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Perceptions, Beliefs and Practices about Technology among Teachers in a Jamaican Infant School

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Perceptions, Beliefs and Practices about Technology among Teachers in a Jamaican Infant School

by

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Dedication

This project is dedicated to my mother, Agatha Kelly, who continues to be by cheerleader, motivator, and intercessor. Also to my late father, Owen Kelly, who taught me to sing Bob Marley's "No Woman No Cry" (Please do not cry) during tough situations. My husband, John Williams, is the wind beneath my wings. I also dedicate this project to my siblings and their children; I have paved the way for generations to follow.

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Abstract

The purpose of this interview study was to describe and explain perceptions, beliefs, and practices about technology among four teachers at a Jamaican infant school, by answering: What are teachers' perceptions and beliefs about the role of technology in young children's learning? What are the practices regarding technology among Jamaican infant school teachers? I used criterion sampling to identify participants for my inquiry. For data collection, I used semi-structured interviews, teachers' lesson plans, and my reflective journal. I applied a socio-cultural approach (Rogoff, 1990) for the data analysis to make sense of the teachers' perceptions and articulated practices. The findings indicated the teachers' appropriation of technology for knowledge building. The teachers also perceived technology as a tool of instruction to replace charts for curriculum content. The teachers believed technology augment children's readiness skills for first grade. The teachers' envisioned affordances of technology indicated their articulated practices for children's appropriation of technology. The findings also indicated the actual and envisioned barriers that challenged teachers' facilitation of the child as agent with technology in the Jamaican early childhood classroom. The findings indicate the importance of understanding the cultural context of teachers' practices with technology and provide implications for technological innovations in Jamaican classrooms. Information and communication technology for development (ICT4D) is a cultural activity to be explored with teachers, students, and their social partners in institutions of practice.

Chapter One: Introduction and Rationale

Introduction

The early childhood years (birth to age eight) of a child's life are considered the most crucial years for development of life skills (Davis, 2009). These early years are considered foundational for acquisition of skills later in the child's life. Research in early childhood education and child development has covered areas such as cognitive development (Seifert, 2006), peer relations and social competence (Ladd, Herald, & Andrews, 2006), children's morality (Johansson, 2006), emotional development (Denham, 2006), motor development (Gallahue & Ozmun, 2006), and creativity (Runco, 2006). There are windows of opportunity for children's total development in the first five years, which has resulted in increased focus on early childhood education globally.

The global focus on early childhood education has become increasingly more popular in educational research. One area of increased focus for researchers is the integration of technology into young children's learning (Barron et al., 2011; International Reading Association, 2009; National Association for the Education of Young Children [NAEYC] & the Fred Rogers Center for Early Learning, 2012; Parette, Quesenberry & Blum, 2010; Rideout, 2011). This debate has shifted from whether it is developmentally appropriate to use computers with children to focus on the appropriate use of information and communication technology for children birth to eight years of age. The NAEYC (2012) position statement on technology outlines guidelines for the use of technology with children. The teacher is viewed as an important decision maker in the what, why, and how of technology for children (Barron et al., 2011; NAEYC, 2012; Puerling

2012; Simon & Nemeth, 2012). Further, the teacher is key to effective and appropriate use of technology with young children. According to Barron et al. (2011), teacher educators must direct much of their effort toward in-service teacher preparation and support. An exploration of teachers' perceptions, beliefs, and practices regarding technology is warranted to support the appropriate use of technology in the early childhood classroom. The value teachers place on technology for young children's learning will influence their pedagogic choices for integrating technology in the classroom.

Early childhood education has also emerged in the literature on education for sustainable development. Early childhood education has an important role to play in education for sustainable development (Elliott, 2006). There is international consensus in the early childhood sector that lifelong learning begins in early childhood from birth and not in schools. Davis (2009) notes that there is a growing literature indicating that investments in human capital offer substantial returns and early childhood educators should begin engaging with sustainability.

Early childhood education is a crucial component of Jamaica's national development plan. There is emerging consensus in Jamaica, regarding the early years of a child's development as a crucial period where educators lay the foundation for the development of members of its society (Planning Institute of Jamaica [PIOJ], 2009). Jamaica's development plans include Vision 2030, which for long term planning recognizes early childhood development as a key strategic area for national development and for short term planning, treats this area as a priority for implementation (PIOJ, 2009). Therefore, there is need for empirical data about early childhood teachers' perceptions, beliefs, and practices about integrating technology into children's learning. This will help create local evidenced-informed practices regarding the use of technology with young children and capacity building for teachers.

Part of the global discussion on the use of technology in early childhood classrooms is the potential for information and communication technology (ICT) to serve as an agent of development (Sutinen & Tedre, 2010; Unwin, 2009). Information and communication technologies for development (ICT4D) researchers suggest that ICT has the capacity to improve various aspects of life and may be used to help poor and marginalized people achieve economic growth (Avegerou, 2010; Unwin, 2009). Unwin contends that ICTs have the potential to either increase inequalities or to reduce them, depending on the social, political, and economic contexts within which they are introduced. To determine the potentials of ICT in developing countries, Avegerou (2010) examined the cultural implications of technology innovations. ICT in developing countries is viewed as transfer of diffusion and socially embedded action; this action can either be a progressive or disruptive transformation. In keeping with the progressive transformative action of ICT in developing countries, acknowledgement of the research context is crucial to the adoption of technology innovations in developing societies (Avegerou, 2010; Selinger, 2009; Unwin, 2009). There is an ICT4D Jamaican based network organization, established to define, promote and facilitate the use of information and communication technology in the development process. ICT4D Jamaica believes that the secret to prosperity for all mankind lies in the effective use of information for learning and earning (Caribbean Information Society Portal, 2010). One of the ICT focus areas for ICT4D Jamaica is capacity building. Unwin (2009) described ICT4D as a shared agenda to determine how technology can be used to enable the empowerment of poor and marginalized communities. He also noted the importance of including cultural interpretations of the role of technology in the discourse and practices about ICT4D. My interest in the cultural interpretations and practices with technology is the impetus for exploring teachers' perceptions, beliefs, and practices with technology.

Statement of the Issue

Research in early childhood classrooms in Jamaica is in its infancy (Jones, Brown, & Brown, 2011) even though early childhood education in Jamaica has a rich history dating back to the early 1930's (Daley & Thompson, 2004). For example, the work of local pioneers, such as Henry Ward and Dudley Grant, influenced the conceptualization of teaching and learning for young children (Daley &Thompson, 2004). A dream of Dudley Grant and Henry Ward was to provide Jamaican children with learning experiences that stimulate their imagination and early literacy skills. Over the years the dreams were translated into various initiatives by the Jamaican government, through the auspices of the Ministry of Education (MoE), and have resulted in the transformation of the early childhood sector.

One example of this transformation occurred in 2003. The Jamaican Ministry of Education (MoE) established an educational technology resource center. The goal of this center was to facilitate the use of technology in primary schools in order to enhance students' literacy and numeracy skills (Ministry of Education, 2004). This initiative focused on primary aged children. The early childhood cohort served by the technology resource center includes children who are enrolled in first through third grade. Other education initiatives that focused primarily on early childhood aged children and fostered the use of technology included the launch of a Best Practices Guide for early childhood educators in Jamaica (Jamaica Gleaner, 2008) and the development of the Early Childhood Commission (Early Childhood Commission, 2009). Legislative functions of the commission (ECC) are to:Advise the Cabinet, through the Minister of Education and Youth, on policy matters relating to early childhood care and development (ECD), including initiatives and actions to achieve national ECD goals:

- Assist in preparation of plans and programs concerning ECD
- Monitor and evaluate implementation of plans and programs for ECD and make recommendations to the government
- Act as a coordinating agency to streamline ECD activities
- Convene consultations with relevant stakeholders as appropriate
- Analyze the resource needs of the sector and make recommendations for budgetary allocations
- Identify alternative financing through negotiation with donor agencies and liaise with them to ensure efficient use of the funds provided
- Regulate early childhood institutions; and
- Conduct research on ECD.

One notable initiative of the ECC was the design and implementation of The Jamaica Early Childhood Curriculum Guide: Four and Five Getting Ready for Life (Dudley Grant memorial Trust, 2010). This initiative led to nationwide training for teachers of children four to five years old in the effective implementation of the new curricula. This new curricula adopts an integrated design with a thematic approach to teaching and learning. The conceptual framework for the curricula is the emphasis placed on the teacher's role to enhance the learning experiences of young Jamaican children (Dudley Grant Memorial Trust, 2008). The advancement in technologies in this area presents untapped potential for teachers and their students.

Therefore, this untapped potential based in the advancement in technologies as applied to the new curricula of Jamaica warrants a study of early childhood teachers' perceptions, beliefs and practices with technology. More specifically, an interview study of teachers' epistemology regarding technology may initiate discourse regarding technology in Jamaican early childhood

classrooms. Further, such a study may also help support the Jamaican national strategic plan for early childhood development (ECC, 2009). One of the goals of the national strategic plan is to ensure that all children under the age of eight have access to high quality early childhood programs and services. These programs should ensure that children are critical thinkers, sociable, healthy, and ready for life (ECC, 2009).

To further ensure that Jamaican children are ready for life, this study challenged teachers to consider how technology has transformed the daily lives of young Jamaican children. "As technology continues to transform daily life worldwide, teachers need to prepare children for the technology skills they will need as they participate in society" (Puerling, 2012, p. 2). While technology research highlights potential for children's learning in Western and European societies (Barron et al., 2011), the Jamaican teacher's perspective is critical to contextualize the discourse about technology for the country's young children. Such a study was also pertinent because it may help position Jamaican teachers with a platform on which they may initiate a debate about re-conceptualizing early childhood education with contextually appropriate standards and practices. It was this researcher's hope that the Jamaican teachers' perceptions, beliefs, and practices with technology would shed light on their technological competencies and initiate a literature base for examining the potentials for ICT in Jamaican early childhood classrooms.

For the purpose of this study, early childhood teachers' use of technology applies to information and communication technologies such as desktop computers, digital cameras, audio and video recorders, overhead projectors, mobile technologies, and other electronic devices that enhance the teaching learning process (NAEYC, 2012). The use of technology in early childhood education is expanding with the advancement in computers, mobile technologies, Internet, and

software applications. The expanded use of technology with young children includes but is not limited to computers, tablets, e-books, multitouch screens, mobile devices, cameras, DVD and music players, audio recorders, electronic toys, games, and analog devices such as tape recorders, VCRs, VHS tapes, record and cassette players, and projectors (NAEYC, 2012). Technology influences children's interactions with their teachers and peers at school (Mohammad & Mohammad, 2012; Schuler, 2009). Social interactions between children working with technology depend highly on the teacher (Mohammad & Mohammad, 2012). An interview study of teachers' dispositions was able to shed light on teacher beliefs and practices about technology in the Jamaican context. This inquiry helped to fill the sparse literature on early childhood education in Jamaica and position teachers to understand their perspectives of the technology and the potentials for expanding the learning experiences of the children. The teacher is an important decision maker in the use of technology to enhance children's learning (Barron et al., 2012; NAEYC, 2012). The teacher's role is critical in thoughtful planning, implementation, reflection, and evaluation of decisions to guide the integration of technology into the classroom experience (NAEYC, 2012).

Purpose of the Study

The purpose of this study was to describe and explain perceptions, beliefs and practices about technology among four early childhood teachers in a Jamaican infant school. The research questions that guided my study were:

1. What are teachers' perceptions and beliefs about the role of technology in young children's learning?
2. What are the practices regarding technology among Jamaican infant school teachers?

