Project Title: There's an app for that? Examining and Fostering Early Childhood Educators Content Knowledge and Use of iPads within the Early Years Classroom

Prepared for: The Research Collaborative
Prepared by: Debra Harwood, Associate Professor - Brock University
June 1, 2015
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RESEARCH SUMMARY

Background

Technology appears to be a prevalent part of modern society. Increasingly, young children are described as being shaped by a 'technology constructed childhood' (Fleer, 2011). These young 'digital natives' (Rosen, 2006) are active media users, capable of playing sophisticated games on cell phones, creating avatars, requesting and loading specific websites on the internet (Rideout, Vandewater, & Wartella, 2003). Yet, whether or not educators view and understand young children as "emergent users of new literacies and new technologies is not readily understood. And technology "integration in early childhood settings and recognition as a developmentally appropriate practice remains problematic" (Parette, Quesenberry, & Blum, 2010, p. 335). Extrinsic barriers such as limited budgets and resources appear to be a factor impacting technology integration within early years contexts. And educators positive beliefs about children's learning from technology has demonstrated a significant influence on actual use of technology within early years classrooms (Blackwell, Lauricella, Wartella, Robb, & Schomburg, 2013). To date, little research has examined both aspects-*teachers self-reported beliefs regarding technology* and *what integration looks like* in practice, and whether or not differences in quality of integration exists based on beliefs, training, and the supports provided. This mixed-method study seeks to examine how these two aspects might impact the use of tablets (i.e., iPads) in 27* early childhood classrooms.

Research Goals Achieved

The overarching research questions guiding the study include:
- How do teachers' personal beliefs impact the use of and perceived educational value of tablets in the early years classroom?
- How do the structural features of the environment (i.e., training, support, and access) impact the integration of tablets within these contexts?
- What impact does tablet integration have on children's learning?

Project Timeline & Scope

The project's long time frame (Feb 2014-March/April 2015) allowed several activities to occur; ethics approval process, recruitment & selection of of participants, pre-survey, training of educators, 3 observational visits, a post-survey, and wrap-up of the project. In total, there were 4 training workshops completed, 3 site visits, a pre-and-post survey. Additionally, educators participated in an online blog and had continual access to a technical-expert/trainer. Some educators were also supported with 1:1 individualized tutorials.

Project Partners

This project was made possible by the generous support of the Niagara Region Children's Services; the Early Childhood Community Development Centre (ECCDC); and Speech Services Niagara.
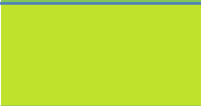
*At the outset of the research project, 27 female participants volunteered. One participant withdrew from the study, and 1 participated did not complete the post-survey. The number of participants responding to each facet of the research is indicated (n).

PARTICIPANT DEMOGRAPHICS N=27	% OF RESPONDENTS
College Educated (diploma)	82
16+ Years of ECE Experience	33
21-30 years in age	39
41-50 years in age	32

Technology Policies

Policies for technology use are important. However, research indicates that at times policies that are *too restrictive* actually impede an educator's ability to integrate and maximize the use of technology to support children's learning. In this study, **60% of educators reported that their centre had no policies** related to technology use. However, **68%** of educators reported they had implemented some form of policy during the project (n=25). In terms of their centre's polices, 12 educators reported the content of those policies related to the following:
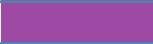
Places time restrictions on children's technology use	33.3%
Encourages the use of pre-approved content/software/etc.	50.0%
Encourages integration of technology across developmental domains	25.0%
Allows educators to use technology at their discretion	41.7%
Allows all forms of technology	25.0%
Allows all forms of technology except for TV	0.0%
Allows children to take/bring portable technology to/from home	16.7%
Allows children to use technology on their own	33.3%
Encourages responsible handling of technology	41.7%
Encourages technology etiquette, such as being respectful to others online, using appropriate language, and respecting others' privacy (e.g., children asking children for permission to take photos prior to taking photos)	25.0%
Limits access to preselected websites	25.0%
Other (please explain)	16.7%
None of the above items are part of our centre's technology policy	8.3%

Comfort in use of technology

As the project unfolded, educators sense of their own proficiency in using the iPad shifted. Most educators felt competent/experts by the end of the project with none reporting that they still felt like a 'novice'. It should be noted that the project spanned 12 months and throughout that period educators were supported via workshops, individual tutorials, varied resources, and access to a technical expert.

