Educational Technology Integration in the Full Day Kindergarten Classroom: Fostering Sustainable Change

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A paper submitted to the Department of Education in conformity with the requirements for the degree of Master of Education

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Kingston, Ontario, Canada
August, 2015
ABSTRACT

Implementation of educational technology into Full Day Kindergarten (FDK) classrooms requires more than just the acquisition of hardware; it requires embedded professional development and training for the FDK educational team in order to foster sustainable change. Research that underpins this project comes from literature related to: Effective educational technology integration in the early years; Designing effective professional learning for teachers; Shifts in the culture within a school; and shifts in teachers’ mindsets. The literature is clear that in order for a sustainable shift in classroom culture, pedagogy and practice to occur there must be ongoing support for these changes. Face-to-face support, either due to lack of expertise, budget allocations, time restraints, or geographical location can be difficult to administer in a timely manner. Therefore, this project focuses on the creation of a professional development resource that will supplement face-to-face professional learning and thereby bridge moments when direct support is not possible. The artifact for this project is the independent creation of an Apple iTunesU course to support the developmentally appropriate and meaningful integration of iPad technology into an FDK educational team’s daily kindergarten classroom practice. By designing a self-paced, professional learning collection of resources, combined with an asynchronous online discussion forum, the goal of this project is to provide professional learning that is relevant, easily accessible, responsive and ubiquitous over time and space.
# TABLE OF CONTENTS

Abstract .......................................................................................................................... 2

Table of Contents........................................................................................................... 3

List of Figures.................................................................................................................. 4

**CHAPTER 1: INTRODUCTION**.................................................................................... 5

Purpose and Rational...................................................................................................... 5

**CHAPTER 2: LITURATURE REVIEW**........................................................................ 10

Overview....................................................................................................................... 10

Effective Technology Integration in the Early Years.................................................... 11

Designing Effective Professional Learning For Teachers............................................ 17

Shift in Culture within a School.................................................................................... 22

Shift in Mindset............................................................................................................. 24

Summary of the Literature............................................................................................ 27

**CHAPTER 3: DESIGN METHOD**............................................................................... 28

The Platform.................................................................................................................. 28

Course Outline.............................................................................................................. 30

  Section 1 – Course Goals........................................................................................... 28

  Section 2 – Introducing iPads to the Classroom....................................................... 32

  Section 3 – Classroom Activities.............................................................................. 42

  Section 4 – Connecting to Home.............................................................................. 49

  Section 5 – Teacher Resources............................................................................... 52

**CHAPTER 4: LIMITATIONS AND DISCUSSION**.................................................... 60

**CHAPTER 5: CONCLUSION**.................................................................................... 62

References.................................................................................................................... 65
LIST OF FIGURES

Figure 1: Course Overview ................................................................. 29
Figure 2: Goals of this Course ........................................................... 31
Figure 3: Using the iPad Camera in the Classroom .......................... 34
Figure 4: Tips and Tricks for the Camera ......................................... 35
Figure 5: Tips for Device Management ............................................ 37
Figure 6: Possible Mobile Technology Accessories for Kindergarten .. 38
Figure 7: Apps for the Kindergarten Classroom ............................... 40
Figure 8: Evaluating Apps ............................................................... 42
Figure 9: Fundamental Principals ..................................................... 43
Figure 10: Creation Activities for the Classroom ............................. 45
Figure 11: Centre-based Learning Audio Instructions ....................... 47
Figure 12: Centre-based Learning QR codes .................................. 48
Figure 13: Creation Activities to do at Home with your Child .......... 50
Figure 14: How to Create you Own YouTube Channel .................... 51
Figure 15: Safe Online Searches for Kids ........................................ 54
Figure 16: Safe Online Searches for Kids Video Tutorial .................. 55
Figure 17: Researching Images; Photos for Class ............................ 56
Figure 18: Researching Images; Creative Commons ....................... 57
Figure 19: Tips and Tricks ............................................................... 58
CHAPTER 1: INTRODUCTION

Purpose and Rationale

One can easily look around and determine that computer technology has infiltrated our society revolutionizing our culture: from the medical field, to retail, to the finance and business sector.

The vision for education is no exception; however, teachers of the 21st century use basically the same tools as teachers from past decades (Cuban, 2001). For various reasons, there has been a slow adoption of technology into daily teaching practices. Some researchers, (Cohen, 1987; Cuban, 1986) feel that schools resist change that put pressure on existing practices. Reforming the role of the teacher from that of ‘giver of knowledge’ to ‘facilitator of student directed learning’ requires educators at all levels to rethink their pedagogical approach, assumptions and beliefs (Rogers, 1969; Wagner, 2010). Others feel that it is the physical structure of classrooms, along with teacher resistance and mindset that is not conducive to successful technological integration (Collins, 1996). I would argue that it is a combination of the above, and that relevant, timely, and authentic professional learning must accompany the acquisition of technological hardware. The question then comes up as to how we can provide such on-going professional learning with limited resources?

Professional learning for educators requires different considerations depending on the goal of the learning, the learner’s knowledge base, and the context in which the learning occurs (Merriam & Caffarella, 1999). Introducing technology into the classroom requires the adult learner to examine their beliefs and assumptions about learning and teaching. It requires critical
reflection on their practice and, in some instances, a transformation in habits of mind, frames of
reference and pedagogical beliefs (Cranton, 2006). The humanistic philosophy of adult
education embraces Knowles’ assumptions of andragogy (1980, 1984) as an effective approach
to adult learning. The topic of designing professional learning opportunities for teachers so that
school cultures embrace technology implementation for deeper learning is looked at under the
framework of andragogy and underpinned with current research on technology integration for
system change. The primary themes of knowledge, self-efficacy, pedagogical beliefs and
mindset, along with subject and school culture all play an integral role in embedding technology
into effective classroom practice and have been re-examined under the andragogical perspective
in the review of the literature.

Why is this necessary? Over the next three years, the Ontario Ministry of Education will
invest $150 million dollars into a technology and learning fund that promises to improve digital
access to students and teachers. The fund will allow K-12 Ontario students and teachers to
become more technologically savvy with digital tools (tablets, cameras, software, netbooks,
laptops), as equity of access is addressed. It is directed towards increasing technology-enabled
pedagogical practices focused on key 21st century competencies such as critical thinking,
problem-solving, collaboration, communication, creativity and entrepreneurship. Minister of
Education, Liz Sandals supports the funding by stating on the Ministry of Ontario newsroom
site:

Students today are growing up in a world where technology and digital resources are an
integral part of their everyday lives. We need to tap into that existing knowledge and
familiarity with technology to make learning even more compelling, and allow our
EDUCATIONAL TECHNOLOGY INTEGRATION IN FDK


Teachers require relevant, content specific and timely learning opportunities for successful integration of this technology to revolutionize education (Cuban, 2013; Ertmer and Ottenbreit-Leftwich, 2010; Fullan, 2010; Kenaya, 2005; Baylor and Richie, 2002). Online learning and online communities of practice provide educators with opportunities to supplement face-to-face learning. Online learning is self-directed, timely, content specific, repetitive (if required), levelled, and requires some amount of internal motivation to learn. Merriam and Bierema (2014) discuss Knowles’ theory of andragogy which states that as learners mature, they move from being dependent learners to more self-directed learners, that learning needs to be content specific and timely, and that adults are more internally motivated to learn, (Knowles, 1980, 1984; Merriam & Bierema, 2014). Designing an online course that will supplement face-to-face learning for educators and assist them in using technology for deeper learning activities that involve critical thinking, problem solving, creativity and collaboration seems a positive way to help shift our culture of learning.

Theory suggests that adult learners respond well to content that is relevant to their current needs and to learning that can be put into action immediately (Knowles, 1980, 1984; Merriam & Caffarella, 1999; Fidishun, 2000). This project will focus on full day kindergarten teachers as a target group, and literacy as the content area. As of September of 2015, Full Day Learning Kindergarten programs are infused into all Ontario schools (Full Day Early Learning-Program, 2010-11). The premise for this program is a play-based pedagogy where student directed exploration is emphasized. According to the Ontario Full Day Early Learning Kindergarten
Program document (2010-11), play is the core of innovation and creativity. The former Minister of Education, Leona Dombrowsky, states that, “full-day learning is part of our overall plan to help more children get a strong start in school, so they can go on to have successful, rewarding lives. By giving them more opportunities at a young age, we’re giving our children a brighter future” (Full Day Early Learning-Program, 2010-11). What does, “more opportunities at a young age” look like in today’s 21st Century skill set (Fullan, 2012)? How can educators teach and enhance collaboration, creativity, communication, critical thinking, and citizenship in our youngest learners? To assist kindergarten teachers with this, the online course created for this project provides connections to the overall expectations, big ideas and fundamental principles of learning outlined in the Ontario Ministry Full Day Early Learning Kindergarten Program (2010-11). It provides resources and concise video tutorials for device management, online safety, and digital literacy. Classroom activities with clear connections to the Ontario curriculum along with resources for strengthening the connection between home and school, including how social media can be used as a communication and learning tool, specifically address the renewed goals for education outlined in the Achieving Excellence document (April, 2014). These outlined goals include achieving excellence, ensuring equity, promoting well-being and instilling public confidence and are addressed through well-researched, well-planned activities and resources for the teacher, parent and student (Achieving Excellence: A Renewed Vision for Education in Ontario, 2014).

