Khoo. E., Merry. R., Nguyen, N.H., Bennett. T., & MacMillan. N. (2013). Early childhood education teachers' iPad supported practices in young children's learning and exploration. *Computers in New Zealand Schools: Learning, teaching, technology*, 25(1-3), 3-20.

Early childhood education teachers' iPad-supported practices in young children's learning and exploration

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Abstract

This paper reports on a qualitative study exploring ways teachers can adopt iPads to provide opportunities for young children's learning and exploration in an early childhood education and care setting in Hamilton. Interviews with teachers, children and their caregivers as well as observations of teacher interactions with children and copies of children work produced on the iPad informed the study. The findings focused on two teachers' practice to reveal the different ways teachers can make use of the iPad to expand children's learning opportunities and foster closer home–centre links. In particular, four key iPad-supported practices were observed – use of the iPad as a relational tool, as a communicative tool, as a documentation tool, and finally, as an informational tool for supporting child-led learning. These strategies were however contingent on teachers considering the interplay between the opportunities that iPads

offered, their own pedagogical views and children's learning needs and contexts. Implications for practice for teachers of early childhood services and new entrant classes are offered.

Keywords: young children, pedagogy, affordances, iPads, tablet technology, early childhood education (ECE)

Introduction

Tablet technologies such as iPads are captivating, entertaining, and can be educational for young children. Much has been reported in mainstream media concerning the relative ease with which young children pick up and develop the skills to use iPads (Wade, 2012). In spite of the rhetoric on the iPad's potential to engage children (and their learning), concerns have been raised about the potential harm of exposing young children to such technologies for fear of this being detrimental to their learning and overall development (Churchill, Fox, & King, 2012). Evidence for informing this debate has so far been inconclusive (Dhir, Gahwaji, & Nyman, 2013).

Although there is emerging evidence that iPad use in early childhood education (ECE) settings supports and extends learning opportunities for young children (Fagan & Coutts, 2012; Verenikina & Kervin, 2011), there is still a dearth of research-based understanding regarding its particular affordances in areas such as best strategies for supporting teacher and learner development for engaging with iPads, pedagogical frames that might help us better understand teacher roles, how the use of iPads can alter or shape power relationships in favour of more personalised learning contexts, and how might the design of iPad apps for young children's learning be better informed (Falloon, 2013; Ostashewski & Reid, 2010; Woolf, 2010).

This article reports on a qualitative study exploring the use of iPads in an ECE setting. The study investigated two teachers' practice in support of young children's learning and exploration of the world around them with and through using an iPad. A brief description of the early childhood curriculum and literature relevant to young children's use of iPads is provided, followed by details of the study context and findings. The

article ends with a discussion of what the findings might mean to current early childhood and new entrant teachers' practice.

Te Whāriki: Early Childhood Curriculum

Te Whāriki is the New Zealand curriculum framework (Ministry of Education, 1996) designed to support teachers and young children's learning opportunities within a sociocultural context. Partnerships between teachers, parents and children are emphasised within the curriculum. Te Whāriki is based on four principles: Empowerment, Holistic Development, Family and Community and Relationships, and five strands: Well-Being, Belonging, Contribution, Communication and Exploration. The curriculum recognises that learning is not segmented into discrete parts, domains or topics and that all aspects of a child's learning and development are integrated, interconnected and occur dynamically within the learning environment and with those important to and interested in their learning and development. These ideas resonate with a sociocultural view of learning and emphasise learning as participation in the valued cultural activities of a community and as mediated through tools and artefacts (Wertsch, 1998). Within this view, young children are considered to have developed "funds of knowledge" – cultural knowledge, skills and practices typically formed at home (Moll, Amanti, Neff, & Gonzalez, 1992) – that they, and others interested in their learning, can draw from and use to extend their learning and exploration of their surroundings.