Theoretical Framework: Socio-cultural Theory

Qualitative research is grounded in a conceptual framework that guides the questions to be asked about a research topic, the literature to be reviewed, the methodology for data collection, data analysis, and interpretation of findings (Merriam, 2009). Merriam views the theoretical framework as the stance researchers bring to their investigation. As an international student I am often struck by the cultural implications of a phenomenon for teaching and learning in the Jamaican context. As a result I employed a socio-cultural stance in order to critically assess the potentials of information and communication technology for a developing society such as Jamaica. In order to investigate the cultural implications of the technology, Rogoff's socio-cultural theory was applied to interpret the teachers' perceptions, beliefs and practices about technology. People develop as participants in cultural communities (Rogoff, 2003), and the teachers' perceptions, beliefs, and practices were interpreted based on their socio-cultural contexts. The Jamaican early childhood movement began as the grassroots efforts of local communities (Morrison & Milner, 1995), which makes it a good fit to investigate teachers' perceptions, beliefs and practices through socio-cultural lens. According to Rogoff, individuals' development can be understood only in light of the cultural circumstances of their communities. She proposed three interacting planes of influence: intrapersonal (individual), interpersonal (interactions among social partners), and community/institutional (contextual).

Rogoff (1990) used the terms apprenticeship, guided participation, and participatory appropriation to describe individuals' involvement across the interacting planes. Apprenticeship is the plane of community activity involving active individuals participating with others in culturally organized activity, which has as part of its purpose the development of mature participation in the activity by the less experienced people. Rogoff extends Vygotsky's (1978)

concept of scaffolding individuals across the zone of proximal development. Guided participation is the interpersonal plane where people communicate and coordinate efforts while participating in culturally valued activity. The participatory appropriation refers to how individuals change through their involvement in one activity or another, becoming prepared for subsequent involvement in related activities. As such, the teachers' perceptions, beliefs, and practices were not analyzed in isolation of their social context. I applied Rogoff's socio-cultural lens to the types of interview questions asked and the analysis of interview data. As we consider different ways of grappling with early childhood issues in Jamaica, Rogoff's socio-cultural theory provides a relevant lens from which to understand teachers' perspectives on issues related to curriculum, teaching, and learning with technology.

Tobin, Hsueh and Karasawa (2009) in their studies of preschools across three cultures highlighted the challenges of the relationship between continuity and change and the influence of importing ideas from abroad. The authors' ethnographic study focused on the centrality of culture in determining best practices within the context of preschools. "Preschools are institutions that both reflect and help to perpetuate the cultures and societies of which they are a part" (Tobin et al., 2009, p. 225). The Chinese, Japanese and US preschools had diverse values and expectations based on the cultural values of the communities. Tobin et al. (2009) contend that culture can act as a source of continuity and as a brake on the impacts of globalization. Chinese, Japanese, and American educators viewed early childhood practices differently and as such reiterate the point that there is no universal truth regarding best practices for quality early childhood programs across cultures.

Early childhood is a global phenomenon with cultural implications for curriculum, teaching, and children's learning and development (Rogoff, 2003). The ICT4D research

highlights the connections between technological interests and social change (Unwin, 2009). The main focus of ICT4D is on what should be done with technology and how it should be done in the unique context of developing countries (Selinger, 2009; Unwin, 2009). "ICT4D therefore has a profoundly moral agenda" (Unwin, 2009, p. 33), with emphasis placed on the needs of the people who stand to benefit from the technology innovation. The focus is not about the technologies themselves, but how the technology can contribute to the empowerment of communities. In the context of this study the cultural context of the teachers is crucial in shaping the possibilities, support, and affordances of technology as viewed by the teachers' epistemology regarding technology and young children's learning. The cultural implications of ICT should not be ignored, as this component is crucial to the shared agenda about ICT4D proposed by Unwin (2009).

Importance of the Study

Jamaica's public education for young children is provided in infant schools, the infant departments of some primary level schools, and basic schools (MoE, 2012). As a college instructor at Shortwood Teachers College, I have visited the schools regularly to supervise pre-service teachers in their field experience. I had access to the schools, and I was able to find four willing participants at one school site in the main urban area. Further, there is a preponderance of female teachers at the early childhood level in Jamaica, which means the female perspective is dominant in that context. In spite of the initiatives in the sector over the past ten years, we have not studied the teachers' perceptions, beliefs and practices to inform professional development or reforms for teacher education programs. Describing the teachers' perceptions, beliefs and practices may assist in the design of professional development models that meet the needs of teachers at the research site as they explore technology integration in their classrooms.

Jamaican teachers in early childhood classrooms may learn from the experiences of my research participants. Merriam (2009) notes, that the chances of finding research helpful are increased if the study included a setting similar to that of the reader. I am also hopeful that the study will provoke discussions about the need for a local ICT policy statement for early childhood classrooms as the ICT policy from the information and telecommunications department from the office of the prime minister has excluded early childhood education from that framework. The research was innovative as it addressed teachers' experiences using a qualitative approach that applied a socio-cultural framework to describe and explain teachers' perceptions, beliefs, and practices about technology.

I chose interviews because of my interest in the teachers' stories, and I recognized that I had limited understanding of Jamaican teachers' practices with technology (Seidman, 2006). As a result, I strived to understand their actions through this interview study, which has the potential to enhance the implementation of technology projects in their early childhood classrooms. With this in mind, purposeful sampling of an infant school was deemed as the best fit for an in-depth interview study on teachers' perceptions, beliefs, and practices about technology for children's learning. Infant schools are one of three types of early childhood programs offered on the island. According to Morrison and Milner (1995) infant and infant departments are pre-primary programs for four (4) to six (6) year olds. They also add that basic schools serve children three to six years old and are seen as substandard to the kindergarten and infant school classrooms. Parents pay exorbitant fees for their children's enrolment in kindergarten (Daley & Thompson, 2004). The kindergarten classrooms vary in quality but usually have more resources for teaching and learning. While you may find very few basic

schools with computers, kindergarten classrooms and some infant schools usually have a computer lab or a computer center with one or two desktop computers.

Historically, infant schools in Jamaica are the oldest type of formal schooling for children four to six years old. The British Infant School model developed by Robert Owen influenced the infant schools. Formal schooling for young children in the early 19th century focused on children four to six years old in an attempt to get them ready for first grade. While some teachers in the basic school and kindergarten classrooms might not have a teaching diploma, all infant school teachers across the island are trained and they are expected to be the mentors for their colleagues in neighboring basic schools. Majority of the basic schools might have one trained teacher, which would require a study of multiple sites and a myriad of variables to consider for data analysis. The infant school teachers are positioned to make a great impact on their colleagues in basic and kindergarten classrooms.

Research Design

Socio-cultural researchers, such as Tobin et al. (2009), used interviews to understand participants' experiences in early childhood classrooms. Tobin's (2011) ethnographic study of early childhood education has highlighted the need for addressing cultural implications of best practices for early childhood classrooms. Vanderline, Dexter and van Braak (2012) used an in-depth interview study to explore teachers' perceptions of a new ICT curriculum in Belgium. Other researchers have also applied a socio-cultural perspective to the investigation of information and communication technology to enhance children's learning in preschool (McPake, Plowman, & Stephen, 2012; Plowman & Stephen, 2007; Stephen & Plowman, 2008).

My data sources were in-depth interviews and selected classroom documents, which included, but were not limited to such things as a teacher's lesson plan. I conducted in-depth

interviews with four female teachers who were using technology with the new curriculum for five year olds. The teachers targeted for this study were from a large metropolitan area, where a number of private companies often donated used computers for school computer labs. I conducted three separate interviews for each participant and limit the interviews to no more than one hour per session. Seidman (2006) suggests a three interview series, which include focused life history; details of the experience; and reflection on meaning. I analyzed interview transcripts for emerging categories. The second interview of each participant was used as follow up to themes that emerged from the first rounds. The third interview focused on participants' reflections on the meaning of their experiences with technology for young children's learning. Another source of data was my researcher reflective journal. The researcher reflective journal served as a meditative focus to refine ideas and deepen self-awareness (Janesick, 2011). My researcher reflective journal was also used to keep check of my biases and assumptions to ensure transparency and credibility.

Definition of Terms

The following terms were used throughout the study. These definitions were attained from review of the literature in Chapter Two:

Technology This term is used to refer to information and communication technology such as desk top computers, computer software, digital cameras, overhead projectors, mobile technologies (smart phones, tablets), audio cassette players, video recorders, and other electronic devices that enhance teaching and learning (NAEYC, 2012).

ICT Information and communication technology

ICT4D	Information and communication technology for development (ICT4D). The term refers to the opportunities of ICT as an agent of development (Sutinen & Tedre, 2010).
TPACK	Technological Pedagogical Content Knowledge; the thoughtful weaving of all three key sources of knowledge: pedagogy, technology, and content (Mishra & Koehler, 2006).
Digital Divide	Term used to describe the differences among use and access to technology and the ability to produce or to effectively use ICTs due to cost, lack of training, and opportunity to use ICT (Avegerou & Madon, 2005).
Digital Literacy	Digital literacy refers to having fluency with digital hardware and software technologies in order to access, control, and create information, as well as having information literacy skills to ask questions, find and use relevant information, and to critically evaluate the credibility of information on the Web (Edutopia, 2013).
Media Literacy	Media Literacy is a 21st century approach to education. It provides a framework to access, analyze, evaluate, create and participate with messages in a variety of forms — from print to video to the Internet. Media literacy builds on an understanding of the role of media in society as well as essential skills of inquiry and self-expression necessary for citizens of a democracy (Center for Media Literacy, 2011).
Basic School	A type of early childhood institution in Jamaica owned by the community (church, or private individual) that caters to children three to five years

old. The parents are charged a fee and teachers' salaries are subsidized by the government (Morrison & Milner, 1995).

Infant Department A type of early childhood institution in Jamaica owned by the state and attached to a primary school. The infant department caters to children four to six years old. The principal of the primary school is responsible for the infant department attached to his/her school (Jones, Brown, & Brown, 2011).

Infant School A government funded program for Jamaican children four to six years old. The infant school is independent of a primary school and has its own principal and board of directors (Morrison & Milner, 1995).

Kindergarten Jamaican Kindergarten is a privately owned early childhood program and caters to children three to six years old (Jones et al., 2011).

Diploma The certification awarded to Jamaican teachers upon completion of the three year college program in early childhood education.

ECC **Early Childhood Commission -**The governing body with responsibility for the supervision and regulation of early childhood institutions in Jamaica (ECC, 2009).

Delimitations and Limitations

The four participants were selected from one school in the metropolitan region of Jamaica. The purpose of the study was to describe and explain the teachers' perceptions, beliefs, and practices about technology in a Jamaican Infant school. Interview studies are used to

describe cultural, historical, social, and material contexts of the participants' lives (Kvale & Brinkmann, 2009). While the interview statements can relate to the broader social and economic context of Jamaican teachers, the perceptions, beliefs and practices of teachers at the research site are not representative of teachers in other infant schools across the island. The teachers' perceptions, beliefs, and practices were shaped by the unique context and available resources of their school, hence the need to interpret the data based on those contextual factors. Further limitations also exist for the other forms of early childhood programs on the island. The Jamaican programs for children three to age six are of four types (infant school, infant department, basic school, and kindergarten). Each program type has its unique structure, criteria for teacher qualification, and availability of technology resources. The level of access that teachers and students have to technology at other sites must be considered when attempts are made to relate interview statements to other early childhood institutions in the country. Another limitation is the nature of knowledge that will be produced from the interview study (Kvale & Brinkmann, 2009). The hermeneutic principle of qualitative research suggest that interpretation depends on the cultural context in which it was originally created as well as the cultural context within which it is subsequently interpreted.

Chapter Summary

In this chapter I provided an introduction and rationale for the interview study on perceptions, beliefs, and practices about technology among teachers in a Jamaican infant school. I provided the context for the study as well as a rationale and purpose for the interview study. I explained the theoretical framework, Rogoff's socio-cultural theory and a brief introduction of the research design for the study.

In Chapter Two I present a review of related literature on the topic. I cover categories including the context of the inquiry, technology and young children, technology and the teacher, and reports on technology for teachers of young children. Chapter Three describes the methodology for the study and outlines the data sources and methods of data collection. A description of how data were analyzed is provided for transition to chapter four. Chapter Four is the presentation of the data and analysis of findings to respond to the study research questions. Chapter Five is the data analysis, discussion, conclusion, and recommendations.