For the purpose of this project, key terms to be addressed are FDK (Full Day Kindergarten - children aged three to six years) educational technology (iPads, interactive white boards, tablets, interactive tables, computer hardware and software, digital cameras, Smartphones), and literacy, which includes the traditional meaning of literacy along with ‘new
literacies’ meaning the “competent handling of texts that are meaningful to ‘insiders’ of particular sociocultural practices and discourse communities” (Lankshear & Knobel, 2006).
CHAPTER 2: LITERATURE REVIEW

Overview

Effective implementation of educational technology into the Full Day Kindergarten classroom requires more than just the acquisition of hardware. Meaningful professional learning, development and training for the educational team is required in order to create a sustainable change in pedagogy that will shift the culture of learning within the classroom. The artifact that developed out of this project, an iTunesU online course, was designed to assist teachers in implementing educational technology into their daily kindergarten classroom practice. By designing a self-paced, professional learning collection of resources, combined with hands on co-planning, co-teaching, and co-reflecting professional development sessions within the classroom, the goal of this project is to bridge face-to-face professional learning in an online experience that is relevant, easily accessible, responsive and ubiquitous.

From this project goal, and as a result of informed research, this literature review has been framed into four themes. The first theme, Effective Technology Integration in the Early Years, considers the implications for literacy development, the need for explicit teaching of digital citizenship, digital leadership and online safety, and the impact that technology can have on strengthening the home to school connection. The second theme, Designing Effective Professional Learning for Teachers, outlines the necessary elements of professional development that will lead to a sustainable change in pedagogy, mindset and school culture. This has been re-examined under the andragogical perspective of adult learning in consideration of the professional adult learner. Theme three, Shift in Culture within a School, discusses the importance of a strong vision and leadership, along with well-designed professional learning opportunities that will encourage schools towards embracing technology integration for good
teaching and successful learning. Building from this, *Shift in Mindset*, discusses the importance of mindset in successful technology integration. Teachers need to shift their practices to encompass today’s technological advances to parallel societal evolution and make learning relevant. In doing so educators will not only engage students but also allow for differentiated learning styles while opening up opportunities for digital literacy skills, including communication skills and critical thinking skills to be developed.

**Effective Technology Integration in the Early Years**

Literacy capacities are growing and changing as technology continues to transform our way of communicating. With this technological and societal evolution, the idea of what constitutes literacies must also broaden; new forms of communication need to be accepted as valuable sources of ways to communicate message meaning (Burnett, 2010; Collier 2007; Kress 2003; Lankshear & Knobel 2006; Leu, 2004; Turbill, 2001). With the definition of literacy being a moving target (Leu, 2001), no longer is text the single mode of literacy; image, graphics, video, song, speech, gestures, and visual design - along with text - work simultaneously to constitute the multi-literacies that infiltrate our society (The New London Group, 1996). As educators, we must know how to understand both the conventional literacies and the technology enabled ‘new’ literacies, and know how to use them productively and creatively to educate young learners and to be effective citizens in our society (Lankshear & Knobel, 2006). Students come to school with a variance of backgrounds on methods of communication, some of which involve the ability to manipulate technology at a very early age. We must consider what the shift from page-based to screen-based text and symbols is doing to the traditional definition of literacy, as well as how we teach literacy. The use of technology in developmentally appropriate and intentional ways can extend and support active hands-on, creative and authentic literacy experiences (Bailey &
Blagojevic, 2015). As well, extending this use from school to home allows for complimentary learning to occur.

Recently, the definition of literacy has broadened and according to the People for Education document (2014), digital literacies are being recognized as a valuable component of the plurality of literacy. As stated by Peurling (2012), societal dependence on technology uses has changed the way that educators and parents need to view the importance of technology in FDK. The National Association for the Education of Young Children (NAEYC), suggests in their position statement that digital tools be applied in ways that support the healthy development of young children.

Effective uses of technology and media are active, hands-on, engaging, and empowering; give the child control’ provide adaptive scaffolds to ease the accomplishment of tasks; and are used as one of the many options to support children’s learning. To align and integrate technology and media with other core experiences and opportunities, young children need tools that help them explore, create problem solve, consider, think, listen and view critically, make decisions observe, document, research, investigate ideas, demonstrate learning, take turns, and learn with and from one another. (NAEYC & Fred Rogers Center (2012), pp. 6-7)

This project aims to align with this statement as the resources included are aimed at extending activities within the classroom by using technology to create, communicate, demonstrate, explore safely online, document and observe learning – with a focus on empowering and engaging the child.
In her 2001 ethnographical study, Jan Turbill paralleled Marie Clay’s Concepts of Print (as cited by Turbill, 2001) to her own hypothesis of ‘Concepts of Screen’, concluding that there are similar concepts that need to be mastered in both print text and digital text for a clear understanding of literacy to begin to emerge. She argues that teachers’ perceptions of literacy need to encompass both (Turbill, 2001). Beginning readers use print illustrations to make meaning of text before they engage in print (Parkes, 2000), just as visuals, icons and animations assist with meaning making in multi-modal texts. Reading digital text requires a different skill set than reading print based text; images, icons, hyperlinks, sound clips and embedded video make up some of the multi-modalities of digital literacy. Learning how to read digital text deeply for comprehension and communication requires critical thinking skills to be developed and explicitly taught (Harvey, Goudvis, Muhtaris, & Ziemke, 2013). This form of reading needs to be incorporated into a teacher’s definition of literacy and the regular classroom practice (Turbill, 2001). If Kindergarten teachers view literacy as merely cracking the code of phonetics through the traditional modelled, shared and guided reading of print based texts, then are they teaching students to become fully literate in today’s society? The meaning of literacy will continually change depending on what society expects literate individuals to be able to do (The New London Group, 1996). Currently, literacy involves effectively communicating, collaborating, curating, and creating, along with being able to think critically and infer meaning from graphics, gestures, speech and text (The New London Group, 1996). By providing modelled activities in the classroom that allow for such transferable skills to be developed, teachers are demonstrating effective communication techniques. Communicating through classroom websites or blogs, connecting via Twitter or Skype to families, the community and experts, combined with providing open-ended activities using creation applications that enhance inquiry learning, all
Studies that have been conducted with young learners strongly suggest that the use of digital technology gives children a platform to use and make sense of print within a context that is meaningful and motivating (Levy, 2009; Turbill, 2001). Conclusions suggest that young learners are not only competent users of digital technology but have also developed a transferable literacy, meaning they are able to operate unfamiliar technologies with fluency (Levy, 2009). Even before formal schooling, young children may already be entrenched in the practice of multi-modal discourse (Levy, 2009). The argument is raised, “about how young children learn to read screen texts and how this understanding can influence the teaching of reading within the digital culture in which children live today” (Levy, 2009). Similarly, Plowman, McPake and Stephen (2008), conclude that children learn how their family communicates and interacts with one another – hugs, e-mails, or uploading photos to social media. These interactions and observations with family members are not the only influences that shape their worldview; their interactions with technology are equally influential (Plowman, McPake & Stephen, 2008). This underpins the assumption that children come to school with a varied exposure to digital media literacy, and as technology continues to transform our daily lives, teachers need to prepare themselves, and the children they teach, for the skills they will need to participate in a digital society (Puerling, 2012).

Using technology to connect the school to home and community, breaks down the walls of the classroom and opens up new learning opportunities. Harnessing the power of technology in this manner redefines the traditional way in which teachers can interact with the home. Technology is a game changer for students who do not yet have the words to express what they
did at school; instead they can show their parents through digital photos and digital sharing. Digital visual and audio supports allow for conversations to get started as children are given a voice to express themselves. This is especially important as classrooms become more inclusive and multilingual (Kaldor, 2015). Educators have the unique opportunity to support parents and help them use devices as tools to support communication, creativity, curation, accountable talk, digital citizenship and to build relationships. Likewise, parents can use devices to share information, ask questions, seek advice, and engage in the classroom program. Hollandsworth, Dowdy & Donovan (2011) use the analogy “It Takes a Village” when discussing the school, home and community teamwork that is involved in owning the challenge of guiding students toward digital literacy and online safety. This reform is more of a social action than an educational approach, but schools should be modelling the way to empower this young generation, and it can start in kindergarten. This social action requires a cultural shift that demands all invested parties (teachers, administrators, technology specialists, parents, students, media specialists and academics) to mimic the societal shift we see within the educational setting. There needs to be common ground that advocates the use of technology as a tool to enhance communication, collaboration, curation, creativity, and critical thinking and a strong bridge between the home and school (Hollandsworth, Dowdy & Donovan, 2011). It could be said that an educator that introduces a child to these multimodalities and multi-literacies in kindergarten, the beginning of a student’s educational career, is truly empowering the student, reflecting societal cultural trends and shifts, and providing an authentic education to the child.