Response	Chart	Percentage	Count
Novice (a fairly new user)		19.2%	5
Comfortable Beginner		53.8%	14
Competent/Expert		26.9%	7
		Total Responses	**26**

April 2014 Pre-Survey

April 2015 Post-Survey

Response	Chart	Percentage	Count
Novice		*0.0%*	*0*
Comfortable beginner		45.8%	11
Competent/Expert		*54.2%*	*13*
		Total Responses	**24**

Supports that were most useful for educator professional development

In terms of professional development (PD) opportunities, most often educators reported that the **training workshops, help from a colleague, opportunities to network, and access to a 'technical' expert** as 'extremely helpful' or 'very helpful'. Notably, educators also responded that having access to an iPad and opportunities to 'play with apps' as very significant to their learning to use technology in their programs. Additionally, many ECEs noted a need for continual PD and since the nature of iPads technology & apps is rapidly & constantly changing, continual and diversified PD opportunities appears warranted.

able appreciate apps attended based blogs children classroom computer dane different discussion due eagerly enjoyed explore found getting going ideas individual integrate interest ipad knowledgeable learning needed networking open opportunities others possibilities prep program project questions really related required sessions someone talk tech things training used valuable ways work workshops

How children were engaged in using the iPads

Educators were asked in an open ended question to describe the ways in which the children engaged with the iPads. Here, responses were varied and included descriptions of children's independent use, collaborative use, co-constructed use, and educator directed use. Some educators also reported a comprehensive use of the iPad.

Independent use

"Children were able to freely explore the iPad at anytime during the day".

Collaborative use

"I have noticed that the children's attention span and self regulation has increased. The children have formed small groups around the iPad and there is a lot of conversation happening. I feel the children's confidence has increased with teacher's praise and their accomplishments. They are learning colours, letters, numbers and increasing their fine motor skills. Using the iPad helps answer children's inquiries that I may not have the answers".

Co-constructed use

"We have used the iPad to: make movies, video each other, create works of art, take photos, research questions, practise printing, expanded into cooking, emails from their families, emails from a school in Saskatchewan and the apps".

Educator directed use

"In the classroom we work one on one with the children while using the iPad. We use the iPad at circle time and use different apps with the children".

Comprehensive use

"Children loved to explore the apps on their own and often times went through phases of which apps they preferred the most. The iPad was also used as a tool to document the children's learning opportunities in the classroom. We often used the iPad to enhance children's inquiries for example looking up videos on how things were made, etc. The iPad was also very helpful when working with children that were new to the program and ESL because it was a familiar tool to them".

## How educators engaged with iPads in their pedagogical practices

A closed ended question asked educators to choose one phrase that best described their own use of the iPad within their program/classroom. Interestingly, none of the educators identified their practices as involving using the iPad in <u>educator/directed learning activities.</u> However, both field observations and educators own responses related to children's engagement did indicate some participants favoured a directed iPad teaching approach. **Most** educators self-identified their practice as being 'balanced' (half educator directed/guided and half child initiated) or mostly child initiated. It is important to consider the ways in which iPads are 'taken-up' within teaching practices. Although children tend to demonstrate an intuitive sense in terms of using iPad technology, often their use can be quite limited. Thus, to maximize the teaching/learning benefit of iPads a **balanced and intentional teaching** approach should be considered.

Response	Chart	Percentage	Count
I am currently not using the iPad within the program		*4.0%*	*1*
iPads(s) are used in educator directed/learning activities (e.g., using the iPad for educator led circle time)		0.0%	0
Mostly the iPad(s) are used in educator directed/ guided activities (e.g., educator makes most of the decisions related to the iPad & controls use)		*8.0%*	*2*
About half educator directed/guided and half child initiated learning activities (e.g., shared decision making and use of iPads)		28.0%	7
Mostly child initiated with some time for educator directed/guided learning (e.g. iPad use is mostly directed by children with some support/		*52.0%*	*13*
All child initiated activities (e.g., iPad is accessible to children at any time & similar to any other resource in the program)		8.0%	2
		Total Responses	*25*