In response to Te Whāriki, Learning Stories (Carr, 2001a), a new approach involving narrative-focused assessment was developed. Learning stories are based on the notion of narratives to capture multiple voices, foreground the value of learning dispositions, acknowledge children's strengths and interests, and make transparent the teacher's actions in teaching contexts. As part of their assessment practice, many early childhood teachers document children's learning using narratives and photos in ways that reflect the children's interests, ways of being and ways of knowing. Digital forms of documentation (using iPods, digital cameras etc.) are commonly integrated into teacher's work on a daily basis with both teachers and children documenting learning as it occurs (Carr & Lee, 2012). It is becoming more common for children to use a range of information and communication technology (ICT) such as iPods and digital cameras to document their own learning, direct teachers to capture aspects of their play, revisit

their learning, create videos of play, use search engines such as Google to investigate ideas, and connect with the world outside of the centre through the use of Skype or FaceTime (Archard & Archard, 2012; Hatherly, 2009).

Given that ICTs are already widely incorporated in current ECE contexts in New Zealand, the introduction of iPads is thus an extension of such practices and warrants further investigation to examine the extent to which it can support young children's learning and interests about the wider world.

iPads in ECE contexts

Archard and Archard (2012) suggest that ICT use in ECE settings can support a combination of informal and formal learning opportunities through a mix of learner-centered and adult-directed activities. In this process, teachers' intentions and pedagogical approaches can influence the outcomes of these opportunities along with children's purpose or intentions for their ICT use. Very little has been written specifically about children's use of iPads in early childhood settings, particularly in New Zealand; however the current literature contains views similar to those expressed by Archard and Archard (2012). For example, Fagan and Coutts (2012) describe the educational use of iPads by young children to include opportunities for children to work collaboratively, produce their own stories that may include visual images and sounds, and engage in digital forms of literacy. They suggest that iPads can also play a role in fostering relationships between the centre, home and the children's wider worlds. They indicate that teachers' interactions and pedagogical approaches are more important than the technology itself. Furthermore, they believe iPad use needs to be combined with thoughtful teaching strategies to maximise these learning opportunities for children. Others such as Verenikina and Kervin (2011) have found that children's use of iPads in ECE settings for digitally mediated play can foster imagination, encourage collaborative play, and extend the opportunities for sustained imaginative play. These studies highlight the potential value of incorporating iPad use in teachers' practice as part of supporting young children's development and interest in learning and exploration of the world around them.

Research context

The research reported in this article is based at Campus Creche (Creche), an ECE centre located at the University of Waikato, Hamilton, New Zealand. Creche houses five centres catering for children from 3 months to 5 years. In congruence with Te Whāriki, the curriculum adopted is emergent, as it stems from the interests of individuals/groups of children and staff, and engagement with the learning environment. Effective communication and involvement of family/whānau underpin Creche's partnership with, participation in and celebration of cultural diversities among the children, their families and staff (Campus Creche, n.d.).

This research was based at one of Creche's centres – the Preschool Centre (the Centre) –which caters for children aged 3½ through to 5 years of age with a typical enrolment of 35 to 40 children. The staff to child ratio at the centre is one staff to nine children in attendance. In mid 2011, two of the Centre's teachers, Tim and Nadine (real names used with permission), initiated bringing their personal iPads into the Centre for the children to explore and use. This generated much interest from the children. iPad use was informal and children took turns exploring different apps and activities that they were interested in with other children watching within a group. Either Tim or Nadine was always present to help and guide the children's use. This experience was limited by the teachers' availability to use the iPad with the children, which was in turn partly determined by the daily routines already established at the Centre.

The research project in partnership with Creche collaborated with Tim and Nadine (teacher participants), who were keen to explore and extend the possibilities of iPad use with the children. Data was collected through teacher interviews, observations (video, audio recordings and photos) of teacher interactions with children using the iPad, and copies of children's artefacts produced as part of the teaching and learning process using the iPad. Teacher interviews were conducted at the beginning and on completion of the study to ascertain changes to teachers' perspectives on iPad use. A total of eight observations (each lasting between an hour and two hours) were conducted with the two teacher participants. Each observation session concluded with a teacher-researcher debriefing of the session and negotiated planning for further exploration or refinement of iPad use for the next session. Due to limits of space for the purposes of this article,

only excerpts of teacher–child conversations recorded in the observations and quotes from the teacher interviews are reported.

The project obtained human ethical approval from the Faculty of Education, University of Waikato. Parents/caregivers of children at the Centre were provided with information about the project. Tim and Nadine and the Centre supervisor helped to explain the project to the children's parents/caregivers and collected their signed consent to participate in the study. The children were also given the opportunity to "sign" and consent to participating in the study (with explanation and help from their parents/caregivers and or Centre teacher). All participants (teachers, parents and children) consented to participate in the study on a voluntary basis.