Chapter Two: Literature Review

Introduction

The purpose of this study was to describe and explain the perceptions, beliefs, and practices about technology among selected early childhood teachers in a Jamaican infant school. The questions that guided this study were:

1. What are teachers' perceptions and beliefs about the role of technology in young children's learning?
2. What are the practices regarding technology among Jamaican infant school teachers?

In this literature review I explore the following areas: Jamaican context, early childhood for sustainable development (ECEfSD), ICT4D, information and communication technology in early childhood classrooms, technology and the teacher with an emphasis on the Technological Pedagogical and Content Knowledge (TPACK) framework, and the socio-cultural theoretical underpinning of the study. I selected these categories because they were the themes for the literature I reviewed regarding the phenomenon under inquiry and the context in which the inquiry took place. Figure 1 provides a visual representation of the literature review.

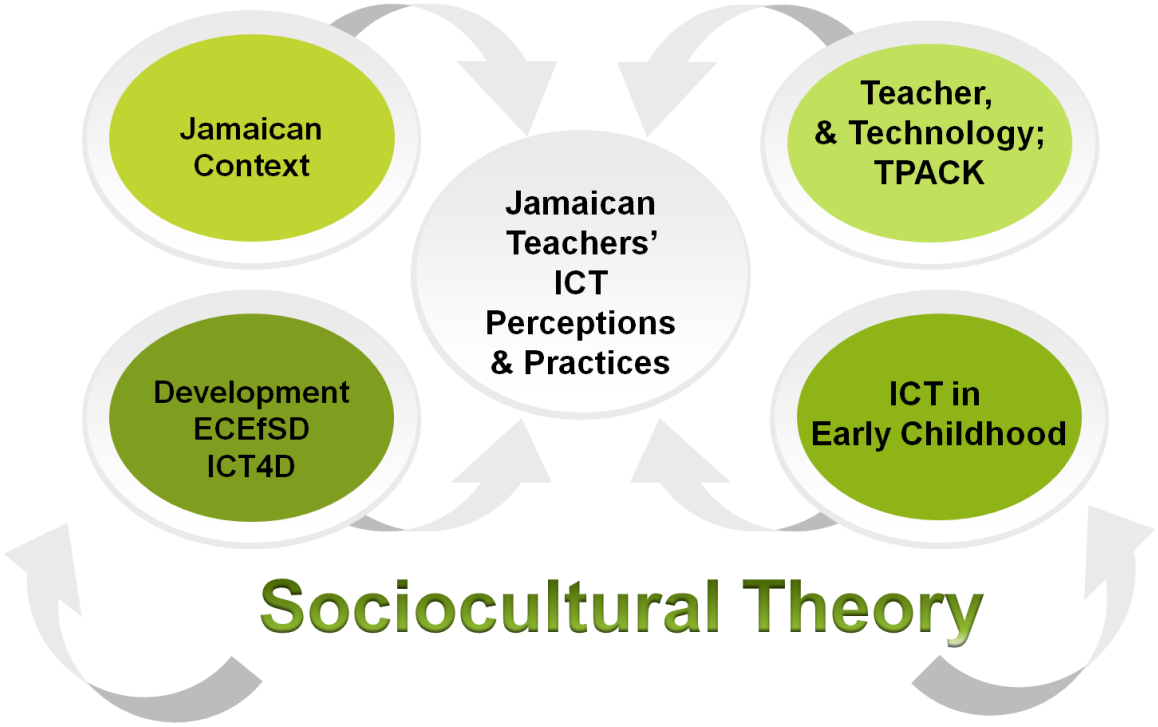

Figure 1. Visual representation of literature review

The Context

Jamaica is a sub-tropical island situated in the Greater Antilles of the English speaking Caribbean. See Appendix M for Country Information. Although Jamaica gained its independence from Britain in 1962, the education system has maintained some features of its colonial past (Jones, Brown, & Brown, 2011). Since independence, governments have focused their attention

on universal access to education. This focus has resulted in Jamaica fulfilling the primary enrollment levels of millennium development goal two. According to Jones et al. (2011), schooling in Jamaica is a class-based, two-tiered educational system. The class-based system is evident in the stark difference between community basic schools, public infant schools, and well-resourced private kindergartens.

Historical overview of early childhood education in Jamaica. Early childhood education in Jamaica focuses on children birth to eight years old. The history of early childhood education in Jamaica began in the late 19th century. A few privileged women who entered the profession were allowed to teach only the infants (4 to six year olds) of the elementary schools and the few infant schools across the island (Morrison & Milner, 1995). In the late 1930s there was increased demand for the care of young children as females were needed to work in factories. A local pioneer Reverend Henry Ward observed children unprotected, running about the streets while their parents were off at work. He was concerned about their safety and decided to do something about it. He asked one of his parishioners, a middle aged female who could sing and loved children to be the first teacher. This resulted in the first community school for three to six year olds, 'Play Center', opened in 1938 with a female parishioner as teacher. The curriculum included songs, nursery rhymes, bible stories, reading, writing, and number work, lessons on children's pets, and care of a garden (Jones et al., 2011).

Through the efforts of Henry Ward, the Jamaican government's attention was drawn to the need for a more organized system of care and training for young children in custodial care. The community was not comfortable with the name 'play center' because play was seen as frivolous and idle jesting. As a result the name Basic School was coined, and through government subsidies and the efforts of local communities, Basic Schools were established

across the island. Another local pioneer, Dudley Grant, with support from the Bernard van Leer Foundation, embarked on a series of curriculum design and teacher training. A formal curriculum was designed in the form of a manual with a series of lessons outlined for the paraprofessionals who were the teachers in the basic schools. These paraprofessionals attended bimonthly workshops where they were instructed in implementation of the curriculum. Dudley Grant was instrumental in approaching the Bernard van Leer Foundation to create the basic schools as a model of the American Head Start Program. By the mid-1960s American ideas (Head Start) on compensatory education for the disadvantaged had assumed some importance in Jamaican education. It was felt that because the basic schools were strongly rooted in the most deprived sections of the island, this could be a medium through which the Head Start concept could be a vehicle for theoretical and experimental work.

The theoretical frame for Jamaican early childhood education programs is eclectic (Dudley Grant Memorial Trust, 2008). The programs are designed based on the tenets and practices of different theorists; Montessori, Pestalozzi, Piaget, Froebel, Dewey, and Bruner (Morrison & Milner, 1995). Early childhood programs in Jamaica are one of four types: day care centers, basic school, infant school/ infant department, and preparatory school (Daley & Thompson, 2004; Morrison & Milner 1995). The infant schools/infant departments are opened to children four to six years old and no fees are charged; the government provides full funding for these programs. A Jamaican kindergarten classroom is part of an independent preparatory school, which is a private institution that serves a wider age range [kindergarten to sixth grade] than basic schools, infant schools, or infant departments (Morrison & Milner, 1995).

Jamaican early childhood teachers are taught that "Froebel, Montessori, and Piaget recognized the cognitive value of play" (Morrison, 2001, p. 247). Teachers are expected to

implement the learning through play philosophy. There is still, however, a lot more to be desired in identifying the possibilities of technology supported tools for digital play and children's learning across the curriculum with technology. According to Jones et al. (2011) despite shortcomings Jamaica is one of the few developing countries with a low cost model of provision for preschool education. With the advent of the Early Childhood Commission (ECC) in 2003, new standards and new criteria for program quality were established. The new early childhood curriculum has moved away from the traditional view of preparing children for more formal schooling. The ECC has outlined new standards for program quality and the operation of early childhood programs across the island. The major areas covered by the standards are process quality programs (teacher pupil ratio, space etc.), teacher qualifications, and curriculum.

Institutions attempt to meet the standards for quality set by the ECC but are faced with the challenge of limited resources.

> At the pre-school level, many early childhood development institutions are under-resourced. They lack equipment, trained personnel, and appropriate physical and social environments. Some parents are ill-equipped for their role as caregivers and to provide a supporting environment for the development of their children. As a result, many children attain primary school age without the necessary preparation to access the primary level curriculum; they under-perform at higher levels of the school system. (PIOJ, 2009)

With the foregone view of children's attainment at the primary level, early childhood education for sustainable development is viewed as part of Jamaica's Vision 2030. To further support early childhood for sustainable development the Planning Institute of Jamaica has affirmed their commitment to this initiative:

> The early childhood years are recognized as the period to lay the foundation in the development of members of society. The type of foundation laid influences our long-term capacity to learn, our lifelong values and attitudes and our general life chances. Failure to properly address the needs of children in these early years of development could result in far reaching social and economic consequences for our society and the country. Vision 2030 Jamaica recognizes early childhood development as a key strategic area for national development and, in the medium term, will treat this area as a priority for implementation. (PIOJ, 2009)

Jamaican early childhood curriculum. Program quality in Jamaica has improved from a variety of perspectives. The new early childhood curriculum has more emphasis on child directed activities as opposed to teacher directed and rote activities (Jones et al., 2011). With the advent of the Early Childhood Commission (ECC), there are new standards regarding adequate space and teacher pupil ratios nearing developed countries standards. The ECC is proposing a teacher pupil ratio of 1:10 as a benchmark for quality interaction in early childhood classrooms. Jones et al (2011) note this is a steep challenge for most ECIs across the island, especially for Basic Schools and Infant schools. Basic Schools have been operating on the long standing formula for receipt of salary subsidies of I teacher to 30 children. While the ECC is engaged in an island-wide public campaign to sensitize staff, boards, and parents in discussion of the new regulations and standards, parents and teachers are concerned about the implications for their early childhood institutions.

The first written early childhood curriculum for children four to six years old was completed in 1973 through the Project for Early Childhood Education and funded by the Bernard van Leer Foundation (Dudley Grant Memorial Trust, 2010). The 1973 curriculum was called the

Project for Early Childhood Education (PECE) Manual, this subject-based curriculum had detailed instructional guide and step by step approach for teaching content; this was due in part to the paraprofessionals in the Basic Schools lack of experience and in-depth knowledge about child development and principles of teaching and learning (Dudley Grant Memorial Trust, 2010). In 1979, the Ministry of Education carried out a curriculum review and revision process, and in 1983 a Readiness Curriculum was developed. The new curriculum focused on readiness for four and five year olds and replaced the PECE Manual with an integrated curriculum approach (Dudley Grant Memorial Trust, 2010). The integrated curriculum was less detailed and prescriptive than the PECE Manuals, allowing teachers to be flexible in implementing the curriculum. "Both the PECE and the Readiness Curriculum continued to be used in early childhood [programs] up until the development of this present Jamaican Early Childhood Curriculum Guide for Children Birth to Five Years" (Dudley Grant Memorial Trust, 2010, p. iv).

The new early childhood curriculum is based on a thematic approach to integration. The conceptual framework of the curriculum is based on the tenets of learning theories such as Arnold Gesell, Sigmund Freud, B.F. Skinner, Howard Gardner, John Dewy, Jean Piaget, and Lev Vygotsky (Dudley Grant Memorial Trust, 2008). The developmental goals and learning outcomes for Jamaican children birth to five years are: wellness, effective communication, valuing culture, intellectual empowerment, respect for self, respect for others, respect for the environment, and resilience (Dudley Grant Memorial Trust, 2010). Since the revised curriculum was piloted in 2008 there was no research undertaken to investigate teachers' integration of technology to support children's learning across the curriculum domains. There is a dearth in the Jamaican literature on children's learning with new technologies of the 21st century.

The thematic integrated curriculum places equal emphasis on enhancing children's skills in all domains of development, affective, cognitive, and psychomotor. The curriculum is designed on the premise that all domains of development are in constant interaction with each other (Dudley Grant Memorial Trust, 2010). The five year olds are exposed to different themes based on their relevance to the children's life experiences; teachers are encouraged to provide opportunities for children to learn in a variety of ways and to develop skills in all developmental domains (Dudley Grant Memorial Trust, 2010).