However, as educators, we must not assume that students, or parents, already know how to use technology and to manage these skills. We must be teaching students, starting at a very young age, how to learn and communicate with these emerging tools. Modeling how to engage
in online spaces, use accountable talk, use technology with a learning purpose, and to be a productive online citizen are all skills that can be built upon even as technology changes (Collier, 2007) and the definition of literacy changes depending on what society expects literate individuals to do (Leu, Kinzer, Coiro, & Cammack; 2004). Ribble (2010) states that digital citizenship should be a part of the curriculum that starts in kindergarten and builds each year. Our youngest students use technology at home before they begin school and it is the role of the parent to begin to teach digital citizenship and digital literacy. The parent continues to be an integral member of the educational team as teachers offer opportunities to be creators and curators of digital content. Schools must scaffold learning in this area and assume responsibility, along with the parent and the community, to educate the child in digital citizenship. The National Association of Education for Young Children (NAEYC) argues that it is the responsibility of the educational team and home to help protect and empower children by teaching them to learn to ask questions and think critically about technologies they use, even at a very young age. This can be done through modelling and guided and shared learning with technology (NAEYC, 2012).

For a successful cultural shift to occur there needs to be a collaborative effort and clear vision. If there is not a collaborative effort or if the vision is uncertain, then the digital culture is more likely to establish its own, possibly problematic or even dangerous, direction (Ribble, 2010). Hollandsworth, Dowdy and Donovan (2011) argue that if youth are not taught the skills needed for navigating the online world safely and critically, then the potential for learning could be curtailed. Scaffolding student investigations to create thoughtful and meaningful learning experiences is an explicitly taught skill that will enhance learning opportunities in all curricular areas and in all grades (Hollandsworth, Dowdy & Donovan, 2011). Lankshear and Knobel
(2006) provide support for explicitly teaching students’ online safety, rather than blocking or restricting internet access. They argue that instead, we need to teach them how to keep themselves safe online. Restricting access is a double edged sword; students lose out on information, along with the ability to collaborate and communicate, but also lose the opportunity to learn how to navigate online and to be morally responsible.

According to Kamil et al. (as reported by Lankshear & Knobel, 2003), if developmentally appropriate technology is thoughtfully infused throughout curricula and instructional practices, classroom technology usage is consistently associated with increased student motivation and gains in emergent literacy skills. Enabling and explicitly instructing students to communicate, collaborate, create, and curate in online spaces will allow them to not just survive, but to be empowered and to thrive in a digital society. In order for educators to do this successfully, they must be knowledgeable in the technologies, their curriculum content and best pedagogical practices while successfully combining the three to reach optimal learning (Fullan, 2010). The question then becomes, how can we ensure that our educators have ample opportunity to become knowledgeable in these technologies and pedagogical practices?

**Designing Effective Professional Learning for Teachers**

Pilgrim and Bledsoe (2011) take the position that the digital age has allowed educators to have an influx of information available to them at any time. This ubiquitous access to information has allowed educators to engage in self-directed learning opportunities that are tailored to their specific needs, level of sophistication and desired digital mode (text, recorded webinar, video, live conference, social media, iTunesU). Teachers also need to be proficient in digital literacies in order to fully take advantage and absorb themselves in this type of professional learning. Professional development opportunities for teachers no longer need to take
place at scheduled times and scheduled locations, as is the traditional manner. Instead, educators can immerse themselves in self-directed learning. This project uses iTunesU as a platform for housing a professional learning collection of resources to ensure that participants are able to build knowledge on self-selected topics related to their specific content, build efficacy on their own schedule, scaffold their own learning, choose the modality that best suits their learning style, repeat information when required, and gain immediate feedback via live discussions.

Meririam and Bierema (2014) reference Knowles (1980, 1984) in determining that there are unique assumptions needed to be made about learners who are children (pedagogy) and the learners who are adults (andragogy). Knowles’ theory of andragogy (1980) outlines six basic assumptions which can be considered for designing professional development for practicing teachers. They include 1) that as a person matures, they move from a dependent personality to a self-directed person; 2) that an adult’s experiences are a wealth of learning resources; 3) that readiness to learn depends on the adult’s social role; 4) that adults are driven by internal motivation; 5) that adults need to see the relevance and know the reason for learning something; 6) and that adults require knowledge for immediate application rather than future application (Knowles, 1980, 1984). In relation to this, research done on successful and meaningful integration of technology into the classroom by Cuban (2013), Ertmer and Ottenbreit-Leftwich (2010), Fullan (2010), Kenaya (2005) and Baylor and Richie (2002) show four common themes which are all embedded within Knowles assumptions of andragogy (1980, 1984). The themes of knowledge, self-efficacy, pedagogical beliefs and mindsets and subject and school culture, as determined from this research, each discuss facets of Knowles’ assumptions of andragogy which will now be further explored.
Research shows that in designing any effective professional learning opportunity there are certain factors or themes that are required for a positive integration of technology into classroom practice (Cuban, 2013; Ertmer and Ottenbreit-Leftwich, 2010; Fullan, 2010; Kenaya, 2005; Baylor and Richie, 2002). The first common thread is knowledge. Empowering practicing teachers to use technology efficiently and effectively enables them to build knowledge that they can then share immediately with their students. Andragogy suggests that new knowledge will be more readily accepted by adult learners if that knowledge can be used immediately to fill an urgent need (Knowles, 1980). In looking at teacher knowledge as a key variable, research has determined that basic technological and digital literacy is necessary if teachers aspire to prepare their students to be technologically capable (Cuban, 2010; Baylor & Richie, 2002; Ertmer and Ottenbreit-Leftwich, 2010; Fullan, 2010; Kenaya et al., 2005). Learning the basics is the foundation; however, effectively incorporating technology requires “teachers to expand their knowledge of pedagogical practices across multiple aspects of the planning, implementation, and evaluation processes” (Ertmer & Ottenbreit-Leftwich, 2010). Knowledge of subject content combined with developing student learning habits (collaboration, critical thinking, self-regulation, communication) in a technology-rich environment will allow teachers to choose appropriate technologies to support and extend curricular goals (Ertmer & Ottenbreit-Leftwich, 2010). Therefore, having direction and purpose for using the technology needs to be clearly thought out by facilitators of the professional learning team and the FDK team, rather than technology being merely an acquisition for the classroom. As cited by Kenaya et al. (2005), Kennedy suggests that “the most important feature of a professional development program is a strong focus on helping teachers understand how students learn specific content, and how specific instructional practices and tools can support student learning outcomes” (p. 272). The
theory of andragogy supports this idea, when considering practicing teachers, by concluding that adults require knowledge for immediate application rather than future application and that adults need to see the relevance and know the reason for learning something (Knowles, 1984). Therefore, it is essential to demonstrate to teachers the importance of having a sound knowledge in child development and on how technological tools can be used in very specific ways in relation to the curriculum content, the grade they teach and the development of the child to support student learning. By designing an online tool for gaining knowledge, FDK educators can determine what new knowledge is of importance to them for immediate application to their practice, and how it aligns with current thinking and Ministry documents.

Strong self-efficacy levels among educators is a second commonality research has found to effect successful technological implementation (Cuban, 2010; Baylor & Richie, 2002; Ertmer & Ottenbreit-Leftwich, 2010; Fullan 2010; Kenaya et al., 2005). A quantitative study by Baylor and Richie (2002) conclude that the degree of teacher openness to change has a major impact on meaningful technology use in the classroom. Their findings indicate that educators who attempt to incorporate technology enabled learning activities (due to pressure from administrators or from self-exploration) see an increase in student engagement and success. This leads to an increase in teacher confidence, moral and self-efficacy. In relation to this, Merriam and Bierema (2014) discuss Knowles’ theory of andragogy (1980, 1984) as a teacher’s readiness to learn in correlation with their internal motivation to learn. According to Cranton (2006) this internal motivation can be fostered through authentic relationships. Cranton’s work (2006) on authenticity determined that to foster transformative learning, the relationship between the learner and the teacher needs to be open and genuine. To do this the teacher needs to be aware of the learners’ preferences, be aware of the context and constraints of the teaching environment,
and engage in critical reflection as to be aware of the assumptions and values of the learner (Cranton, 2006). This will help build trust and authenticity which are products of teacher self-efficacy (Cranton, 2006). As documented by Cuban (2013), building trusting relationships with teachers in order to co-design and co-facilitate engaging lessons is likely a key element of building a sustainable culture that embraces technology through learning. This will build teacher self-efficacy and continue to promote good teaching and successful learning (Cuban 2013).

