June 2009, from <http://www.efellows.org.nz/sites/efellows.org.nz/files/2006flipbook/carol.html>

Ministry of Economic Development. (2004). *Digital strategy: A draft New Zealand digital strategy for consultation*. Retrieved from Ministry of Economic Development: [http://www.med.govt.nz/templates/MultipageDocumentTOC\\_\\_\\_16285.aspx](http://www.med.govt.nz/templates/MultipageDocumentTOC___16285.aspx)

Ministry of Education. (1996). *Te whāriki: He whāriki mātauranga mō ngā mokopuna o Aotearoa: Early childhood curriculum*. Wellington: Learning Media.

Ministry of Education. (2005a). *Foundations for discovery: Supporting learning in early childhood education through information and communication technologies: A framework for development*. Wellington: Author.

Ministry of Education. (2005b). *Kei tua o te pae Assessment for learning: Early childhood exemplars*. Wellington: Learning Media.

Ministry of Education. (2007a). *Kei tua o te pae Assessment for learning: Early childhood exemplars*. Wellington: Learning Media.

Ministry of Education. (2007b). *The New Zealand curriculum*. Wellington: Learning Media.

Ministry of Education. (2009). *Kei tua o te pae Assessment for learning: Early childhood exemplars*. Wellington: Learning Media.

Monke, L. (2006). The overdominance of computers. *Educational Leadership*, 63(4), 20–23.

Rinaldi, C. (2001). Documentation and assessment: What is the relationship? In *Making learning visible: Children as individual and group learners* (pp. 78–89). Cambridge, MA: Project Zero and Reggio Children.

Siraj-Blatchford, J., & Siraj-Blatchford, I. (2006). *A guide to developing the ICT curriculum for early childhood education*. Stoke on Trent, UK: Trentham.

Yelland, N. (2007). *Shift to the future: Rethinking learning with new technologies in education*. New York: Taylor & Francis.

**Ann Hatherly** works at CORE Education ([www.core-ed.net](http://www.core-ed.net)) and is currently National Team Leader of the ECE ICT PL Programme.

**Email:** [a.hatherly@xtra.co.nz](mailto:a.hatherly@xtra.co.nz)

**Skype:** annhatherly