Data was analysed based on sociocultural theory, which directed attention to the interaction between people, the tools they use to achieve particular purposes, and the setting in which their interaction was occurring (Wertsch, 1998). Emergent themes from the transcribed interviews and observation data were identified through a process of inductive reasoning (Braun & Clarke, 2006). A process of collaborative data analysis (Armstrong & Curran, 2006) between the teachers and research team contributed to further refinements of the analyses.

Findings

The findings revealed that teachers in the study made use of the iPad in four key ways: as a relational tool, as a communicative tool, as a documentation tool, and, finally as an informational tool for supporting child-led learning. Illustrative examples of how each of these ways were enacted in the study setting are reported next. They are drawn from contextualised interpretations and participant excerpts to report on the ways iPad-supported practice can support young children's developing interests and learning about their immediate and wider contexts.

Example 1: iPads as a relational tool for child-led exploration

In this first example, Nadine used the iPad to relate with the children at the Centre through locating and encouraging their developing interests. Her pedagogical action was underpinned by the Te Whāriki principle of Relationships. She explained she views the

forming of trusting relationships with the children as essential for encouraging their further exploration of the world around them. Nadine opted to use the photo capture function on the iPad to take pictures of a child, Zach (pseudonyms are used for all children), who was focused on exploring a video recording camera available at the Centre. She used these as a provocation to encourage Zach to share his interest and ideas on what/how he thought the video camera might work. While reviewing the photos together, Zach pointed to the photos, sliding different ones across the screen and explaining what he was doing with the camera. From this initial interest in reviewing his photos, Zach asked to explore other apps on the iPad. He settled on an app about shapes. Nadine guided his exploration, explaining the different buttons to push on the screen to allow his further engagement with the app. Other children gathered around them to watch, cheering and supporting Zach as he successfully navigated the different tasks to learn about shapes. This newfound confidence and skill in using the iPad led Zach to further explore a drawing app in which he selected the different options available to draw and colour his picture. After Zach completed his drawing and was keen to share this with his family, Nadine guided him on how to save the picture and print as well as email it to his parents.

Reflecting on this episode, Nadine commented on the need for attending to and valuing the ideas that children bring with them to the Centre as a basis for relationship building:

> There is so much more than who they are at the centre. This builds up relationships with their peers and teachers, sharing with their peers and teachers what they know. (Nadine)

Nadine was cognisant that relationships were important for children to develop trust and to take risks in engaging with new learning experiences. She sees the iPad as an enabler in this process as children were generally keen and interested in using the device:

> It comes back to the relationships and relationships we build with the children that are the most important aspect of my job. Relationship building is about the trust for the children to take risks and try new things and be brave. They need to trust the people that they are with. That's why relationships are important. The iPad offers more possibilities to build those relationships. (Nadine)

This valuing of relationships is congruent with how Nadine sees her role as a co-explorer with the children, offering different possibilities to the children to develop their learning interests:

> [My role is as] an explorer … there's still lots of things we haven't explored and lots of ways that can go terribly wrong and all of that stuff which we are going to find out about but we will be doing it together. It's not teacher-led anymore. It's about co-exploring and it's not even about facilitating but about offering possibilities and ideas. They have their own ideas and they run with it once I show them. I think that lots of children are really competent and guiding their own learning and they know what they want to do and don't need assistance in getting there. So this [the iPad] is another vehicle for them to do that. It's also there for the children that haven't developed those skills yet and it doesn't need to be me that's guiding them, it can be their peers. (Nadine)

In this episode, use of the iPad was integrated into Nadine's practice to provide a basis for her to encourage Zach to share his interests. Their interaction with the iPad led to Zach not only exploring his interests but also gaining the skills and confidence to navigate his way through the different apps on the iPad, to settle on a drawing activity and then to share his activity with his family. The iPad as a relational tool allowed for more seamless connections between home and Centre learning because Zach's parents were able to view and input into this learning episode. The fact Nadine was alert to and aware of Zach's interest and encouraged his exploration in using the iPad to foster further interests contributed to his sense of belonging at the Centre in a manner consistent with the values in Te Whāriki. This process was not without its challenges as some apps were new to both teacher and child, and at times both had to undertake trial-and-error strategies together to ascertain how a particular app worked. At other times, some functionalities had to be turned off or ignored (for example, pop-up advertisements). By being supported by his teacher and peers to feel valued and affirmed, Zach developed further confidence to use the iPad to create and share his creations with those who mattered and had interests in his learning and development.