Similarly, Mueller (as cited by Ertmer & Ottenbreit-Leftwich, 2010), determined that due to rapid technology advances teachers will always be in a continual learning phase which is why strong self-efficacy is imperative. Mueller’s study (2008) determined that self-efficacy is even more important than skills and knowledge. It suggests that providing positive personal experiences and time to play with the technology contributes to building teacher confidence. As well, participating in professional learning communities - where learning resides in the social interactions of learners who have different levels of knowledge, behaviours and attitudes (as described by Merriam & Bierema, 2014) - and having professional learning opportunities within the context of teachers’ work will contribute to increased self-efficacy (Ertmer & Ottenbreit-Leftwich, 2010).

The iTunesU course in this project -where FDK educators have similar learning interests, but have different knowledge levels and attitudes – allows for discussion, questions and comments. It builds a personal learning network where collaboration and communication can enhance learning and self-efficacy, to supplement face-to-face learning. Courses designed in iTunesU allow for discussion boards on each topic, as well as personal support via e-mail to the course instructor, if enabled. This will help build trust and credibility with the learners and assist in building an authentic professional learning community.
The next two factors in designing effective professional learning opportunities for teachers, *subject and school culture* and *shift in pedagogical beliefs*, closely align with the overall themes of this literature review, *Shift of Culture within a School* and *Shift in Mindset* and will be reviewed in more detail in the following sections. Teachers and schools need to value technology as an instructional tool to enhance a practice and therefore *subject and school culture* and *pedagogical beliefs* are key variables in designing effective professional learning.

The reviewed studies all have four common assumptions (knowledge, self-efficacy, pedagogical beliefs and subject and school culture) that need to be considered when designing professional learning opportunities that will lead to sustainable change in technological integration and pedagogy. As well, by re-examining these themes through the lens of andragogy, education for adult learners who are practicing educators will be heightened. By building a self-directed iTunesU resource for professional learning targeted at the kindergarten level and aligned with the expectations of the Ontario Curriculum, teachers can see the link between pedagogy, content knowledge and technology.

**Shift in Culture within a School**

Elaborating on the importance of school culture, researchers conclude that the culture of a school is enhanced by a strong vision and strong leadership (Baylor & Richie, 2002; Ertmer & Ottenbreit-Leftwich, 2010; Fullan, 2013; Leu, Kinzer, Coiro & Cammack, 2004; Kress, (2006); Robinson, 2010). As stated by Sir Ken Robinson (2010), school reform is not the answer to a successful shift in practice that embraces the use of technology for learning purposes because a reform will only improve upon a broken model (Robinson, 2010). He argues that what education needs is a revolution to transform education into something else; an organic model that allows students to explore and learn from their passions and talents, rather than the traditional linear
model that gets students from point A to point B (Robinson, 2010). This involves fostering a culture of learning that has us abandoning our traditional beliefs and embracing a culture of organic process by creating conditions where kids can flourish (Fullan, 2013, Robinson, 2010, Wagner, 2012). In his book, Creating Innovators, Tony Wagner (2012) strongly states that technology enabled learning can assist students in connecting with their passions and purpose for learning. Collaborating with others, communicating for an authentic purpose, curating, innovating, creating and making student thinking visible – are all side effects of organic lesson design that harnesses the power of technology. Creating a school culture that thoughtfully embraces technology, and the possibilities of multi-modal learning, will not only assist in transforming teaching practices, but in student engagement and success (Fullan, 2013, Robinson, 2010, Wagner, 2012).

The research of Ertmer and Ottenbreit-Feftwich observes that the belief system of teachers is strongly rooted in the context of their school culture and what constitutes ‘good teaching’, thus reinforcing the importance of a positive school culture that promotes learning through technology. Zhao and Frank (2003), as read in the research of Ertmer and Ottenbreit-Feftwich (2010), state that if the values, beliefs and practices of a school do not embrace technology integration, resistance from staff is more likely to occur. Hesitant teachers are more likely to think positively about technology if encouraged by peers to embrace technology. Creating and supporting a school culture that promotes technology integration is crucial for teachers to adopt new instructional practices (Ertmer & Ottenbreit-Leftwich, 2010).

School leaders who actively use, model and infuse technology in their school lend credence to a technology-rich school culture. A study conducted by Baylor and Richie (2002) concluded that a strong vision that nurtures development and decision making by teachers will
lead to a more successful technology infusion and shift in pedagogical practice. Baylor and Ritchie help us to understand that by allowing teachers to be leaders, as well as participants, in their own professional learning, “investments in time and money will pay off in greater content acquisition, and greater teacher competence and morale” will follow (p.19).

Kress (2003) discusses that literacy development is dependent on what the culture of the school makes available to the student as a way of creating and communicating a message. These representational modes, such as text, speech, graphics, music and gesture, can be enhanced with increased access to technology embedded into the classroom environment. Schools that have an internal and a community culture that encourage the use of social media, blogs, and websites – along with traditional book and screen use – allow for multiple options to disseminate the message and create an opportunity to learn with multi-literacies (Kress, 2004). Leaders who participate in this style of information dissemination are leading by example and helping to build a culture of trust and educational transformation. Leu et al. (2004) argue that schools and districts who are not building towards a culture that embraces technology, or are lacking in technological hardware, can be considered ‘partially literate’ spaces. Just as teachers who are not embracing pedagogical practices redefined by technology are blocking opportunities for student learning. This is yet another reason why creating a culture that embraces learning through technology is so important. However, to shift a culture of learning, the mindsets of teachers need to be redefined.
Shift in Mindset

The importance of educator mindset in technology integration in schools is a significant contributing factor to the quality of programming and lesson design which directly impacts student engagement and success (Cuban, 2013; Dweck, 2006; Ertmer and Ottenbreit-Feftwich, 2010; Fullan, 2010; Hess, 2010; Lankshear & Knobel, 2006; Wagner, 2010).

Cuban reminds us that what has kept classroom practise stagnant is often teacher resistance to reform, due to traditional teaching styles passed down through the decades. He states that one reason many reform initiatives fail is that top-down reform does not often consider how to change teacher instruction, but instead focusses on redesigning key structures (Cuban, 2013). If we think about the idea of educational reform versus educational revolution, perhaps the problem partially lies here. Traditional teaching practices and ideas are formed to meet the needs of the past, however, as information communication technologies revolutionize our daily lives, have we shifted our mindset to parallel this in the classroom setting? Echoing this line of thinking is Hess (2010), Rogers (1969) and Wagner (2010) who claim that it is time to rewrite the job description of a teacher and redefine the role from that of ‘giver of knowledge’ to ‘facilitator of student directed learning’ which requires educators at all levels to rethink their pedagogical approach (Hess, 2010; Rogers, 1969; Wagner, 2010).

Lankshear and Knobel (2006) discuss new literacies and the challenge of mindset. They highlight that new technologies allow us to redefine the way we communicate and make meaning of information, thus demanding a transformation of our pedagogical beliefs. Continuing with old routines in more technological ways is not leading towards a transformation in education – and ultimately is not leading to an increase in student success (Lankshear & Knobel, 2006). Altering
a core belief system is a challenging endeavor that tackles personal beliefs, societal beliefs and cultural beliefs.

Ertmer and Ottenbreit-Feftwich (2010) recognize that a teacher’s core belief system will be the most difficult change. We are hypnotized by our traditions (Robinson, 2010). Traditional teachers will need to see the relevance and value of technology in their subject area and how it is relevant to their goals. It will be more widely accepted if they can readily transfer that knowledge to their own classroom, which is why this project artifact is directed at extending learning opportunities specifically to the kindergarten program. If the learning experiences are solely about the technology, with no connection to grade or content learning goals, the practices are unlikely to be adopted by teachers (Fullan, 2010). All learning activities within this project artifact have direct curriculum links attached to assist in making clear connections. As cited by Ertmer and Ottenbreit-Feftwich, Hughes (2005) states, “the more content-specific the example, the more likely the teacher will see value and learn it” (p. 295).

It is proposed that, teachers must be willing to change their mindset to accept the idea that teaching is not effective without the appropriate use of information and communication technology resources to facilitate student learning (Ertmer & Ottenbreit-Leftwich, 2010). School cultures that encourage a growth mindset (Dweck, 2006) can be an accelerator for this mindset change. According to Dweck’s work (2006), a growth mindset encourages individuals to recognize failures as a time to reflect, continue to learn and continue to try. Having a positive support system within the school as teachers attempt to abandon traditional ways of teaching and learning and embrace new pedagogies will encourage this educational transformation. As mentioned previously, teachers who are open to change find it easier to adopt technology use and see an increase in desired student learning outcomes (Ertmer & Ottenbreit-Leftwich, 2010). This
leads to increased teacher confidence and moral, a shift in mindset and a catalyst for change in school culture.