They can engage in mentally stimulating and challenging activities that increase their literacy, numeracy, critical thinking and general knowledge skills; practice social skills during interaction in small and large groups with their peers and adults; engage in aesthetic activities including drawing, painting, constructing, singing, dancing, dramatizing and reciting; engage in physical sports and games; refine and master gross and fine motor skills, experiment, explore, and discover the properties of many things in their world. (Dudley Grant Memorial Trust, 2010, p. vi)

There are endless opportunities for the seamless integration of technology with young children's learning in Jamaica. The curriculum covers a wide range of themes for five year olds, including but are not limited to: our country Jamaica, transportation, sports, Jamaica land we love, and the weather. These themes can be meaningfully linked to the students' everyday lives in Jamaica as well as provide authentic opportunities for learning with technology.

The Jamaican Early Childhood Curriculum has developmentally appropriate features, which can be supported by NAEYC position statement on technology integration for young children. The features of the curriculum are:

- allows children to make connections and link learning across subject lines, which promotes children's active engagement in planning and implementing learning activities
- provides opportunities for children's creative expressions and allows for individual learning styles and multiple intelligences
- facilitates the flow of meaningful learning activities

(Dudley Grant Memorial Trust, 2010; NAEYC Position Statement, 2012).

Tablet in schools project. The government of Jamaica in April 2013 announced its Tablet in Schools pilot project, which is in keeping with the objectives of Digital Education Services. Digital Education Services provides e-Learning products and services to educational institutions in Jamaica and the Caribbean. The strategic objective of Digital Education Services is to reduce the cost of education for schools, parents, and students. The aim is to facilitate a reduced cost of quality education with digital tools and e-Learning solutions. Digital Education Services provides e-Learning solutions for the implementation of the Jamaican government's tablet in schools project. e-Learning Company Jamaica Limited, proposed to have tablets in the hands of teachers and students beginning September 2013 (Digital Education Services, 2014). Figure 2 shows the tablets in schools eLearning training for early childhood education.

The tablet computers will be equipped with learning applications. The devices will have communication applications (Internet, email, Skype), reference books (Bible, world atlas, Jamaican yellow pages, eBooks), news and magazines (national geographic, BBC news service, CNN) word processing, and multimedia applications. The provision of up to date cost efficient and accessible information technology to students and teachers is part of Jamaica's national development goal for a technology enabled society by 2030.

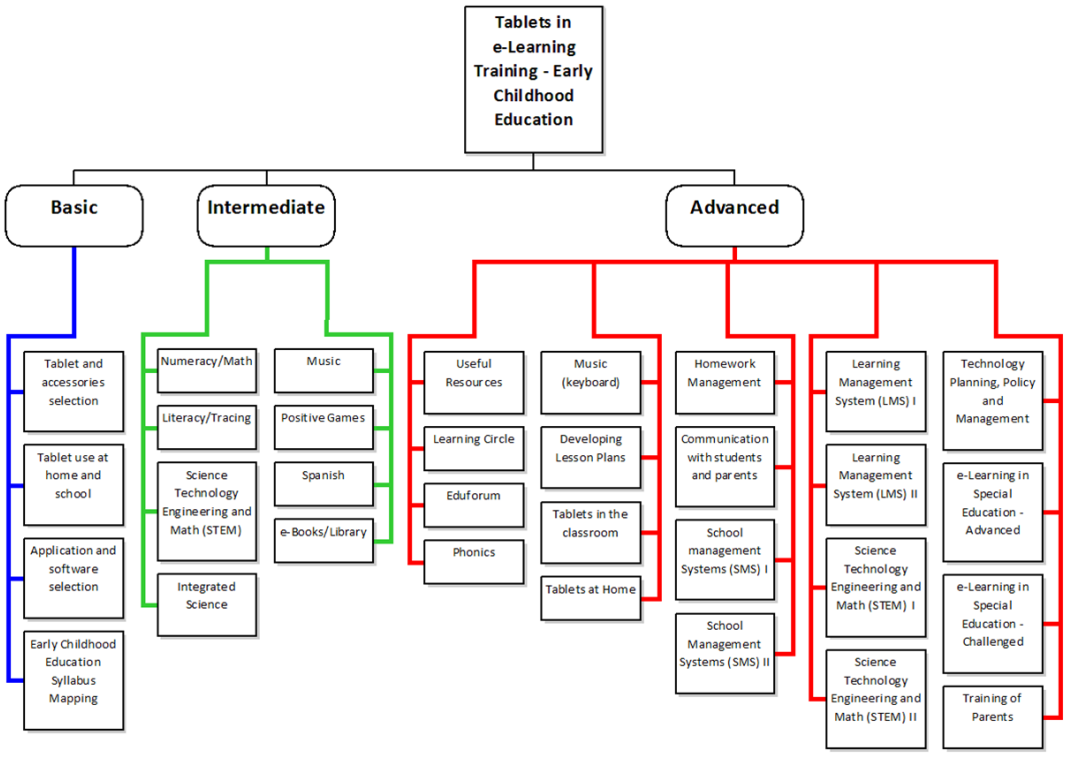

Figure 2 Tablets in e-Learning Training – Early Childhood Education (Digital Education Services, 2014; http://digedusrv.com/index.php/products-and-services/training/training-e-learning-with-tablets-early-childhood-education)

Early Childhood Education for a Sustainable Society

The literature highlights early childhood education as the starting point for lifelong learning within education for sustainability (Davies et al., 2009; Elliott & Davis, 2009; Pearson & Degotardi, 2009; Siraj-Blatchford, 2009). Early childhood education is further positioned as an important factor in efforts towards sustainable development (Didonet, 2008; Kaga, 2008; Otieno, 2008; Pearson & Degotardi, 2009; Siraj-Blatchford, 2009). What would early childhood education that contributes to sustainable society look like? (Kaga, 2008). Kaga (2008) outlines the following features of early childhood education for a sustainable society: equitable access to early childhood education; nurtures learning dispositions and basic life skills such as inquiring

minds, creativity, and problem solving; fosters love for, caring attitudes, and respect for others and nature; and promote children's contact with nature and include concrete outdoor projects to foster an awareness of environmental issues.

Early childhood education has a pedagogical advantage for education for sustainability (Elliott, 2010; Elliott & Davis, 2009). With this pedagogical advantage, early childhood educators need a mind shift to create synergy between pedagogies that promote cultural change and the wider community. Early childhood education "seeks to empower children and adults to change their ways of thinking, being and acting in order to…enhance environmentally and socially sustainable practices" (Elliott & Davis, 2009, p. 68) both in their homes and wider community.

One of the goals of Jamaica's Vision 2030 plan is to develop a technology enabled society, which I propose should begin with a focus on technology integration in early childhood classrooms. Developmentally appropriate integration of technology in the early childhood classroom can address the issue of equity and access, and fosters inquiry, creativity, problem solving, and also promotes children's contact with nature (features of early childhood education for sustainable development).

The literature on early childhood education for sustainable development (ESD) suggests an integrated approach to embrace positive cultural practices and other influences on curriculum decisions (Otieno, 2008; Pearson & Degotardi, 2009). The early years are important for building cultural identity, hence, communities and their social structures play an important role in the success of early childhood care and education programs (Davies et al, 2009; Otieno, 2008). Yan and Fengfeng (2008) discuss ESD as a lifelong construct, which requires people with a capacity for sustainable development. Young children and their teachers are important stakeholders in the

sustainable development agenda. The integrated curriculum with emphasis on respect for self, others, and the environment is crucial to ESD. The Jamaican early childhood curriculum framework consists of six desirable learning outcomes for children: wellness, communication, valuing culture, intellectual empowerment, respect for self, others and the environment, and resilience. These learning outcomes are closely related to sustainable development and the integration of technology has the potential to help children achieve the learning outcomes. For children to achieve the outcomes by the end of the preschool stage, their environment should provide activities and experiences that support their development over time (Dudley Grant Memorial Trust, 2010).

The recommendations for early childhood education for sustainable development include capacity building, learning for change, and access to lifelong learning, networks and partnerships, professional development, integrated curriculum, and research (Davies et al., 2009). These recommendations resulted from collaboration between researchers in Australia, Sweden, Kenya, United Kingdom, and South Africa. According to Davies et al. (2009) these recommendations are based on the notion that "children are competent, active agents in their own lives" (p. 113) and "early childhood education is recognized as the starting point of lifelong learning within education for sustainability" (p. 113).

Information and Communication Technology for Development (ICT4D)

The term ICT4D refers to the opportunities afforded by ICT as an agent for development (Selinger, 2009; Sutinen & Tedre, 2010; Unwin, 2009). Unwin (2009) contend that information and communication technologies (ICT) can be used to help poor and marginalized people and communities make a difference to their lives. ICT4D offers the theoretical notions about development, empowerment, poverty, marginalization, and ideas about difference as it relates to

the technology integration agenda in developing countries. ICT4D researchers evaluate the feasibility of existing technologies in the context of developing societies (Sutinen & Tedre, 2010; Unwin, 2009).

Development in the 21st century is primarily concerned with economic growth, identifying ways in which the economic systems of poor countries can be made more effective; or participation and empowerment. ICT has a key role in delivering both interpretations of development (Unwin, 2009). Unwin further adds that ICTs can make a difference to the lives of the poor and marginalized but depend in part on their contribution to economic growth, and also concerned with issues to do with access that people have to information, ways in which those from different backgrounds communicate with each other, and the content requirements that poor people need if they are to be able to transform their lives and livelihoods.

ICTs have the potential either to increase inequalities or to reduce them, depending on the social, political, and economic contexts within which they are introduced. An understanding of how ICTs can be appropriated either for individual profit or for communal purposes can help us design appropriate programs to empower poor and marginalized communities (Unwin, 2009). ICT4D is about what should be done and how we should do it; ICT4D therefore has a profoundly moral agenda. It is not primarily about the technologies themselves, but is instead concerned with how they can be used to enable the empowerment of poor and marginalized communities.

> Education is not just about making sure that the citizens of a country are able to compete on an equal footing with the rest of the world. It is also about helping new generations to understand the context of their own cultural and social traditions, and to identify and associate with what it is that makes them unique so they can specialize in providing a particular set of goods and services. (Selinger 2009, p. 213)

Technology in the classroom enhances students' access to understanding through the use of multi-modal representations of difficult to grasp concepts (Selinger, 2009). The technology can remove inequalities between urban and rural communities; Sugata Mira (2006) as cited in Selinger, suggests that technology introduced in rural areas has a greater impact on learning outcomes where it can compensate for poorer-quality teaching. Selinger (2009) highlights the pedagogical considerations for ICT4D. She notes the important role of culture based on Jerome Bruner's idea that education must be conceived as aiding humans in using learning tools to make meaning and construct reality to better adapt to their world. "In many developing countries the transmission model of education is still very much in evidence and students are learning by rote" (Selinger, 2009, p. 216). Effective ICT4D requires new teaching models that will ensure greater knowledge retention and conceptual understanding of children and teachers. Technology is not the panacea for education ills; in order for the ICT to have any meaningful impact, it has to be located in an environment that will support learning (Selinger, 2009; Unwin, 2009). Selinger further argued that technology has the potential to address the challenge of education transformation, which can be evidenced by greater knowledge retention and conceptual understanding of students.

Technology innovation in developing countries is also seen as a process of diffusion of knowledge, which is transferred from advanced economies and adapted to the conditions of a developing country (Avgerou, 2010). In light of the advancement in technology in developed countries researchers are also concerned about developing countries' adopting innovations from developed societies. Avgerou (2008) challenges the feasibility of transferring generic technical know-how into developing countries. He admonishes that technology innovations transferred into developing countries organizations should not expect to have the same organizational

practices and outcomes as in the context the innovation originated. The social embedded innovation research focuses on the cognitive, emotional, and political capacities that individuals nurture in their local social institutions bring to bear on the unfolding of innovation efforts. The "socially embedded innovation discourse sheds light on what is locally meaningful, desirable, or controversial, and therefore how technology innovation and organizational change emerge (or are retarded) amidst the local social dynamics" (Avgerou, 2010, p. 4). Avgerou and Madon (2005) challenge aspirations for technology innovations with the notion that the root to counter development obstacles results from technology information and knowledge that are irrelevant to how people in developing countries live their lives.