Educator Self-Reported Integration of iPads in Practice

Educators were asked to identify within which learning/developmental areas the iPads were integrated. Although educators reported iPads use across all domain areas, **language & literacy** and **mathematical thinking & numeracy** received the highest concentration of responses. iPads to support scientific thinking was also consistently reported but to a lesser extent. Notably, in a subsequent question educators strongly agreed that iPads supported children's inquiries/investigations as they played and learned. Perhaps, the phrase 'scientific thinking' was unfamiliar terminology. Since, scientific thinking is an inherent aspect of inquiry/investigation we expected to see a higher concentration of responses in this category. The arts, social studies, and health & well-being received the fewest responses. Perhaps, this finding is suggestive of a need to focus future professional development opportunities to clearly demonstrate *the how and why* of integrating iPads within these core areas of learning.
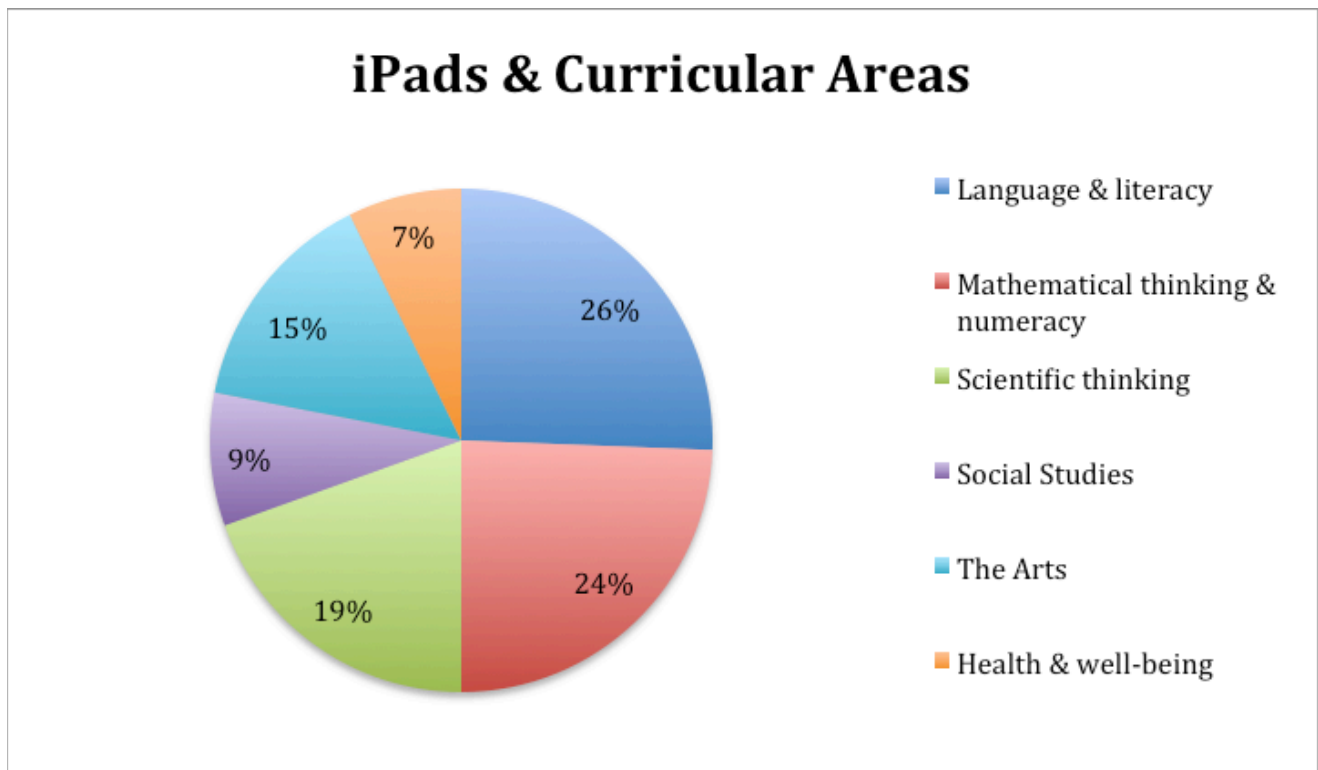
'Storied' Experiences of How the iPads were Taken Up in Practice

The participating educators all worked within diverse contexts. Some of these variances included the number of children in each program, the age and gender mix of the children (e.g., several toddler groups participated), co-teaching models versus sole educator models, the number of children with special needs served, diversity of the families, full year programs versus 10-month programs, etc. Thus, we offer insights from 12 months of the educators' blog entries as a way of highlighting several themes that emerged from the data. These themes include (but are not limited to): ***1. using iPads as a 'provocation' tool to promote & support inquires & make new discoveries 2. iPads as a parent engagement strategy, 3. fostering children's creative & multimodal expressions through iPads, and 4. using iPads to support children with special needs.***