Summary of the Literature

The literature reviewed helped to identify four themes for consideration: Effective Technology Integration in the Early Years, Designing Effective Professional Learning for Teachers, Shift in Culture within a School and Shift in Mindset. These themes, and the research that underpins them, informed critical decisions in determining the most effective way to develop a collection of professional learning resources for integrating technology into kindergarten classrooms that would bridge learning when face-to-face opportunities were not possible.
CHAPTER 3: DESIGN METHOD

Kathleen Cercone (2008) discusses that the adult educational environment is increasingly moving toward an online platform and that the needs of adult learners, discussed in Knowles’ assumptions, need to be considered in the design of the learning. She states that, “One must be familiar with the way in which to design an online environment, understand the strengths as well as limitations that are inherent in this type of instructional medium, and balance that with information about how adults learn” (Cercone, 2008, p. 142).

The Platform

This Apple iTunesU course was independently developed to supplement face-to-face professional learning. The free course, entitled iPads in FDK: Empowering Young Innovators through Purposeful Play, is targeted towards educators of Full Day Kindergarten programs. The course can also be beneficial to Early Child Educators or educators teaching in the primary division. In some instances, it can stand alone as professional development to assist in technology integration in areas where face-to-face learning does not exist. To enroll in the course, the adult learner will need to have access to an Apple iPad and the free iTunesU app will need to be installed on the device. The course is accessed by using the (+) symbol in iTunesU app and choosing “Enroll in a Course”. The code DXM-NNH-RCA will then be entered. This platform was chosen as a direct result of funding expenditure decisions in many Ontario school boards to purchase Apple iPads for elementary classroom use. Once enrolled in the course, the adult learner will see a course overview as in Figure 1 (stating the course title, affiliations, course
creation date, expected duration and one sentence course descriptor), the Instructor information, and course outline which identifies the sections within the course.

![Figure 1. Course Overview](image.png)

*Figure 1. Course Overview: The iTunesU course overview states the course title, affiliations, course creation date, expected duration and one sentence course descriptor.*

This course is divided into five sections. They include 1) Course Goals 2) Introducing iPads to the Classroom 3) Classroom Activities 4) Connecting to Home and 5) Teacher Resources.

The adult learner can toggle along the bottom to give them options to gain more information about the course, access course posts, compose their own notes to accompany instructor posts, audio, video or iBook references, and access all materials housed in the course in a concise list. The instructor has sole administration privileges that allow them to enable private email to the participants, collect assignments, and enroll students, if desired.
Course Outline

Section 1 - Course Goals. As read in Cercone’s (2008) study, Lieb (1991) argues that adults are goal oriented and therefore objectives and goals need to be identified early in a course. The goals of this iTunesU course clearly state that the design of the course, in consideration to adult learning needs (Cercone, 2008; Knowles, 1980, 1984, 1991; Merriam, 2014) is self-directed, timely, intended for immediate use, and relevant. The Course Goals section demonstrates this further by including a video that walks through the Ministry of Ontario Full Day Early Learning Kindergarten document (2010-11) and highlights direct links between the Ministry’s goals for the role of information and communication technology in FDK and this course (Figure 2). These links include the idea of promoting technology use to “connect children to other schools, at home and abroad, and to bring the global community into the local classroom”, and to “whenever appropriate support and communicate their learning…as a research tool and as creative media” (The Full-Day Early Learning-Kindergarten Program, p. 42). It is strongly emphasized in the video that, “Early Learning Kindergarten teams should be critical consumers of educational software to ensure that the software offers opportunities for higher level thinking. Programs that promote only rote repetition of facts and information should be avoided” (The Full-Day Early Learning-Kindergarten Program, p. 42). All apps and lesson ideas promote creativity and higher order thinking skills. Literature reviewed for this project greatly considered this goal of digital literacy in the heading Effective Technology Integration in the Early Years (Burnett, 2010; Collier 2007; Kress 2003; Lankshear & Knobel 2006; Leu, 2004; Turbill, 2001). The Ontario Ministry Document also highlights that “all children must be made aware of issues of privacy, safety, and responsible use” (p. 42). Research done on the
importance of explicitly teaching digital citizenship beginning at a young age helped to shape this section of the course and support the goal outlined in the document (Hollandsworth, Dowdy & Donovan, 2011; Lankshear and Knobel, 2006; NAEYC, 2012; Ribble, 2010). The Course Goals video also introduces and encourages the use of the discussion forum to ask questions, post comments or suggest further resources. The idea of creating an online community of practice where there is collaborative learning around a shared interest allows for geographically boundless opportunities for discussion and reflection to propel learning and for self-efficacy to grow (Merriam & Bierema, 2014; Ertmer & Ottenbreit-Leftwich, 2010).

Figure 2. Goals of this Course: Outlining direct connections between the Ministry of Ontario curriculum document for Full Day Kindergarten and the objectives for this course allow educators to see the relevance of learning through technology. It highlights the importance of the
educational team being critical consumers of educational software to ensure that planned activities encourage creativity and communication and assist in connecting the home and school. Online safety and responsible use are also highlighted as important instruction within the classroom setting.

**Section 2: Introducing iPads to the Classroom.** The iTunesU Course begins with the Introducing iPads to the Classroom section which is broken down into three subsections. They are Care, Camera and Maintenance, Taking Care of the iPad, and Reviewing Apps. These sections help set the stage as to why technology should be integrated into the classroom. Research informs us that clearly identifying the ‘why’ of technology integration, as outlined in the Ontario Ministry of Education Early Learning Kindergarten document (2010-11) and referenced to in the Achieving Excellence document (2014) assists in shifting mindsets within the culture of education. Mindset is a contributing factor to the quality of programming and lesson design which directly impacts student engagement and success (Cuban, 2013; Dweck, 2006; Ertmer and Ottenbreit-Feftwich, 2010; Fullan, 2010; Hess, 2010; Lankshear & Knobel, 2006; Wagner, 2010).

The camera is one of the most important tools on the device and allows for beginning lessons on digital citizenship. Using the iPad Camera in the Classroom (Figure 3) reminds educators that iPad camera instruction is an opportunity to teach how, when, and why to use the camera. Explicitly teaching students how to use the camera effectively includes instructing them on how to hold and focus the iPad, what is an appropriate photo subject, how to document their learning through photo and video, how to screenshot their learning to share in e-Portfolios or on social media, and when is an appropriate time to take a photo. Proper use of the camera as a tool for documenting learning, sharing observations and creations, and exploring digital citizenship not only engages and empowers the student but also aligns with the NAYEC position statement.
that digital tools be applied in ways that support the healthy development of young children (NAEYC & Fred Rogers Center (2012)).

The resource acts as an instructional poster for teacher use that reminds the education team that photo taking needs to be explicitly taught, that positive digital citizenship begins with the camera, and why the iPad camera is an invaluable tool for the classroom. Tips and Tricks for the Camera (Figure 4) provides tips and tricks for taking a picture and enhancing photos, including cropping, brightness, automatic focus, and reflecting student work to a large screen.
Figure 3. Using the iPad Camera in the Classroom; An instructional poster that guides teachers on how to take a photo, screenshot and video along with highlighting what needs to be explicitly taught so that students can be successful in self-directed documentation. The importance of using the camera as the first tool to teach digital citizenship is discussed.
Figure 4. Tips and Tricks for the Camera; Assists teachers in taking superior photos and video for documentation or creation by going over the editing features of the iPad. It instructs teachers on four ways to take a photo, giving choice to the teacher and student for optimal photos. It informs educators that the iPad can also be a portable document camera that allows for student work to be shared easily by projecting it to a large screen.
For successful integration of technology into the classroom, device management needs to be considered prior to introducing the technology to the classroom. Considerations for technology transportation and sharing of devices between classrooms, charging, cleaning, storing, exporting media, saving work, simplifying the face of the device, and setting up useful device features need to be planned ahead of time. The school culture can have a large impact on setting the tone for device management. This is enhanced by a strong vision and strong leadership (Baylor & Richie, 2002; Ertmer & Ottenbreit-Leftwich, 2010; Fullan, 2013; Leu, Kinzer, Coiro & Cammack, 2004; Kress, 2006; Robinson, 2010). Having all team members following the same vision will likely increase the successful integration within the school.