ICT4D is also concerned with how technology innovations are diffused in developing societies. Diffusion is "the process by which an innovation is communicated through certain channels overtime among the members of a social system" (Rogers, 1995, p. 538). The characteristics of innovation identified by Rogers are: relative advantage, compatibility, complexity, trialability, and observability. To ensure teacher buy in of technology innovations, these characteristics should be explained to determine how technology best suits the needs of the society. In other words, how do technology innovations get diffused in the Jamaican context? The relative advantage of technology within the Jamaican context depends largely on teachers' perception of the advantageous nature of the innovation. If teachers perceive the innovation as advantageous the more rapidly the technology will be adopted. The perception of relative advantage might also be influenced by the way in which an innovation is presented to teachers; whether the idea is to supplant their current ideas for technology integration or to complement them.

The other characteristic of an innovation is the degree to which it is perceived as complex and difficult to understand. For technology innovations to complement teachers' attempts at integration, the implementation should be context specific to meet the goals of the Jamaican early childhood sector. The trialability characteristic has implications for the extent to which teachers are able to experiment with the new ideas generated from their attempts at integrating technology with young children's learning. A technological innovation creates a kind of ambiguity about its expected consequences (Rogers, 1995). Kelly (2008) suggests that technology integration features are unique and situation specific, idiosyncratic in nature and defy prefabricated strategies. In other words there are no tailor made solutions for technology integration as the problems often arise while teachers are actively engaged in instruction requiring an immediate solution. The idiosyncrasies also relate to the innovation characteristic of observability, the extent to which the results of an innovation are visible to other members of the social system. Teachers need assessment strategies that clearly identify criteria for technology integration and how these strategies may differ based on the context of their schools and the needs of the learners.

The critical features of ICT in education are as follows: ICT and related infrastructure is in place; teachers are trained and electronic resources available at the appropriate time and in the best sequence, so that the integration of ICT into teaching and learning is as seamless as possible; desired and culturally relevant pedagogy; and local ownership is embraced as early as possible (Selinger, 2009; Unwin, 2009). The issues of ICT4D also address the natural, social, economic, and technical environment in developing countries. These issues involve contextualizing the general curriculum in order to respond to the challenges of the environment (Sutinen & Tedre, 2010).

Information and Communication Technology in Early Childhood

Some of the research in early childhood and technology reviewed focused on different forms of technology including computers (Hatzigianni & Margetts, 2012; Ihmeideh, 2009b; Mohammad & Mohammad, 2012), mobile technologies (Bebell, Doris & Muir, 2012; Chiong & Shuler, 2010; Shuler, 2009), digital media (Johnson & Christie, 2009; Lieberman, Bates & So, 2009) and interactive whiteboards (McManis, Gunnewig, & McManis, 2010; Morgan, 2010). Other studies focused on content areas including literacy and technology (Ihmeideh, 2009a; Marsh, 2011; McKenney & Voogt, 2012), and digital play (Mawson, 2011; Rafar & Yang, 2010; Yelland, 2010).

The 21st century has seen a rapid increase in technology and learning applications for young children. Infants and toddlers are exposed to different forms of information technology in their homes and preschool centers (Baron et al., 2011). Children come to early childhood settings with a range of experiences with new media; in order to remain relevant school experiences and activities should contain materials that children have available in their daily lives (Yelland, 2010). Young learners in the 21st century are not viewed as passive receivers of technology but as active agents who are able to appropriate the technology to serve their learning across domains (Berson & Berson, 2004; Wang, Berson, Jaruszewicz, Hartle, & Rosen, 2010). While young children are becoming competent in their independent use of computers and digital technologies; teachers are challenged to integrate technology in learning experiences to optimize children's skill sets as active learners (Berson, 2009; Selinger 2009). Teachers are also cautioned not to allow technology to replace children's engagement with their learning environment; as such the National Association for Education of Young Children (NAEYC, 2012) has outlined guidelines for integrating technology in early childhood classrooms. The recurring theme

throughout the NAEYC guidelines is the developmentally appropriate use of the technology to enhance children's learning across all domains.

According to the NAEYC guidelines in the position statement, technology can be integrated in early childhood classrooms to enhance young children's cognitive, and social abilities (NAEYC, 2012). Despite the potentials of technology, NAEYC and the Fred Rogers center acknowledge that the issues of equity and access remains unresolved and create a digital divide. Children from low socio-economic backgrounds have little or no access to the latest technologies in their homes, schools, or communities (Rideout, 2011). To address the digital divide, NAEYC recommends that early childhood settings should provide learning opportunities with digital cameras, audio and video recorders, printers, and other technologies for children who might not have access to these tools (NAEYC, 2012). The issue of equity and access can be addressed when educators provide opportunities for all children to participate and learn using technology in early childhood classrooms (NAEYC, 2012).

As the use of technology has increased, so has the growing concern about the developmentally appropriate use of technology with young children. Wang et al. (2010) explain that technology should provide children with multiple ways to challenge their problem solving and critical thinking skills. Some researchers have posited a critical view that teachers who are hesitant about integrating technology are failing to capitalize on developmentally appropriate technology for the 21st century (Parrette, Quesenberry, Blum, 2010). Technology in early childhood should be presented as a tool to enhance children's learning and problem solving. The joint position statement between the National Association for the Education of Young Children and the Fred Rogers Center has provided a set of guidelines for the appropriate use of technology in early childhood classrooms.

Researchers outside the USA have also investigated the potentials of ICT in early childhood and early primary classrooms (Lin, 2012; McDonald & Howell, 2011; Stephen & Plowman, 2008; Vanderlinde & van Braak, 2011; Vanderlinde, Dexter, & van Braak, 2012; Voogt & McKenney, 2008). Lin (2012) developed a model for computer technology integration to support teachers' current teaching methods and teaching habits in Taiwan Kindergarten classrooms. The research resulted in the design of eight tool kits for integrating technology; storytelling, motivation, group discussion, drill, game, instruction, portfolio making, and evaluation. The aim of the investigation was to design a model for integration of technology in Taiwan kindergarten classrooms. Two of the research questions were: What ways do teachers integrate computer technology into their classroom teaching? In what part of classroom teaching to teachers involve computer technology? Research of this nature addresses the social context for technology integration with value placed on the teachers' pedagogical practices.

Vanderlinde et al. (2012) examined the ICT policy plan for technology integration in Belgium primary grades. They concluded that schools with no ICT policy plan identified lack of time and governmental pressure as factors. Also, government involvement in training and support for schools with best practices for ICT policy plan was crucial. The primary purpose of the investigation was to examine the content of school based ICT policy plans in primary education. Investigations into the ICT policy plan for early childhood classrooms might also be an area worth investigating and developing. Teachers, perceptions, and beliefs about technology in early childhood classrooms could impact the development of a local ICT policy to guide effective technology integration.

In Australia, McDonald and Howell (2011) examined the role of creative digital technologies in the early years. They applied grounded theory to make sense of the role of

technologies in maximizing learning for children ages 5 and 7. They used an ethnographic case study approach to investigate digital technologies as a conduit for learning. Their findings included positive student engagement, development of literacy and numeracy skills, and the development of interpersonal skills. Although interpersonal skill was not a focus of the research project, students showed improvement in turn taking, sharing, and working effectively in groups (McDonald & Howell, 2011). The researchers employed a three-phase model to implement robotics: modeling, exploring, and evaluating. This approach enhanced students' engagement and reflected best practices for Australian early years students (watching, listening, and doing). While the digital pedagogy of the three-phase model appeared to have been successful in integrating digital technology in the early years, one also has to consider the factors that may have contributed to the success. Some factors worth mentioning (which were not discussed by McDonald & Howell) are teachers' technological and pedagogical competence, access to the digital technologies, school ICT policy, and administrative support for implementation of the model. Keengwe and Onchwari (2009) conclude from their investigation of technology integration in teacher education curriculum that " providing opportunities for a seamless integration of technology into instruction requires teachers, school administration, technology coordinator, and parents to play an active role in determining the importance of technology integration in classrooms" (p. 216).

Similarly in the UK, Stephen and Plowman (2008) investigated the nature of guidance necessary to enhance children's encounters with ICT in authentic playroom contexts using guided inquiry. In this study, the researchers used guided inquiry with the teachers in preschool classrooms to integrate digital camera, digital video camera, draw and paint software, ICT in the music area, and digital microscope with the computer. The findings from this study revealed that

children need adult support to become independent and confident users of ICT. Both children and adults acquired new skills as they learned the functions of technology to support their learning (Stephen & Plowman, 2008). What is noteworthy about this study was the implications of guided inquiry to support teachers learning, which in turn enhanced children's use of the technology as a learning tool.

Researchers agree that digital technology has the potential to facilitate children's playfulness; they recommend software that stimulates imagination and creativity as well as challenges curiosity (Johnson & Christie, 2009; Yelland, 2010). Open-ended software allows children to engage in creative play and conversation (NAEYC, 2012). Researchers suggest that technology has tremendous potential to support children's creative problem solving (Johnson & Christie, 2009; Shuler, 2009). Barron et al. (2011) identify 21st century skills that children need to function as lifelong learners. These skills include interacting with one another and with adults, moving, exploring, manipulating objects, constructing, reading, and creating representations, listening to books, engaging in pretend play, conversing and forming relationships.

The literature on young children's learning provides supportive evidence for learning through play. The concept of multimodal playful experience is becoming acceptable in the field of early childhood education. "Multimodal experiences combine the written, visual, gestural, aural, linguistic, and tactile. Children experience such texts on a daily basis in their lives and enjoy designing and creating their own" (Yelland, 2010, p. 12).

The debate on technology in early childhood education has been based on the benefits of the technology to enhance young children's social-emotional, cognitive, and language development. Li, Atkins, and Stanton (2006) concluded from their randomized controlled pilot trial with Head Start children that computer use in school enhances the development of children

from socioeconomically disadvantaged homes. The 122 Head Start children were divided into an experimental group and a control group; the control group had 15-20 minutes of computer time over a six month period while the control group had their standard Head Start curriculum. The experimental group outperformed the control group in the schools readiness test (Li et al., 2006).

Some other literature on technology focus on issues such as inquiry based learning (Wang, Kinzie, McGuire & Pan, 2010) digital, hybrid and multi-lingual literacies (Burnett, 2010; Razfar & Yang, 2010), and pockets of potential for mobile technologies (Schuler, 2009). Wang et al. (2010) proposed a synthesis of the roles of technology to enhance inquiry based learning. They suggest that computer technologies offer an accessible vehicle for extending inquiry as children naturally explore and learn about their environments. Technology in education should serve different roles: enrich and provide structure for problem contexts, facilitate resource utilizations, and support cognitive processes (Wang et al., 2010). Razfar and Yang (2010) argue that the rapid growth in information and communication technology warrants a revisiting of what counts as literacy. Given the shift from predominantly print-based media to a variety of electronic media in the social context of early childhood, children and adults are expected to be fluent in using multiple modalities and mediational tools (Razfar & Yang).

Lin (2012) described a model for the integration of technology in Taiwan Kindergarten. Lin criticized the "pedagogical dogmatism" that is evident in the discourse about technology integration in early childhood. The tendency to present constructivism as the ideal from which technology is integrated accurately in early childhood classrooms, may be what discourages teachers from adopting technology integration as part of their pedagogical practices (Lin, 2012). Lin proposed a model for technology integration in Taiwan kindergarten through an empirical investigation of how teachers integrate computer technology in kindergarten classrooms. The

purpose of the study was to help teachers to move away from viewing technology integration as a theoretic concept toward a practical pedagogy (Lin, 2012). Lin used grounded theory to investigate teachers scheduling of computer technology to understand teachers' choice of technology for kindergarten teaching (what, when, how).

"Thematic teaching is acknowledged as being the main curriculum trend, and is most often adopted as a kindergarten curriculum by kindergarten teachers in Taiwan" (Lin, 2012, p. 8). A similar trend of thematic curriculum exists in the Jamaican early childhood curriculum for five year olds (Dudley Grant Memorial Trust, 2010). The aim of Lin's study was to develop a model for integration that was not too theoretical and idealistic but one that could be easily implemented in teachers' classroom context to enhance their practical pedagogies. In contrast to the child centered approach taken by other researchers (McDonald & Howell, 2011; McPake, Plowman, & Stephen, 2012), Lin proposed a teacher centered approach to the design of computer integration in Taiwan kindergartens. In spite of the myriad of integration models, Lin concluded that the "models do not address the details of actual design operation, timing and options of integrated types, which can only offer limited support for teachers in their actual integration of computer technology" (2012, p. 7). The study resulted in an eight tools kit model for integrating technology in kindergarten teaching; storytelling, motivation, group discussions, drill, game, instruction, portfolio making, and evaluation.