1.   Using iPads as 'Provocation' to Promote & Support Inquiries & Make New Discoveries

During pet doctor (app) last week while we were playing we were talking about things that people can eat and things that people can't eat and that are only good for pets or other animals. We made a list of people food and animal food or both. It was fun comparing the different food. Some of the children realized while playing that you can keep your finger on the food and the animal would keep eating without going back and forth, they were excited when they watched the animal eat quickly. I'm not sure why this is but one of my children is left handed and he always uses his right hand on the iPad.   *February 23, 2015*

These passed few weeks we have been talking about bugs. it has been interesting as the iPad provides a resource to enhance the discussion of the topic. At the moment we have two horn worms in our classroom that we are taking care of. The iPad has helped in looking up information on these caterpillars. At the moment they are going into the pupa stage and eventually turning into a large moth. Hope to seen pictures. The children have been very interested in this process, even the looking after them.   *May 8, 2015*

Over the past couple weeks we have been talking about recycling and how we could reuse things we don't need anymore. So when we talked about milk containers & one of the children suggested we make bird feeders. So after having a look on the iPad about different birds and bird feeders the children had lots of ideas about what kind they wanted to make and what kind of birds they wanted to attract. The Tangram app was a great follow up to the children talking about birds they were able to create their own exotic birds.   *April 28, 2015*
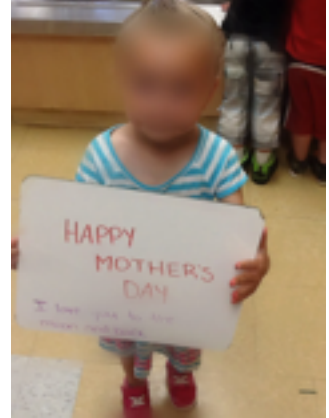
2.   Engaging & Connecting Parents to Children's Learning

One of my friends this week was exploring making stories. He tried a book with paper, then just a single piece of paper and eventually found his way to the I pad. He used the my story app to make his own story and absolutely loved getting to hear himself tell the story which he then showed his mom.   July 21, 2014

We took pictures of the kids and sent them out by email today. Moms loved it.
May 10, 2015

3.   Children's Creative & Multimodal Expressions through iPads

In the past two years I have helped the children in my kinder class make stop motion movies. Usually we take pictures with a camera and I get my son to help me paste it all together and add some music. This year the children and I are doing together and very quickly. They make their own characters out of paper, toys, clay or Lego. They draw a setting back ground. Then we talk about how to take the pictures and off they go. Once they finish taking the photos they call me over to help edit. They put back ground music, sound effects and change the colouring. Presto chango the movie is complete and they share with their friends. This app is awesome.
January 28, 2015

My children love the PuppetPals app! They are constantly using their friends pictures to make puppets. I noticed that they were only moving the puppets around and there was not a lot of language happening. To expand on this activity we selected a scene and vehicles. My toddlers and I choose a bus. We put all our friends into the bus. We recorded our buses and I sang "The Wheels on the Bus." I played it back to them and the laughed and laughed. I also tried this with the preschoolers. They were able to set up the scene and choose the characters. They also were able to sing along. They loved it!
March 6, 2015

4. Supporting Children with Special Needs

I have a new special needs boy in my classroom. He is very active and is brand new to day care and limitations. To settle him down a bit and have him try to focus I took out the I pad for him to use. I put monsters on we used the app together and before long he was doing the game himself. He was laughing so hard and able to use the app appropriately. I was surprised at how long he was able to sit and use the app. When mom came in I showed her the app and showed her his monsters. I will try the draw app for him later. I have a hard time for him to come and try some creative maybe the app will help him to focus and have some attention skills. Very happy with the progress as well as mom.
May 11, 2015

I was very impressed with one of my special needs boys. Not too long ago he was not able to move the bird to feed him when he did he was not able to avoid the candy. He loves this game and tends to get frustrated with the bird. The other day he picked the game and he was able to move the bird with ease and able to catch only the bugs. He was so proud of himself and I was also very proud. We had high fives all around. What a great feeling.
February 4, 20

Summary of Findings

The following summary highlights some of the relevant findings from the study as a way of addressing the specifics of the research questions.