Example 2: iPads as a communicative tool for exploring different modes of communicating

In this example, Tim experimented with using the FaceTime app (an app that enables synchronous – real time – video and audio communication) on the iPad to allow for children at the Centre to communicate with one another. His intention was to enable the children to explore a different mode of communication, especially one that would call into play a different spatial awareness and experience. For this to happen, Tim used two iPads: one that was set up stationary in the corner of the Centre (stationary iPad), and another that was available for any of the children to carry around to other parts of the Centre (mobile iPad). He set up both iPads to be able to FaceTime one another. The children gathered around him, curious and interested as he got the iPads ready for synchronous communicating. Once FaceTime communication was established between the two iPads, Tim demonstrated how the children could talk and communicate through the FaceTime app. He advised them on which buttons to push (or not) for this to happen. The children were fascinated with the fact they could communicate with one another virtually. Each child began to take turns carrying the mobile iPad and walking with it towards other areas of the Centre. The children based at the stationary iPad would ask the mobile iPad child questions about his location, the details of what he was seeing and so forth. This experience also included children asking the mobile iPad child to occasionally turn his iPad around so the camera would show the children at the stationary base what the mobile iPad child was seeing as well. A typical conversation between Tim and Alan, a child exploring with the mobile iPad, included:

> Tim (explaining what they were observing on the FaceTime screen to the children gathered with him at the stationary iPad): He's [Alan] taking us to see the tortoise.
>
> Tim (speaking to Alan): You what? Hold on. Oh. Hey. There they are (Tim directs the children's attention towards the screen to observe what Alan was seeing). Look. (He looks at the tortoise so we can see from here.)
>
> A child with Tim: I can't see.
>
> Tim: Wait. Wait until he looks closer.

(Alan explains to the group he is going to go closer.)

Tim: Yeah, Alan, we can see the tortoise. Have a look. He's looking at the tortoise's home.

The children were very interested in the space and place aspect of exploration offered through use of iPads. They would watch the FaceTime screen, think about what it was they were seeing (through their friend's verbal explanation or visual showing of where he/she was located at the moment), create a possible hypothesis of their friend's spatial location and run off to check their theory. In this, the children were empowered to use a new and different albeit virtual mode of communication, which allowed them to talk to one another across spaces/distances in a multimodal manner. Children also learned to discover the world through others' eyes and perspectives and developed spatial awareness of the environment around them within a setting that was safe and familiar to them. This aligns with the principles in Te Whāriki encouraging support for different forms of child-led exploration and experience with multiple forms of literacies and making sense of the world around them.

Example 3: iPads as a documentation tool for co-constructing learning stories

This next example revolves around Tim's incorporating iPad use as part of his assessment practice. Using the iPad, he initiated taking photos of the different children playing in the outdoor area to document the different activities and equipment (swings, sandpit, climbing rails) they were interested in that were available in the area. The children gathered around him when he later sat and reviewed the photos with them. One of the children, Fred, was interested to view the photos taken of him. Fred had never used an iPad before and was eager to do so. Tim proceeded by guiding Fred to slide his fingers to review and select the photos he would like to talk more about. Fred was prompted to explain his actions in the selected photos. Tim then explained to him that he could share the interesting events indicated in the photos with his family in the form of a learning story. Fred agreed to do this and was happy for Tim to guide him through this process. Tim opened an app called Pages and proceeded by firstly asking Fred for a title that could encapsulate the event:

Tim: Do you want a heading, a title?

Fred: Yes, title.

Tim: What do you want the title to say?

Fred: To say… that I jumped… I jumped…

Tim: What do you want to say? Do you want to say 'I jumped' or '[the child's name] jumped'?

Fred: I jumped.

Tim then prompted him on the details to include. Fred was keen to include his full name and went on to share some phrases to explain his photos to his family:

Tim: What do want the story to say? You tell me about the story. What did you do in the photo?

Fred: Today I was climbing twice … on that one … in the swing one.