This eight tools kit model proposed by Lin supports the practical and meaningful integration of technology in the existing pedagogical practices of kindergarten teachers. Storytelling, motivation, and group discussions are pedagogical practices of kindergarten teachers across cultures, and Lin's eight tools kit model could easily be adopted by Jamaican

kindergarten, infant, and basic school teachers with modifications to meet the unique needs of the students and their teachers.

Other studies on technology integration in developing countries focus on the barriers to use of technology in preschool settings, for example, Ihmeideh, (2009b) focused on the barriers to technology integration in Jordanian preschool settings from teachers' and principals' perspectives. The main barriers identified by teachers were: lack of developmentally appropriate software, time, and rewards. For principals, the main barriers were inadequate funding, lack of knowledge about technology use, and lack of appropriate facilities. While Ihmeideh provided a number of recommendations for technology integration in Jordanian preschools, the interviews with participants could also ask them to consider how best to use the technology they have at their disposal as a starting point in the technology integration initiative for Jordanian preschoolers.

McKenney and Voogt (2012) investigated teacher design of technology for emergent literacy. They recommend that teachers need support to work in their own 'technological zone of proximal development' in order to implement seamless integration of the technology in regular classroom activities. Research on UK classrooms at the preschool and early primary grades suggest that teachers' perspective of ICT in their classroom is crucial to ICT transformation in schools (Morgan, 2010; Yang, 2012). Yang's (2012) study of ICT in English primary and secondary schools revealed that teachers' attitudes tend to be more adaptable despite the resistance in institutional curriculum and assessment in schools. As such, the participants from Yang's study regard teacher training as a crucial component to harness technology's pedagogical potential. Yang noted the need for further research in English schools to investigate teachers' perspectives and practice with ICT. He believed that teacher training should be an essential

variable, coupled with awareness that changing teachers' attitudes through training alone is limited unless complimented by institutional change to achieve higher order learning skills in students. School leadership influence on teachers' attitudes about practice with ICT constitutes an area for further investigation (Yang, 2012). "For ICT in education to be successful and embedded into teaching and learning, it is therefore important for it to be included in pre- and in-service teacher training" (Selinger, 2009, 221). Wang et al. (2010) also argue that teacher training is critical for teachers to effectively implement technology enhanced inquiry learning.

Morgan (2010) investigated the reflections of teachers and children regarding the use of interactive white boards (IWB) that were being used in 30 classrooms with children aged three to seven years old in the UK. While the teachers valued and promoted playful and interactive experiences as vehicles for learning, the IWBs were routinely being used to support a more didactic form of pedagogy. The use of the IWBs in the classrooms was categorized under three headings: for whole class teaching, group work (predetermined by teachers), and students' independent use. According to Morgan (2010) the students viewed the IWB as the teachers' property and did not view their interactions with the IWB as being playful. Teachers' pedagogical practices in daily classroom routines are not always transferred to the use of technology as tools for children's learning. UK teachers' openness to technology integration may be due in part to a perception of ICT as a social and cultural phenomenon echoed in UK government initiatives (Loveless, 2011).

Technology and the Teacher

TPACK framework. In order to understand the teachers' pedagogical practices with technology I will use a technology conceptual framework to guide the analysis of teachers' practices. Mishra and Koehler (2006) present a framework for integrating technology in

education; Technological Pedagogical and Content Knowledge (TPACK). They argue that a conceptual framework to show the relationship between technology and teaching can transform technology integration and teachers' professional development. The TPACK framework informs the debate about what teachers need to know and the pedagogy needed for the seamless integration of technology. It is incomplete to investigate children's appropriation of technology without exploring the teachers' approach to technology integration; "social and contextual factors also complicate the relationship between teaching and technology" (Koehler & Mishra, 2009, p. 61).

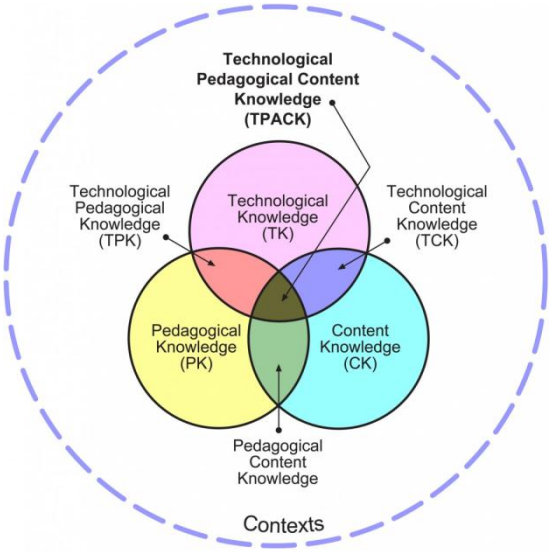

Figure 3 Technological Pedagogical Content Knowledge (TPACK) model (Mishra & Koehler, 2006; http://tpack.org/; Used with authors' permission)

What is TPACK? According to Koehler and Mishra (2009), the characteristics of new technologies (protean, unstable, and opaque) present new challenges to teachers who are struggling to integrate technology in their teaching. Koehler and Mishra (2008) identify the core components of technology integration and the relationship among and between them: content,

pedagogy, and technology. Pedagogical knowledge (PK) represents teachers' knowledge of practices and methods of teaching and learning, which includes how students learn, lesson planning, assessment, and behavior management of learners in the classroom. Content knowledge (CK) is the teachers' understanding of the subject matter, hence competence to teach the content. Teachers also need the pedagogy that is specific to a particular content in order to employ strategies and techniques that are applicable to the subject content; pedagogical content knowledge (PCK). Technological knowledge is having an understanding of the open-ended interaction with technology and how this knowledge evolves with the constant changes in technology.

Effective integration of technology requires the dynamic connections between technology, pedagogy, content, and knowledge (Angeli & Valanides, 2009; Koehler, Mishra & Yahya, 2007). Koehler et al. (2007) contend that teachers need a technology by design approach in order to switch their roles from passive consumers of technology to more active role as designers of technology. The design approach empowers teachers to bring the dynamics between pedagogy, content, and knowledge at the forefront of children's learning experiences. The use of technology with young children should position children as active producers of technology in a learning community with their teachers and peers.

To further explain components of TPACK, Angeli and Valanides (2009) note that the concept of pedagogical content knowledge (PCK) was introduced by Shulman (1986) in an attempt to put more emphasis on content of lessons in research on teaching and teacher education. They argue that Shulman's "construct of PCK constitutes a special amalgam of content and pedagogy, and is the kind of knowledge that separates an expert teacher in a subject area from a subject area expert" (2009, p. 155).

Koehler and Mishra (2008) explain technological content knowledge (TCK) as the awareness of the ways in which technology and content influence and constrain each other. This shows the combination between teachers' knowledge of the content and the different ways in which constructed representations can be changed with application of technology. Technological pedagogical knowledge (TPK) on the other hand is the awareness of changes in teaching and learning when particular technologies are used. Based on the TPACK framework effective teaching with technology is dependent on the synergy between representation of concepts using technologies, pedagogical techniques with technology to teach content, and knowledge of content to be learned and how technology can enhance the learning of specific content. The synergy is also dependent on teachers' awareness of students' prior knowledge and their ways of knowing and how technology might be used to build on existing knowledge or extend the knowledge base of students (Koehler & Mishra, 2008).

Researchers have criticized Koehler's et al's (2007) TPACK framework from epistemological considerations; Angeli and Valanides (2009) argue that the framework needs further scrutiny in order to clarify if growth in TPACK constitutes growth in all other constructs of the framework (Pedagogical Content Knowledge, Technological Content Knowledge, and Technological Pedagogical Knowledge). Researchers have concluded that the TPACK model is not yet fully understood and that Koehler et al. (2007) failed to provide practical examples of the integrative construct of TPACK (Angeli & Valanides).

A study of teachers' practices is important to make sense of their use of technology and also help teachers' identify their own technological competence and the kinds of support they need. According to Orlando:

> If we are to properly study teachers' practices mediated by ICT and how and why they change, there is a need to acknowledge aspects such as the role played by social, cultural and institutional representations of ICT, school organization of ICT, other stakeholders, and professional and personal experiences with ICT, as well as teachers' beliefs regarding ICT in their role as a teacher in a school. (Orlando, 2009, p. 35)

To further add to the support for teachers, various organizations have highlighted guidelines and competencies for pre-service and in-service teachers. The NAEYC position statement clearly identifies the teacher as a key factor to effective integration of technology in early childhood classrooms (NAEYC, 2012). The International Society for Technology in Education (ISTE) has national education standards for teachers (NETS). The NETs for teachers fall under the following categories: facilitate and inspire student learning and creativity; design and develop digital age learning experience and assessments; model digital-age work and learning; promote and model digital citizenship and responsibility; engage in professional growth and leadership. To develop these competencies teachers need intentional professional development to meet their unique needs.

Florida Center for Instructional Technology (2014) based at the University of South Florida, developed a framework to guide the evaluation of technology integration in K-12 classrooms. The Technology Integration Matrix (TIM) can be used to evaluate the level of technology integration in the classroom. TIM provides teachers with models of how technology can be integrated in the classroom in meaningful ways. The framework includes five interdependent characteristics of meaningful learning environments: active, constructive, goal directed, authentic, and collaborative. The TIM associates five levels of technology integration (i.e., entry, adoption, adaptation, infusion, and transformation) with each of the five

characteristics of meaningful learning environments. The TIM uses the term 'technological tools' in reference to computers, laptops, mobile devices, interactive whiteboards, online tools, videos, recording devices, and software.

The TIM can be used by teachers and school communities across cultures. The teachers' and other stakeholders will need to identify what technological tools teachers and students have access to. The TIM was developed for Florida schools but may be used as a guide to develop a similar tool for technology integration in Jamaican classrooms. The framework provides a guide for professional development activities geared towards technology integration. A framework of this nature helps to guide the systematic integration of technology in the learning environment.

Theoretical Frame - Socio-cultural Theory

The integration of technology in early childhood classrooms differs across countries in light of their implicit cultural beliefs and practices. Pearson and Degotardi (2009) argue that research on early childhood practices is located within a European American cultural and philosophical context. To avoid endangering cultural practices and beliefs (with focus on technology), Tobin (2011) argues that countries have early childhood education cultural beliefs and practices that should not be undervalued. While I investigate teachers' perceptions, beliefs and practices with technology I will be cognizant of their cultural beliefs and practices. I will attempt to avoid pressure on participants to rationalize and modernize their early childhood practices in light of universal standards for [technology integration] (Tobin, 2011).

Creativity researchers (Klausen, 2010; Runco, 2006) admonished that some research on children's creativity may have presented a Western notion, and emphasize the need to address several culture dependent notions; these may differ about whether the product or personal growth is more crucial to the creative process. With this context dependence notion of creativity it will

be interesting to shed light on teachers' perceptions, beliefs, and practices with technology for Jamaican children. Klausen (2010) and Runco (2006) agree that creativity is a socially constructed phenomenon, which depends on the wider cultural context.

Since "preschools are institutions that both reflect and help to perpetuate the cultures and societies of which they are a part" (Tobin et al., 2009, p. 225), the cultural implications of technology integration should not be overlooked. Tobin (2005) encouraged the preservation of the cultural practices of schools and guards against throwing out the old for the new in a "one size fits all" approach to early childhood education.