1. *How do teachers' personal beliefs impact the use of and perceived educational value of tablets in the early years classroom?*

    Educators' beliefs about the role of technology correlated with their use in the classroom & perceived benefit to children. Not surprisingly, years of experience negatively correlated with educators' self-reported comfort level with using technology (i.e., the more years of experience with teaching meant educators reported feeling less comfort). At the start of the study, educators' use of technology was significantly correlated with how useful they perceived tablets would be for developing content knowledge (but not significantly correlated with how useful they perceived tablets may be for developing critical thinking). Preliminary analysis does indicate that educators' use of the iPads was related to their beliefs. Thus, an educator who supported the belief that iPads and computers were best 'learned at home' reported challenges in integrating the iPad and found limited use of the iPad within pedagogical practices.

2. **How do the structural features of the environment (i.e., training, support, and access) impact the integration of tablets within these contexts?**

    The research project also clearly indicated that educators gained confidence in their own abilities of using iPads within their practices and benefited from a **continuous approach to professional development.** In considering the types of support needed, it would appear that a diverse array of PD is needed. Additionally, responding to educators needs for support should be conducted in a timely manner. In this project (and in addition to workshops), access to a technical expert, delivering of manuals directly to the educators' iPads (pushing out via a connected network), one-on-one tutorials, and blog responses were all used to support educators. Thus, the type and frequency of support for educators integrating iPads into their practices is an important future consideration. Access to the internet & connectivity, and having only 1 iPad per program were all reported as challenges. Connectivity issues can cause frustration for children and educators alike. Moreover, the advantage of the iPad in terms of being responsive to children's queries can be capitalized upon if/when connectivity issues are resolved. Programs/classrooms should carefully attend to the strength of their connectivity if iPad integration is to occur. In the research literature, answering the question *how many iPads are needed in a classroom* has yet to be fully answered. However, some studies have found that a 'collaborative' approach of using iPads among young children is more beneficial. Finding the right balance of iPads in a classroom does require careful consideration.

The findings from this research project did indicate that iPads offered several advantages inherent with their flexibility, portability, and 'invitational' nature (i.e., graphics, sound, and touch technology are easier to access/use for younger children). As one educator noted in her blog, "I have noticed since we are using the iPad and our computers, that the children have an easier time to use the I pad than to try and manipulate the mouse. Our toddlers have a great time on the iPad and they are not ready for the computer yet. We also have been using s stylus which helps with pincer grip. Also the iPad is so transportable we can take it outside or anywhere. I really appreciate having the iPad".

3. What impact did the tablet integration have on children's learning?

Cumulatively, the data records (i.e., pre/post-survey, blog entries, site visits, observational notes) indicate that educators, when supported, found **authentic ways and valuable means** of implementing iPads into their programs. Although, some discrepancies were apparent in terms of educators' self-reported use of iPads and researchers' observations, overall the integration of iPads did foster new ways of teaching and learning within the early years programs. Please note that the results here are somewhat incomplete. The study was limited in terms of the hours of observations conducted by the researchers and thus a more fulsome picture of actual teaching practices is needed to fully understand the relationship between iPad pedagogies and children's learning. However, we emphasize that in order to maximize the teaching/learning benefit of iPads a ***balanced and intentional*** approach should be considered. The educators reported that children benefited both cognitively and emotionally-socially from the integration of this 'new medium'. Educators self-reported the beneficial use of the iPads across all domain areas of learning, and especially in language & literacy and mathematical thinking & numeracy. And although using the iPad to support scientific thinking was reported with less frequency, it was clear in the blog and observational data that educators were using iPads to support inquiry (where scientific thinking is fostered). Integrating iPad use within the arts, social studies, and health & well-being received the fewest responses. Perhaps, these curricular areas were not as well represented within the apps chosen for the project or the workshop. We suggest that training and future PD (and research) should explore ways to support integration of the iPads across the curriculum.

Conclusion

The findings from this research project has added to the dialogue and understanding of the role of iPads in the early years. The debate on whether or not iPad technology should be integrated into early years programs can now be re-focused on the question of ***how should iPad technology be integrated and what supports are needed*** to insure the quality of experiences for young children. The quality of integration of iPads within teaching appears to be contingent on many complex factors including (but not limited to) educator beliefs, efficacy, training and educator experiences. The adult has an important role in mediating and guiding children's use of iPads in the classroom. Clearly, more research is needed to fully understand the relationship between pedagogy and iPad play/ learning.

Suggested Further Readings

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