Tim: You were climbing on the straight ladder?

Tim continued to provoke and scaffold Fred's responses. Fred was able to make other suggestions when Tim prompted him to do so. Tim also asked for and incorporated Fred's responses to details such as the number of photos and their sizing. As part of this process, Tim showed and guided Fred to change a photo size and move it to a desired position on the iPad. After the learning story was completed and Fred was happy it accurately reflected his earlier outdoor play interests so he could share these with his parents, Tim saved his work to incorporate it later in Fred's learning portfolios. It was also possible to email a copy to Fred's parents.

In this episode, the iPad afforded instantaneous capture and record of the children's play and learning interests in action and was valuable in supporting Tim's assessment practice:

> It's handy that it's [iPad] got a camera on the back. It's not a very good quality camera but it does mean that we can take photos and insert those photos straight into a learning story on the go. And everything's there, you've got the keyboard and the photos and everything's already there on the screen. You don't need to get things from the office to do it. You just need the iPad and you might see something happening so you can take some photos and then those children can be involved in their assessment for learning. (Tim)

Tim explained the rich possibilities for including children's voice for assessment using the iPad:

> The children would be interested in seeing their photos and being able to move their photos where they wanted to in their learning story and then they can tell me what they were thinking at that time of each photo so we can make captions under each photo, or they can dictate a story to me and I can type it up. It won't be very common for a child to type up their own story but they can certainly dictate and we can type as they talk. The whole point is to make assessment for learning exciting so that they can be empowered to be part of that process. (Tim)

This episode highlights how teachers can make use of the iPads' affordances to capture and co-constructively document children's interest in action. Children's voices in the form of their ideas, explanation, questions and elaborations could be incorporated immediately on-site and recorded for sharing with their parents/family at home. In this example, teacher and child worked together to co-construct the learning story. Importantly, the child was empowered to be involved in the entire process of selecting, documenting and editing the story in line with the Te Whāriki principle of Empowerment. Put another way, the child was given ownership and agency to act in the moment rather than the story being written solely from the teacher's perspective at a later time, as has been the norm in ECE practices.

Example 4: iPads as an informational resource tool for accessing the internet and educational apps

Both teachers made use of the internet connection available on the iPad to foster child-led exploration and sharing of their learning. Nadine quoted an example about Andy, a

child who was typically quiet and reserved but had a huge vocabulary and knowledge about dinosaurs. By using the iPad, Nadine guided Andy to use the internet search function on Google to look up images and information about different dinosaurs. She reflected:

> For Andy, and a few children who are passionate about dinosaurs… For him, he is quite a quiet, shy, reserved boy. But for him to sit there and go through pictures of dinosaurs and because he knows who they are and what they eat and what they do, for him to share that knowledge with a group of friends, share what he knows, was an amazing thing. He is not the type of child who has the courage to stand up and let the world know that stuff but in that small group, he was a bit puffed up and had them all completely intrigued. It was pretty amazing. It gave him the opportunity to share what he knows [through using the pictures on the iPad]. (Nadine)

Andy was then able to share his knowledge with the other children who had gathered around him through searching for different images of dinosaurs on the iPad and explaining about each type of dinosaur, their habitat, eating preference and so forth to his peers. Another child present, Jackson, had attended a special exhibit/performance about dinosaurs the previous week. Nadine allowed Jackson to Google and share bits of the performance with the children. She explained the value of doing this:

> Like Jackson, who'd come in for one day and had been to the "Walking with Dinosaurs" [a special performance]. So we Googled that and found the video clip of that so he could show his friends where he'd been and what he'd seen. It's about those connections with home and the outside world and them being able to share that with their peers. It turned out that there had been a few of them that had been [to the same performance] so we all got to talk about it. (Nadine)

Nadine noted how the incident helped Andy develop his confidence and allowed a usually reserved child to take on a leadership role through speaking about and sharing a topic that was of personal interest to him. Through Andy's and Jackson's sharing the other children in turn became more informed and asked questions, which sparked further interest in the topic, affirming Andy's knowledge about dinosaurs that was further exemplified through the performance shared by Jackson.