Edwards (2007) examined the appropriation of socio-cultural theory by a group of Australian early childhood teachers, who critiqued and analyzed their existing practices in an attempt to implement new models of work and reflect on new ways of seeing children, growth, learning and development. Edwards noted the teachers' shift from a predominately developmental-constructivist view of children to a socio-cultural discourse. The teachers noted the influences on this shift; postmodern arguments regarding the subjective nature of language; dissatisfaction with the normative approach to development promoted by Piagetian theory; and increased emphasis on Vygotsky's socio-historical explanation of development (Edwards, 2007). A Vygotskian conception of knowledge of development permeates the early childhood literature since the late 1980s (Edwards, 2007). Early childhood curricula need to draw on socio-cultural constructions of knowledge development to promote learning and to support children's development in socially and culturally respectful ways; from a developmental to a socio-cultural approach. The questions that guided Edwards (2007) investigation were: What does the translation from a normative conception of child development mean for educators? What are

their existing beliefs about early education? How do teachers appropriate contemporary perspectives in their work with children?

Human development is a process of people changing participation in socio-cultural activities of their communities. People contribute to the process involved in socio-cultural activities at the same time they inherit practices invented by others (Rogoff, 2003). Rogoff views development from interacting planes of influence; intrapersonal (individual child), interpersonal (interactions among social partners), and community/institutional (contextual). This displaces the idea of the child as constructor of his/her own knowledge. Development and knowledge acquisition are positioned as a function of community participation and interaction across the three planes. Assumptions based on chronological age and developmental milestones are often unquestioned by those who study human development. Issues of age transitions are based on cultural perspectives (Rogoff, 2003). People develop as participants in cultural communities. Their development can be understood only in light of the cultural practices and circumstances of their communities.

> In addition to instructional interactions, guided participation focuses on the side -by-side or distal arrangements in which children participate in the values, skills, and practices of their communities without intentional instruction or even necessarily being together at the same time. (Rogoff, 2003, p.284)

Children take part in activities of their community, engaging with other children and with adults in routine and tacit as well as explicit collaboration and in the process of participation become prepared for later participation in related events (Rogoff, 1995). Developmental research has commonly limited attention to either the individual or the environment, whereby treating adults and children as separate entities rather than being mutually defined and interdependent in

ways that preclude their separation. Rogoff (1995) uses the metaphor of apprenticeship for the plane of community activity involving active individuals participating with others in culturally organized activity that has as part of its purpose the development of mature participation in the activity by the less experienced people.

Guided participation refers to the processes and systems of involvement between people as they communicate and coordinate efforts while participating in culturally valued activity. The guidance refers to direction offered by cultural and social values, as well as social partners. Participation refers to observation, as well as hands-on involvement in an activity. Participatory appropriation refers to how individuals change through their involvement in one or another activity, thus becoming prepared for subsequent involvement in related activities. Guided participation is the interpersonal process through which people are involved in socio-cultural activity; participatory appropriation is the personal process by which, through engagement in an activity, individuals change and handle a later situation in ways prepared by their own participation in the previous situation (Rogoff, 1995).

Roopnarine and Metingodan (2006) concluded from their cross national research that children develop hybrid or self-selected identities, hence the need for curriculum changes that present contradictions between traditional ways of educating children and modern efforts to design early childhood programs that consider the local and global culture in the context of delocalization and global consciousness. The two way flow of professional, cultural, and personal knowledge about childrearing and early childhood practices (e.g. DAP, child centered training, democracy in the classroom) between post industrialized and developing societies through digital communities, cultural exchanges, and contemporary global consumerism have

forced early childhood educators to reflect and modify firmly established goals and practices in raising and educating young children (Roopnarine & Metingodan, 2006).

Educational accounts of early childhood education in the developing societies tend to be less data-based and largely descriptive in nature (Roopnarine & Metingodan, 2006). Considerations of early education in Jamaica outline the state of early childhood education with little attention given to systematic assessments of cognitive and social outcomes (Roopnarine & Metingodan, 2006). An understanding of what is valued in childhood behavioral and cognitive development and what is expected of early childhood programs may shed light on what drives early childhood practices in Jamaica. With this knowledge teachers might be better able to discern the responsibilities of schools and parents in children's academic and emotional development, especially as it relates to technology integration.

Gaps in the Literature

A gap that is evident to date is the sparse literature in early childhood education in the Jamaican context. There is need for a research base on technology for children's learning in the Caribbean context. Also, Jamaican research on technology is needed to examine teachers' experiences as a phenomenon to be investigated and described within a cultural context. In the case of the TPACK framework there is no research on the use of TPACK in early childhood education and as such research to explore the implications of the framework for early childhood teacher educators is timely and urgent. The teachers' perceptions, beliefs and practices will shed light on their competencies in relation to their sources of knowledge: pedagogy, content, and technology.

Chapter Summary

In this chapter I included a visual representation of the literature to capture the major areas that surround my study. The research on ICT in early childhood includes but not limited to computers, mobile technologies, digital media, and interactive whiteboards. The rapid increase in technology has influenced the teaching learning process, and teachers are encouraged to find new ways to teach young children in the 21st century. Organizations such as NAEYC, ISTE, and UNESCO have provided frameworks to guide technology integration and foster capacity building of teachers and students.

The TPACK framework has been used by researches to conceptualize the sources of knowledge for the seamless integration of technology in education. The teacher is regarded as a key player in the effective use of technology with children. The design of a model for integration of technology depends largely on teacher competence and the availability of technology resources for teaching and learning. Early childhood educators are encouraged to develop their digital and media literacy in order to make informed decisions about the types of technology to use for different content areas and student inquiry.

Because of the social nature of teaching and learning the potential of technology for development is embedded in the culture of the school and wider community. Early childhood education has a role to play in education for sustainable development. A socio-cultural framework is needed to assess the cultural relevance of technology innovations for the unique context of schools. This study will contribute to the research by exploring Jamaican teachers' perceptions and beliefs regarding technology. The teachers' practices with technology in a Jamaican infant school may contextualize the discourse regarding implications of technology integration for Jamaican infant schools.

Chapter Three: Research Design and Methods

Introduction

This chapter describes the methodology that was employed. It outlines the research design, selection of site and participants, data sources, and the procedures for data collection and analysis. Rubin and Rubin (2005) identified the steps in qualitative design as follows: choosing a topic that is of sufficient interest and importance, identifying the puzzle you will attempt to resolve in the form of research questions, and deciding if the questions are best answered through in-depth interviewing.

The purpose of this study was to describe and explain perceptions, beliefs and practices about technology among selected early childhood teachers in a Jamaican infant school. The research questions that guide this study were:

1. What are teachers' perceptions and beliefs about the role of technology in young children's learning?

2. What are the practices regarding technology among Jamaican infant school teachers?

Rationale for Research Design

Qualitative research is categorized in the interpretive and constructivist epistemological perspective (Merriam, 2009). She further states that the purpose of qualitative research is to describe, understand, and interpret multiple realities that are context specific (Merriam, 2009). Qualitative research gets to the description and narratives that illuminate participants' first hand experiences with the topic of the study. Whether the focus of the inquiry is a phenomenon or

specific unit of study the qualitative researcher is expected to ensure rigor, ethics, trustworthiness and transparency in the field, as well as, in the analysis of data and reporting of findings (Janesick, 2011; Rubin & Rubin, 2005). A qualitative research design is focused on explaining the big picture of participants' experiences with an emphasis on understanding their social context with no interest in predicting and controlling (Janesick, 2011; Merriam, 2009). Kvale and Brinkmann (2009) propose that in order to arrive at compelling descriptions the researcher should address the epistemological presumptions of what knowledge is and how it is obtained. The knowledge of focus for this study was the nature of teachers' perceptions, beliefs, and practices with technology in the classroom. Data on this was obtained through in-depth interviews of participants, triangulation of data through member checking, and review of classroom documents. Classroom documents for this study included lesson plans, and the curriculum guide. The value of this type of data is in its ability to further the discourse about information and communication technology within the social context of Jamaican early childhood classrooms. The knowledge gained through this study will be expected to undergo scrutiny and critical analysis by other scholars as the cycle continues in the quest to understand the technology phenomenon in Jamaica.

An interview study was best suited for this inquiry since each participant provided an authentic description of her perceptions, beliefs, and practices with technology. To determine if my topic was suitable for qualitative interviewing, I was guided by Rubin and Rubin's pertinent questions:

- "Are you looking for nuance or subtlety?
- Does answering the research question require you to trace how present situations resulted from prior events?

- Is an entirely fresh view required?
- Are you trying to explain the unexpected?
- Does puzzling out the research question necessitate layers of discovery in which initial questions are asked to discover alternatives that are then explored in turn?" (2005, pp. 47-48).

My response to these questions led to the determination that qualitative interviewing was suitable for the focus of this study. More specifically, I was interested in early childhood teachers' nuances as it related to technology in the Jamaican context and the unique perceptions of each participant. In order to investigate what may influence these teachers', beliefs and practices regarding technology, I investigated the past events that influenced their current situation. Qualitative interviewing follows an iterative design that allows follow up questions to explore participants' subtle responses to more elaborate themes and categories for analysis. The in-depth interviews of the teachers contextualized their perceptions and beliefs and provided access to understanding their practices with technology.

In this study I describe and explain teachers' perception, beliefs and practices regarding technology for children's learning in a Jamaican infant school. An in-depth interview study design was used to investigate the teachers' epistemology about technology and their related practices. While we can answer many questions by surveying and analyzing official data, these techniques have limits (Janesick, 2011; Rubin & Rubin, 2005). Statistical summaries may not communicate a story that readers can understand easily and the numbers tend to strip away context. The results of this are a loss of the richness and complexity of realistic research (Rubin & Rubin, 2005). To combat this, the qualitative researcher can study participants in their natural settings, where they live or work, and then analyze what is heard and/or seen (Rubin & Rubin,

2005). Rubin and Rubin (2005) also outlined the following characteristics of in-depth qualitative interviews:

1. Build on a naturalistic and interpretive philosophy.
2. Extend ordinary conversations.
3. Position interviewees as partners in the research enterprise rather than subjects to be tested or examined.

I used these steps as I interviewed teachers at their school, where they felt comfortable and in charge of their surroundings. The teachers were my research partners as they developed an understanding of their own perceptions, beliefs, and practices about the use of technology. I also relied upon the following characteristics of qualitative research from Janesick (2011) and Merriam (2009). I:

1. Attempted to understand the whole picture of the social context under study;
2. Referred to the personal, face to face immediate interactions in a given setting;
3. Attended to detail and focused on understanding the social setting rather than predicting and controlling;
4. Demanded for myself equal time in the field and in analysis;
5. Incorporated a complete description of the role of the researcher;
6. Relied on the researcher as the primary instrument of research;
7. Viewed participants as co-researchers in the project;
8. Used an inductive process that builds toward a theory; and
9. Used words and pictures to provide a rich description of what I learned.

It is important to stress that my choice of qualitative interviewing is based on my beliefs, assumptions and values as a qualitative researcher. I believe in the potency of qualitative data to

make decisions in the field of early childhood education. I also believe responsive interviewing can lead to a rich data set to understand teachers' perceptions, beliefs, and practices. Responsive interviewing is dynamic and iterative, with questioning styles that reflect the personality of the researcher and may change as the interview progresses (Kvale & Brinkman, 2009; Rubin & Rubin, 2005).

I ensured that I was effectively prepared for each stage of the inquiry. Therefore, I also applied Kvale & Brinkmann's (2009) seven stages of an interview inquiry as outlined below. This helped me maintain the focus of my study to answer the research questions, and ensure rigor and credibility of my methods.

1. Thematizing – formulate the purpose of the investigation.
2. Designing – plan the design of the study
3. Interviewing – conduct interviews
4. Transcribing – prepare the interview material for analysis
5. Analyzing – decide on the mode of analysis appropriate for the interviews
6. Verifying – ascertain the validity, reliability, and generalizability of the interview findings
7. Reporting – communicate the findings of the study

The purpose of this study was to describe and explain perceptions, beliefs, and practices about technology among early teachers in a Jamaican infant school. To understand teachers' perceptions, beliefs, and practices regarding technology for children's learning I employed interview research techniques "to understand the world from the subjects' points of view, to unfold the meaning of their experiences, to uncover their lived world prior to scientific explanations" (Kvale & Brinkmann, 2009, p. 1).