Technology in Kindergarten: Planning for Successful Technology Integration in your Classroom (Figure 5) is an instructional poster for educators to direct them to consider factors that will increase the likelihood of success prior to class, during and after class as well as at the end of the school day. Possible Mobile Technology Accessories for Kindergarten (Figure 6) is an educational resource to guide the education team to consider possible accessories to be used with the iPads for optimal learning to occur, including adapters and reflection solutions to project learning to a large screen, cases for device protection, headphones, and a device stand that allows for the iPad to be used as a document camera. These accessories are not necessary, however do enhance the learning and sharing experience allowing students and teachers to easily make their thinking visible.
Figure 5. Tips for Device Management; Intended for classrooms, schools and leadership so that a clear vision and clear expectations can be discussed and decided on. The poster acts as a guideline and highlights items to consider when schools are deciding protocol that will help to create a unified culture for successful technology integration.
Figure 6. Possible Mobile Accessories for Kindergarten; Assists educators in budgeting for accessories that are desirable for optimal learning opportunities in the classroom. Items such as headphones, or a reflection solution that allows for all students to see what is happening on the iPad screen, enhance the learning experience, but are not mandatory. Each classroom will have to assess their learning needs and decide what elements are necessary for learning opportunities to be most successful.

<table>
<thead>
<tr>
<th>Product</th>
<th>Purpose</th>
<th>Estimated Price</th>
<th>Web resource</th>
</tr>
</thead>
<tbody>
<tr>
<td>VGA adapter</td>
<td>-connects the iPad to the projector or</td>
<td>$55.00</td>
<td><a href="http://store.apple.com/a/product/MHD22ZM/A/Airplane-in-vga-adapter">http://store.apple.com/a/product/MHD22ZM/A/Airplane- in-vga-adapter</a></td>
</tr>
<tr>
<td>Apple TV</td>
<td>-wirelessly streams iPad content to the</td>
<td>$109</td>
<td><a href="https://www.apple.com/ca/apple">https://www.apple.com/ca/apple</a></td>
</tr>
<tr>
<td>Apple iPad case</td>
<td>-protective case</td>
<td>$40.95</td>
<td><a href="http://store.apple.com/a/search/iPad-Air-case5">http://store.apple.com/a/search/iPad-Air-case5</a></td>
</tr>
<tr>
<td>Headphones (with or without microphones)</td>
<td>-listening/voice recording</td>
<td>$10-$50</td>
<td></td>
</tr>
<tr>
<td>Otmo Game System</td>
<td>Gaming system that allows for physical play</td>
<td>$100</td>
<td><a href="https://www.playotmo.com">https://www.playotmo.com</a></td>
</tr>
</tbody>
</table>
Another resource in the course section *Introducing iPads to the Classroom* falls under the heading Taking Care of the iPad and includes a video designed for young learners entitled iPad Do’s: Taking Care of the iPad in the Classroom. This independent video reminds young learners that iPads are a tool for learning that they must help take care of by reminding them to have clean hands, use two hands to carry the device, use ‘butterfly’ or gentle touches to manipulate the screen and to sit down when appropriate to work with the device. These reminders indirectly support the teacher by pointing out that what is obvious for the adult, can be new knowledge for the young learner and that we must demonstrate how to use touch sensitive devices. Although many young learners come to school with a wealth of knowledge, not all have access to iPad technology. Puerling, (2012) reminds us that as technology continues to transform our daily lives, teachers need to prepare themselves, and the children they teach, for the skills they will need to participate in a digital society. This can begin by teaching students to care for and respect the device as a tool for learning, rather than a toy.

Suggested Apps for the Kindergarten Classroom (Figure 7) recommends creation applications that promote open-ended learning for differentiated instruction where creativity, problem-solving, and higher order thinking skills are promoted. Highlighted are suggested tools for creation, tools for learning and tools for publication and sharing. The New London Group emphasized that text is no longer the single mode of literacy; image, graphics, video, song, speech, gestures, visual design and text work together to constitute the multi-literacies (The New London Group, 1996). The intent of these app suggestions is to assist teachers in streamlining the over 1.4 billion Apple apps to choose applications that are useful for classroom learning and exemplify learning concepts outlined in Achieving Excellence (2014). These applications, when
**Figure 7.** Apps for the Kindergarten Classroom: A suggestion of creation apps, learning tools and publication/sharing apps that, when coupled with intentional learning activities, can provide opportunities for enhanced creativity, collaboration, and communication while enabling the class to connect to the home and the community.
coupled with intentional learning activities and goals, have been selected for their ease of use, creativity, ability to share and to save, their friendly interface and appeal to students and educators.

To guide teachers in selecting apps for the classroom, an instructional poster to assist educators in reviewing applications has been provided (Figure 8). Apps are considered “Go” apps if students can create and produce content with the app, share and save their products easily, are considered open-ended and encourage teachers to rethink and improve their task design due to the functions of the technology. Apps considered ‘Stop’ apps are those that are lite versions, have in-app purchases, or mimic flashcards or worksheets where there is no creativity or higher order thinking skill involved. Research informs us that by providing well planned, developmentally appropriate opportunities to create, collaborate, communicate, solve problems and use critical thinking skills we are empowering and engaging students in their learning (Fullan, 2010; NAEYC, 2012; Robinson, 2010; Wagner, 2012).
There are over a million apps that are available for the iPad. Please check the LDSB app catalogue to ensure that the functions and purpose your requested app are not already available in another app format.

Apps should be chosen for their ability to create, collaborate, share, and produce content, that will grow with the student.

**“Go” Apps:**
- Students can create and produce content with the app.
- Students can share and save their products easily.
- Learning can grow along the SAMR continuum with this app.
- Engages students in the higher order levels of Bloom’s taxonomy:
  - Creating
  - Analyzing
  - Evaluating
  - Applying
  - Understanding

**“Stop” Apps:** Avoid apps that are:
- “lite” version
- have in-app purchases,
- are flashcard type or digital worksheets that do not grow with student learning. These type of free apps are great to recommend for home use to compliment classroom instruction.

Check YouTube videos to learn about the full function of the app.

Figure 8. Evaluating Apps; Encouraging educators to be critical consumers of iPad applications before introducing them to the classroom. Criteria such as opportunities for creativity, collaboration and communication, appropriate sharing and saving options and open-ended learning is encouraged.

**Section 3 – Classroom Activities.** This section includes three subsections; Fundamental Principles, Using Creation apps and Using QR codes in the Classroom. All sections have considered the research in their design to provide meaningful and relevant activities that are directly connected to the curriculum for immediate use in the classroom, or at home.
The Fundamental Principles section (Figure 9) clearly connects the Six Principles, Big Ideas and Overall Expectations found in the Ontario Kindergarten Program (2010-11). Consideration to the six student standards of the International Society for Technology in Education (ISTE) have also been embedded in the attempt to show educators the relevance of this learning. The following documents - Ontario Kindergarten Curriculum, 2010-11; Achieving

![Image](image_url)

**Fundamental Principles**

The classroom ideas included in the course are based on the Six Principles, as well as the Big Ideas and Overall Expectations of the Ontario Kindergarten Program. Consideration to the six student standards of the International Society for Technology in Education (ISTE) have also been embedded.

The Ontario Ministry of Education Full Day Kindergarten document is based on six principles:

**Principle 1:** Early childhood development sets the foundation for lifelong learning, behaviour and health.

**Principle 2:** Partnerships with families and communities strengthen the ability of early childhood settings to meet the needs of young children.

**Principle 3:** Respect for diversity, equity, and inclusion are prerequisites for honouring children’s rights, optimal development, and learning.

**Principle 4:** A planned curriculum supports early learning. (The Full-Day Early Learning Kindergarten Program, 2010-11, p. 2)

**Principle 5:** Play is a means to early learning that capitalizes on children’s natural curiosity and exuberance.

**Principle 6:** Knowledgeable, responsive educators are essential.

The ISTE (International Society for Technology in Education) Standards for Students (2007) are based on six themes.

1. Creativity and Innovation
2. Communication and Collaboration
3. Research and Information Literacy
4. Critical Thinking, Problem Solving, and Decision Making
5. Digital Citizenship

*Figure 9. Fundamental Principals; Connects the Fundamental Principles outlined in the Ministry of Ontario Full Day Kindergarten Curriculum (2010-11), the ISTE standards for students and teachers (2014), and the NAYCE position statement (2012) to provide researched relevance and frame the ‘why’ in learning with technology.*
Excellence, 2014; ISTE Standards for Students, 2014; ISTE Standards for teachers, 2014 and NAEYC position statement, 2012 - are included to support this section for teacher reference in helping to frame and provide background to the adult learner.

The second subsection, *Using Creation Apps*, houses nineteen resources (six activity guides, six instructional videos, six app links, and one app suggestion list) for teachers to use immediately in the classroom. Creation apps allow for students and teachers to use authentic classroom photos, student voice and imagination to help consolidate and document learning. They promote a responsive learning environment that allows for differentiated learning goals and open ended creativity. Collaboration on these applications allows for students to further develop social-skills and self-regulation skills; two key areas of focus in the Full Day Kindergarten program (2010-11). Creation apps require well-planned teacher instruction, scaffolding of learning and offer opportunities to teach multi-literacies.