In this incident, Nadine took advantage of a child-led interest about dinosaurs as a prompt to use the iPad to source further information and resources about dinosaurs. In doing so, it added to the children's understanding about the topic and allowed different children's voices, including those such as Andy who were typically shy and lacking confidence, to be incorporated in the learning process. This also helped children see the value of the funds of knowledge that they bring from home to the Centre in contributing to and enriching one another's mutual learning process, again reflecting the Te Whāriki strand of Belonging and Communication.

Discussion and conclusion

This study explored early childhood education teachers' iPad supported practice with young children. While the study represents a convenient sample of teachers and young children in one ECE setting, the findings are consistent with those of others who have found the iPad to be appealing to young children and instrumental in supporting and extending their learning and active participation in their own, and even in others', learning and understandings (Dhir, Gahwaji, & Nyman, 2013; Verenikina & Kervin, 2011). Across the four examples, teachers made use of the iPad through a combination of planned and emergent strategies. Although each example is presented to highlight specific aspects of iPad use, the uses overlap. The teachers used the iPad in similar ways to serve multiple functions and provide different opportunities for learning and exploration. For instance, Examples 1 and 4 both involved using the iPad to access the internet, but internet access was not used in the same way. In the first example, it helped to build the teacher's relationship with a child through acknowledging his interests and sharing these via emailing with his family. In the latter example, it was used as an informational resource tool (via Google) to add to children's shared understanding about a particular event/phenomenon.

We would like to emphasise the potential for iPad use to access and value the funds of knowledge that children bring with them from home into ECE settings (Plowman, Stevenson, McPake, Stephen, & Adey, 2011). In the study, Tim and Nadine were able to take advantage of the children's common and accessible interests, be these drawing or dinosaurs or climbing frames or tortoises, to leverage iPad use in support of child and peer learning. As a result, the children obviously felt that their knowledge and

contributions were valued and they developed skills and confidence that will provide them with a basis for further learning and exploration. From this they become empowered to share and contribute to their peers' learning in a reciprocal manner, thus mutually enriching each other's learning and awareness about the world around them.

We recognise that teachers need to be aware of the opportunities that iPads offer. We hope that the examples will demonstrate to teachers how an iPad can be used to foster affirming relationships with children, as an informational resource, as a resource to document the co-construction of a learning story, and/or to engage in a virtual mode of communication. We acknowledge, however, that teachers need time to explore and experiment with the iPad's different functionalities and possibilities in order to develop the skills and confidence to incorporate it in their practice. As the findings indicate, iPad use can complement and expand teaching and assessment practice, adding to educators' ability to use technology for teaching as a social practice (Carr, 2001b). In each instance, iPad use on its own was not the main focus. Tim and Nadine used the iPads in support of their view of teaching (be it relationship building or co-exploring or incorporating children's voices).

It was noteworthy from the study that teacher guidance in relation to iPad use occurred dynamically as and when the need arose. Such impromptu actions were integral to children's learning with and through the iPad within meaningful learning contexts. Children's interactions with the teachers and with one another were a valuable part of their exploration and growing understanding of iPad use alongside development of these capabilities through observing, trial-and-error and sharing (demonstrating) their knowledge with others. This complex meld of activities and opportunities requires teachers to be aware of the different opportunities for incorporating iPad use as part of equipping children to become more digitally literate. We propose that such opportunities can go a long way in helping children develop the skills, confidence and dispositions for meaningful and productive engagement with different ICTs in the future.

In conclusion, this study was developed because of an interest in the growing importance of iPads in young children's daily lives. As part of equipping this

generation, there is an imperative for teachers to integrate digital and mobile technologies into the curriculum, including policies that are supportive of this (Zevenbergen, 2007). If teachers are to be successful in facilitating the dispositions, skills and attitudes for children to become lifelong learners in a digital age, they will be required to embrace new technologies, be willing to explore their educational affordances and to reimagine their practice to create varied and rich learning opportunities for the children. The findings from this study add to current understandings of iPad supported pedagogical practice. It is hoped they will be used to facilitate meaningful teaching and learning practices with young children.

Acknowledgements

The authors gratefully acknowledge funding support from the Wilf Malcolm Institute of Educational Research, the University of Waikato, Hamilton, New Zealand. Our deepest gratitude and thanks also to the staff, parents/caregivers and children at Preschool and Creche who have devoted their time and effort. This project would not have been possible without their participation and contribution.

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