The six open-ended creation apps included to help promote and enhance literacy instruction are Book Creator, Draw and Tell, Sock Puppet, Scribble my Story, 30 Hands and Shadow Puppet. A poster activity guide for each of the six creation applications provides an overview of the app, a short video tutorial to build app knowledge, multiple classroom ideas and activities to extend pedagogical practices, and direct connections to the literacy component of the Full Day Early Learning Kindergarten document (2010-11). Creation Activities for the Classroom (Figure 10) is an example of the Book Creator activity guide. All others follow a similar format.
Figure 10. Creation Activities for the Classroom; An example of one of the six activity guides for educators that highlights a creation app and assists them in aligning developmentally appropriate classroom activities to the curriculum. Open-ended activity suggestions are provided along with a link to a tutorial video on how to use the basic features of the app. Emphasis on modelling learning in a whole group setting before using as a centered activity allows for digital citizenship, app expectation and basic app use to be internalized so that the learning focus is on communication rather than on app use.
The third subsection of *Classroom Activities* discusses embedding QR codes into lesson design for easy access to age appropriate content, including audio instructions, to empower students and help them to be self-directed and independent in their learning. The course includes scaffolded tutorial videos to instruct educators on how to create QR codes to deliver content, and how to create instructional voice recordings that can be accessed through a QR code. Video tutorials for adults seem an acceptable method of gaining new knowledge because they require some amount of internal motivation to learn, are self-directed, timely, content specific, repetitive (if required), and levelled – all qualities deemed desirable in adult learning theory (Merriam & Bierema, 2014). To accompany the tutorials, examples of centre-based learning activities that use QR codes for audio instruction and content acquisition are included. An example of this is included in an ‘I Wonder’ station (Figure 11). Other activities included are thirty-seven popular story books that will be read to the student when the code is scanned. This helps young learners to enjoy stories while practicing early reading strategies and concepts of print without the direct support of an adult. QR codes also provide an easily accessible connection for kindergarten students to engage in authentic learning and inquiry as they connect to live animal cams, once again empowering the student to self-direct their learning (Figure 12). By sharing these example activities and providing the tutorials on how to create more authentic activities, it is the hope that educators in FDK will themselves become empowered to rethink their lesson designs to incorporate this type of learning. Bailey & Blagojevic, (2015) remind us that the use of technology in developmentally appropriate and intentional ways can extend and support active hands-on, creative and authentic literacy experiences.
Figure 11. Centre-based Learning Audio Instruction; An example provided to educators of centre-based learning audio instructions and content acquisition. By providing examples, along with tutorial videos on how educators can create their own audio and content QR codes, educators can see the possibilities and begin to create their own learning stations based on the individual needs and interests of their students.
Figure 12. Centre-based Learning QR Codes; An example of using QR codes for young students to easily access inquiry based learning live animal cams. Educators would then provide journaling opportunities for students to document their observations, compare and discuss findings and make predictions.
Section 4 – Connecting to Home. Subsection One, Technology at Home, refers directly to Principle Two from the Full Day Early Learning Kindergarten Program, “partnerships with families and communities strengthen the ability of early childhood settings to meet the need of young children” (2010-11). Prepared information pamphlets for using technology at home to support classroom learning are included for educators to send home with parents. As well, resources to support a Technology in Kindergarten parent night that would possibly help connect the home to the school by sharing the vision for learning with technology have been provided, including an advertisement poster and a parent hand out for Creation Activities to do at Home with your Child (Figure 13). This activity guide assists parents in working with their child to promote safe online use, model proper citizenship etiquette and create conversation at home by using open ended creation apps, rather than flashcard based consumption apps. Sharing meaningful uses of technology to extend school learning to the home, can be an extremely worthwhile way to engage parents and foster a home to school connection. The importance of which is supported in the research (Hollandsworth, Dowdy and Donovan, 2011; Lankshear & Knobel, 2006; Plowman, McPake & Stephen, 2008; Ribble, 2010).
### Creation Activities to do at Home with your Child

| Shadow Puppet EDU          | • Take pictures of a sequenced activity (making dinner, building a tower with blocks) have your child retell the sequenced activity.
|                           | • Have your child take pictures of important people in their life. Introduce each person and tell something interesting about them.
|                           | • Photograph number sets (5 toy dinosaurs, 4 socks) and have them tell all they know about numbers.
|                           | • Pull web photos from the Shadow Puppet web library and research any topic of interest.
|                           | • Pull photos from the map search and learn about your community.
| (Make videos to share ideas, explain thinking, tell stories, sequencing events, explore numbers, or research animals or communities) |

| Scribble My Story          | • Begin with the template stories. Encourage detail in pictures to match the words. Encourage using more than one colour.
|                           | • Work with your child to build their own stories in a blank book. Write the main ideas for them and work toward encouraging initial letter sounds, ending sounds. Have them begin to find these letters on the keyboard with assistance.
|                           | • Demonstrate mathematical thinking using pictures, numbers and symbols.
|                           | • Practice reading skills by rereading your child’s stories that you have created with them.
| (Create pictures to match the template stories, encourage detail and imagination in drawings, move toward creating their own story ideas, work on beginning letter sounds and identifying them on the keyboard) |

| Sock Puppets              | • Create your own educational videos with your child singing favourite songs, ABC songs or counting rhymes. Re-watch for further reinforcement.
|                           | • Talk about feelings, to help express emotions through puppet dialogue.
|                           | • Retell a favourite story, television show or family event.
|                           | • Practice asking questions and answering them in a two way dialogue with your child.
| (Create lip-synced dialogue to retell a favourite story, express feelings and emotions through puppet plays, create social stories) |

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Figure 13. Creation Activities to do at Home with your Child: An example of assisting in connecting the school to the home by continuing the school learning in the home. Creation activities using free apps that encourage parents to work with their child to encourage dialogue, creativity, and problem solving while modelling proper online use are highlighted and form the basis for a parent technology evening.
Supporting this idea of connecting the school to the home, subsection two, *Social Media in the Classroom*, discusses uses for social media (Twitter and YouTube) to connect to the home,

*Figure 14. How to Create your own YouTube Channel; An example of an instructional resource for educators to create their own YouTube channel for uploading and sharing classroom work to keep devices clear of content and to connect with families and the community. An instructional resource for teachers and parents to sign up with Twitter is also provided within the course.*
school community, experts or other FDK classrooms, as well as connecting educators with each other as they form professional learning networks. Course posts include instructional resources for educators to help themselves, their classrooms and their home community to become connected through Twitter and YouTube. Sharing classroom work to Twitter and YouTube gives the parent an eye into the classroom to help promote conversation at home. The included resources in this subsection support using social media in the classroom to offer a relevant and authentic platform for educators to model how to engage in online spaces, use accountable talk, use technology with a learning purpose, and to be productive online citizens (Collier, 2007).

How to Create your own YouTube Channel (Figure 14) is an example of one of the resources included to connect through social media. Theory suggests that adult learners are self-directed and will therefore search out opportunities to learn online, if knowledgeable in the platform (Fidishun, 2000; Merriam & Bierema, 2014). Once teachers are connected through Twitter, it can open up new opportunities for learning within the classroom and an opportunity for educators to develop personal learning communities (Cercone, 2008) as well as connect to the home.

**Section 5 – Teacher Resources.** The Teacher Resources section includes four subsections to address Guided Access, AirDrop, Digital Literacy and Tips and Tricks and is currently the final section in this fluid course.

Although working with a child when using technology is best practice, it is not always possible to do so. The Guided Access feature on the iPad assists with allowing the educator, or parent, to control what applications their child is working in, and have the student directed to remain in that one app. The two short tutorial videos describe how to access this feature, set the passcode and use it in application such as YouTube to protect students from inappropriate online
content, when the adult is not able to work directly with the student. Guided access encourages self-regulation by encouraging students limit their screen time when they have lost interest in the guided time on the iPad, rather than skipping to a new app. This is a key feature built into the iPad device to assist in keeping learners safe online.

A second helpful resource for teachers is the ability to use AirDrop for sharing and saving work. AirDrop allows educators to move content from one iPad device to another. This is useful in simplifying the process to collect student data onto one device for sharing to social media, e-Portfolios or reflecting student work to the entire class on a projection screen. The two minute tutorial video can be reviewed as many times as required by educators.

The subsection Digital Literacy Matters gives insight to choosing developmentally appropriate search engines for children. Using kid friendly engines, such as Google powered KidRex, enhances and encourages Internet based inquiry and research in the kindergarten classroom and at home. The tutorial video and classroom poster, Safe Online Searches for Kids (Figure 15), demonstrate how to upload the search engine to the face of the iPad device for one touch access to this safe search engine. The idea, outlined by Lankshear and Knobel (2006), is to empower young students, rather than restrict them from using the Internet. Age appropriate search engines assist in teaching the skills needed for navigating the online world safely and critically (Hollandsworth, Dowdy and Donovan, 2011) and are demonstrated to educators in video tutorials that assist them in uploading these engines to the face of the device for easy student access (Figure 16).
Figure 15. Online Searches for Kids; Instructs educators on using appropriate search engines for children and how to upload them to the face of the device. This allows students to safely work towards becoming self-directed online researchers.
Figure 16. Online Searches for Kids Video Tutorial; Captures a video tutorial that walks educators through the process of creating a shortcut (app) for easy access to a safe search engine. Educators can watch this as many times as necessary, and post questions to the discussion area if still unsure. By including the instructor video in the bottom corner, the attempt is to create a connection with the adult learner making learning more personal.

The FDK education teams can often pull internet photos for class inquiries. Educating teachers to properly cite photo sources encourages them to properly model digital citizenship and digital literacy skills for students beginning at a young age. The iTunesU course contains classroom posters and tutorial videos for educators to guide them in modelling how to research images from a public domain location, teaching students about copyright, even at a young age. By encouraging educators to use sites such as Photos for Class (Figure 17) or Creative Commons (Figure 18) we are modelling for students and teaching them to be digitally literate.
Figure 17. Researching Images – Photos for Class; A poster instruction for educators to assist them in citing photo sources. A video tutorial that allows teachers to follow directions and to be viewed as many times as necessary accompanies this resource. The intent is for educators to become familiar with this platform and model for students elements of digital literacy and digital citizenship.
Figure 18. Researching Images – Creative Commons; Encourages teachers to practice digital citizenship and model this for students when selecting images from online to use in projects. Giving teachers knowledge about public domain, citing sources, and copyright issues allows them to demonstrate proper online literacy skills to students, even at a young age. Tutorial videos accompany this poster.
The final subsection is a growing list of Tips and Tricks (Figure 19) to assist with successful integration of iPad technology in the classroom. Understanding the potential of the device will allow teachers to apply their pedagogical expertise to create new and exciting ways

Figure 19. Tips and Tricks; A fluid list of tips and tricks that will continue to grow with new learning and course discussion.
for students to communicate their learning. Opportunity for discussion and questioning, as adult learners self-direct through this course, makes this online platform authentic and meaningful for personal adult learning. Online learning respects the knowledge and experience that adult learners bring to the platform and allows them to self-select the modules that are relevant for them, at a time and pace that is appropriate for them (Cercone, 2008; Fidishun, 2000).
CHAPTER 4: LIMITATIONS AND DISCUSSION

It seems that school boards have often been criticized for providing technology hardware without providing relevant, timely and meaningful professional learning. Teaching with technology to enhance learning outcomes and deepen learning experiences requires a shift in pedagogical beliefs, values, assumptions, traditions and mindsets (Cuban, 2010; Baylor & Richie, 2002; Dweck, 2006; Ertmer & Ottenbreit-Leftwich, 2010; Fullan 2010; Kenaya et al., 2005). Not all educators are ready for this shift. The humanistic approach to adult learning assumes that the learner desires to have personal growth and development, that self-actualization is sought after and that the learner is highly motivated and self-directed (Merriam & Caffarella, 1999; Merriam & Bierema, 2014). This may not always be the case. To combat this limitation, andragogy suggests that relevant and timely problem-centered learning that explicitly outlines the reasons for new learning in a climate that physically and psychologically respects the learner will lead to motivation and engagement (Merriam & Bierema, 2014; Knowles; 1980, 1984). By scaffolding the learning into short tutorials (all are under three minutes), as recommended by Fidishun (2000), this course structures learning into short segments in order to assist learners who may wish to be passive in their learning experience to become more self-directed. Fidishun (2000) states “short, directed, concrete online tasks that provide the most learning for the experience to make these adults see the relevancy of online learning” (p. 4). However, andragogy also emphasises the adult’s life experiences as a rich resource for learning. If a learner is close-minded about technology integration because of negative prior experiences, this may be a roadblock to new learning. Likewise, if school leadership is not supportive in this new types of learning, the culture of learning within the school is likely to stay stagnant (Baylor and Richie, 2002; Leu et al, 2004). This is where the ‘why’ in learning needs to be explicit, along with time
for critical reflection, so that shifts in pedagogical beliefs and mindsets can occur. Positive learning communities (Wenger, 1998) can also help to shape and shift mindsets towards new ways of learning (as read in Merriam & Bierema, 2015). If the culture of learning, or the mindset of the educator is not on board with learning through technology, then professional learning opportunities, either face-to-face or supplemental online supports, will not be successful.

Although the research for this project lies heavily with teacher learning, the course itself has been shaped to address teacher learning through authentic teaching with technology in FDK settings. By providing examples to ‘get the FDK team started’ along with the tutorial videos to empower their own learning, the educational team can create their own learning activities specific to the needs and inquiries of their students. The FDK team can work towards a developmentally appropriate learning environment that is creative, communicative, collaborative and connected with the assistance of iPad technology. Each section of the course, Course Goals, Introducing iPads to the Classroom, Classroom Activities, Connecting to Home, and Teacher Resources is supported with research from the four themes that emerged: Effective Technology Integration in the Early Years, Designing Effective Professional Learning for Teachers, Shift in Culture within a School and Shift in Mindset.
CHAPTER 5: CONCLUSION

The Ministry of Education is committing to technology rich learning environments for students and teachers as part of their new vision for education (Achieving Excellence, 2014). Teachers require relevant, content specific and timely learning opportunities for successful integration of this technology to revolutionize education (Cuban, 2013; Ertmer and Ottenbreit-Leftwich, 2010; Fullan, 2010; Kenaya, 2005; Baylor and Richie, 2002). In considering how to design online supports to supplement face-to-face learning in the Full Day Kindergarten classroom, four themes in research emerged; Effective Technology Integration in the Early Years, Designing Effective Professional Learning for Teachers, Shift in Culture within a School and Shift in Mindset. This research was re-examined under the adult learning theory of andragogy in an attempt to most effectively meet the needs of experienced and professional adult learners.

This project artifact focuses on the creation of a professional development resource (iTunesU course) where the intent is to supplement face-to-face professional learning and thereby bridge moments when direct support for the FDK team is not possible. Course design attempts to reflect and consider the research suggestions and findings. Tutorials are designed to build self-efficacy and moral among teachers, increase knowledge, cultivate pedagogical beliefs and begin to create a culture of learning where technology is widely accepted and infused into effective teaching practices (Ertmer & Ottenbreit-Leftwich, 2010). The platform encourages an online learning community through the discussion board and allows for private messaging with the instructor, if required. When adult learning theory is integrated into the design of technology-based professional learning environments, not only are the technological needs of the
learner met but the requirements of adult learner needs are also met, allowing for a more successful experience for the adult learner (Fidishun, 2000).

We must consider the increasing significance of digital literacy skills in our ability to navigate, consume, curate, and create in an online world; how this effects our own learning and the learning of those that we teach. “There is little doubt that the technology infused lives of today’s learners is shaping not only the context of learning, but the learning itself” (Merriam & Bierema, 2014). Integrating technology into the FDK classroom for deep learning experiences requires well thought out, well planned, well researched, well executed and well reflected professional learning for practicing teachers. Andragogy informs us that opportunities to learn need to consider the experience of the learner, their ability to be self-directed, their knowledge, efficacy, mindset, pedagogical beliefs, and school culture. The learning experience needs to be flexible in providing supports that are timely, relevant, authentic and reflective if a revolution of pedagogical educational practices is to occur. Online learning allows for these criteria to be met while meeting different learning styles. Fullan (2010) suggests that new learning systems must meet four criteria for success. The integration of technology and pedagogy must be “irresistibly engaging, elegantly efficient, technologically ubiquitous, and steeped in real-life problem solving” (p. 33). I have attempted to build this professional learning resource on the same four criteria outlined by Fullan, yet have also considered implications for experienced adults learning in an online environment. It is the hope that by designing an online professional learning opportunity with this criteria in mind, combined with the underpinnings of the research, successful integration and pedagogical change within a system will become visible.

Learning through technology is a continuous and exciting journey. “Education will continue to evolve from traditional models, roles and practices to new and emerging ones that
integrate new technologies. Accordingly, technological professional development must be seen as forming a career-long continuum (pre-service, in-service and lifelong) according to Twining et al. (2013). By aiming to provide necessary supports that will assist in creating school cultures that embrace technology, pedagogy and change knowledge (Fullan, 2010), Full Day Kindergarten classrooms will continue to prepare their students and families for a successful future by “giving them more opportunities at a young age” (Full Day Early Learning-Program, 2010-11). From the Achieving Excellence document (2014) the goals of achieving excellence, ensuring equity, promoting well-being and instilling public confidence will be well on their way to being achieved.
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