Data Sources

Interviews. I used interviews as the primary method of data collection for the study. Interview studies require as much rigor as other qualitative methodologies. For this study I used Janesick's definition of interviewing, "interviewing is a meeting of two persons to exchange information and ideas through questions and responses, resulting in communication and joint construction of meaning about a particular topic" (Janesick, 2011, p. 100). The interviews with the four participants allowed me to "elicit depth and detail about the research topic" (Rubin & Rubin, 2005), I also followed up on the answers teachers gave to get at their perceptions, beliefs, and practices about technology. I approached interviewing as a social production of knowledge, which is an active process with the interviewer and interviewees co-constructing knowledge (Kvale & Brinkmann, 2009).

I also employed Kvale and Brinkmann's (2009) metaphor of the researcher as a traveler. I traveled to Jamaica to conduct three face-to-face interviews with each participant. I entered into conversation with the teachers at Beta Infant School, and listened to their stories as they responded to semi-structured interview questions. I used semi-structured interviews in order to be responsive to interviewees answers, as a result I had to "modify questions to match the knowledge and interests of the interviewees" (Rubin & Rubin, 2005, p. 15) around the topic of technology. In order to understand the teachers' epistemology, I applied hermeneutics to conceptualize the knowledge produced in interviews.

The design of the study was based on the intended knowledge to be obtained from the investigation. Kvale and Brinkmann (2009) explained seven features of interview knowledge (pp. 53-56). The seven features are outlined in the table below.

Table 1

Kvale and Brinkmann's Seven Features of Interview Knowledge

Kvale and Brinkmann's 7 features of Knowledge	How These Relate to an Interview Study
Produced	Knowledge is socially constructed with interviewees and interviewer.
Relational	Knowledge produced is inter-subjective.
Conversational	Descriptions and narratives of experiences are epistemic knowledge justified discursively in conversations.
Contextual	Knowledge obtained from interviewees is not automatically transferable, or commensurable with knowledge within other contexts or situations.
Linguistic	Language is the medium of the interview research.
Narrative	Participants' narratives inform the researcher of the human world of meanings.
Pragmatic	Knowledge produced should be useful.

An awareness of these seven features of interview knowledge guided my understanding of the teachers' perceptions, beliefs, and practices. The teachers' perception of technology is embedded in the realities of their social context.

Qualitative researchers such as Janesick (2011) and Merriam (2009) encourage the use of an interview guide or conversational guide (Rubin & Rubin, 2005), which is a list of questions you intend to ask in the interview. My interview guide was semi-structured with some specific and open-ended questions, which I followed up with probes (Merriam, 2009). I also had some areas, topics and issues related to technology in order to form specific questions in subsequent interviews. The interview protocols had jottings, questions, and outlines that guided what questions to ask and whom to ask (Rubin & Rubin, 2005).

Each participant was interviewed three separate times based on Seidmann's (2006) three interview series. I audio taped interview sessions with a digital recorder and transcribed all interviews with some help from a typist. The structure of each interview followed Rubin and Rubin's (2005) suggestion of organizing the interview in main questions, follow-up questions, and probes. The main questions were the structured part of the interview, whereas the follow up questions addressed explanations for concepts or events described by the interviewee. I used the probing questions to keep my interviewees on topic while the main questions ensured that my research puzzle was being answered (Rubin & Rubin, 2005). See Appendix A for Interview Protocol.

Preparation for the interviews was vital for effective conversations with participants. Kvale and Brinkmann (2009) postulate that researchers should conduct interviews based on the knowledge sought and the interpersonal relation of the interview context. To prepare for interviews I followed the suggestions outlined by Janesick (2011) and Kvale and Brinkmann

(2009). I audio recorded the interview sessions using a digital tape recorder but also had my notebook to record field notes while interviewing. To avoid distracting interviewees with extensive note taking I engaged in active listening to "retain those very meanings that are essential for the topic and the purpose of the interview" (Kvale & Brinkmann, 2009, p. 179). To do this, I had to make jottings of ideas and recurring issues that were reiterated with conversational partners. I did verbatim transcriptions of interviews but also included a more literary style to emphasize nuances of a statement and enhance the communication of meaning to readers (Kvale & Brinkmann, 2009). I transcribed some of the interviews in order to learn about my interviewing style as well as have the social and emotional aspects of the interview revived during transcription. This allowed me to begin the analysis of meaning from what interviewees said (Kvale & Brinkmann, 2009).

Documents. As a form of triangulation of data regarding teachers' practices with technology, I examined the participants' classroom documents such as lesson plans to determine their attempts at intentional planning for integrating technology in their teaching with young children. See Appendix L for Sample Lesson Plans. Merriam (2009) used the term document to refer to written, visual, digital, and physical material relevant to the research study. I believed the participants' lesson plans were relevant materials for this study. The lesson plans provided a snapshot of the participants' pedagogy as it related to the technology they used with young children. The lesson plans were classified as research documents for this study since they provided "startling insights into the phenomenon under study" (Merriam, 2009, p. 149).

Researcher Reflective Journal. I wrote my researcher reflective journal to deepen self-awareness and sharpen my reflecting, writing, thinking, and communicating (Janesick, 2011). My researcher reflective journal served as a record of my assumptions, frustrations, challenges,

highlights, and my perspectives on how the research was unfolding (Mayan, 2009). I used the journal to capture how I worked with the data based on happenings in the field, this record helped with my analysis of the data to ensure rigor. See Appendix J for Sample Reflective Journal.

Site Selection

The site for my study was selected based on teachers' willingness to participate in the study and my ability to find all study participants at the same school. There are 32 infant schools across the island of Jamaica; however, not all the schools would have teachers who use technology with young children. The schools in the rural communities were less likely to have access to information and communication technology due to the digital divide that exists on the island. Some of the infant schools in the urban areas, in particular the capital Kingston, are more likely to have computer labs and access to technology in the form of desk top computers with Internet access, overhead projectors, cameras, and video and audio recorders.

The site selected is Beta Infant School (BIS) located in Southeast Jamaica (I use a pseudonym for the name of the school). Children spend two years at this school and then transition into first grade at a primary school (grades one through six). Based on information posted on the school website, the school boasts an enrollment of 384 four to six year olds. There are five classrooms for five year olds and all the teachers' basic qualification was a diploma in early childhood education from any of the notable teacher education programs on the island. Beta Infant School is described locally as a co-ed institution because both boys and girls are enrolled at the school. The classrooms at BIS had one or two computers. Other technology resources at the school included a multimedia projector, television, CD and DVD players, and tape recorders. The teachers used their personal laptops in lessons with the children.

Selection of Participants

Rubin and Rubin (2005) describe interviewees as conversational partners. In order to ascertain teachers' perceptions I interviewed four teachers at BIS who attempted to use technology in their early childhood classroom with five year olds. The purpose of the in-depth interviews was to understand participants' experiences with the focus of the study (Seidman, 2006).

In qualitative interviewing participants are sometimes referred to as conversational partners (Janesick, 2011; Rubin & Rubin, 2005). The term 'conversational partner' denotes the uniqueness of each participant with a distinct knowledge base and interaction style. I was interested in the meaning participants derived from their experience and their subjective understanding (Seidman, 2006) of technology in the early childhood classroom. The term conversational partner as used by Rubin and Rubin (2005) highlights the uniqueness of each participant and her distinct knowledge and style of interaction with the interviewer. As conversational partners, the interviewees concerns helped to shape the direction of each interview session.

Selection of participants for a research study can be either based on probability or nonprobability sampling (Merriam, 2009). Probability sampling allows researchers to generalize the results of a study to the population. Generalization is not a feature of qualitative investigation, hence nonprobability sampling was the method used for this in-depth interview study. "Purposeful sampling is based on the assumption that the investigator wants to discover, understand, and gain insight and therefore must select a sample from which the most can be learned" (Merriam, 2009, p. 77). To employ purposeful sampling, I established selection criteria for participants. To meet the criteria for the study participants should:

1. Currently teach five year olds;
2. Work in an early childhood program for twenty years or less;
3. Graduate from a teachers' college; and
4. Use technology in classroom practices with children.

In addition to the criterion sampling set out above, I searched for participants who were knowledgeable, eloquent, and motivated (Kvale & Brinkmann, 2009). Although the ideal interview subject does not exist, Kvale and Brinkmann add that participants who are truthful, consistent, and give long and lively descriptions of their experiences, may tell stories worth capturing and suited for reporting. Despite the participants' skills set at telling their stories, "it remains the task of the interviewer to motivate and facilitate the subjects' accounts and to obtain interviews rich in knowledge from virtually every subject" (Kvale & Brinkmann, 2009, p. 165).

In order to start the recruitment process, I requested assistance from two of my colleagues, one at a teachers college in Jamaica and the other at the Ministry of Education. I asked both colleagues to help me identify schools where I could find participants who met the selection criteria for the study. I sent a letter to the suggested sites outlining my research topic and data collection methods. I then decided on a school where four participants who were willing to participate in the study. I sent a letter to the principal requesting permission to conduct my study at the school. See Appendix G for Letter of Support from the principal at BIS. I interviewed four female teachers who met the criteria for participating in the study. Although the selection criteria did not include female participants, the school site selected for the study had female teachers for the five year olds. My back up plan included possible replacements of participants in the event a participant decided to withdraw from the study.

Analysis and Interpretation

The analysis of data was an ongoing process beginning with the transcription of interviews. Transcription is an interpretive process, which involves translation from an oral language to a written language (Kvale & Brinkmann, 2009). Qualitative researchers admonish investigators to think about how the interviews will be analyzed before conducting them (Janesick, 2011; Kvale & Brinkmann, 2009; Merriam, 2009). The thoughtful consideration of the analysis and interpretation guided my preparation of the interview guide, the interview sessions, and transcriptions of the interviews. Thus, as noted by Kvale and Brinkmann (2009), the analysis of interviews is mixed between the initial stories told by interviewees to the researcher and the final story reported by the researcher to an audience. I did some of the transcriptions of the interviews in order to help me get closer to these data. I used the verbatim transcripts to facilitate the first and second cycle methods for analyzing and interpreting the data. I am also cognizant of Seidman's caution to avoid any in-depth analysis of the interview data until all the interviews are completed (2009). According to Seidman, this helped to ensure that meanings from one participant's interviews were not imposed on the next.

I also followed Saldana's (2009) tips for coding and analyzing data. I engaged in precoding by circling, highlighting, bolding, and highlighting rich codable moments. Preliminary jottings were used to start coding as data were collected using brackets, capitalized, italized, and bolded text (Saldana, 2009). For initial categories, I used "a word or short phrase from the actual language found in the qualitative data record (Saldana, 2009, p. 74). The words or phrases were the actual terms used by participants themselves (Strauss, 1987). Since, I am applying a socio-cultural lens to the interview study it was suitable to extract indigenous terms from participants' responses. As I read the interview transcripts I attuned myself to words and phrases that called

for underlining, italizing, or highlighting. I kept track of codes that were inspired by participants rather than researcher generated (Saldana, 2009). I further analyzed the codes using second cycle coding methods. An over dependence on words or phrases limited my ability to transcend to more conceptual and theoretical levels of analysis and insight from the research data (Saldana, 2009).

Initial coding involved the breaking down of the qualitative data into discrete parts for close examination and comparison of similarities and differences (Strauss & Corbin, 1998). Initial coding helped me to "reflect deeply on the contents and nuances of [my] data and to begin taking ownership of them (Saldana, 2009, p. 81). The line by line initial coding of interview transcripts produced codes that were reworded as the analysis progressed.

One of the goals of the coding and categorization of interview transcripts was to reduce long interview statements to few simple categories. I did more focused coding of the data in order to gradually move the analysis from descriptive to more theoretical levels (Kvale & Brinkmann, 2009). The coding process eventually led to saturation of the material, the point where no new insights or information seemed to emerge during additional coding (Kvale & Brinkmann, 2009; Saldana, 2009). My researcher reflective journal with analytic memos documented my reflections on the codes as they emerged (Saldana, 2009). Member checking with the participants and peer review by a colleague helped with the triangulation of the data.

I employed Janesick's (2011) system of analysis. I:

- Listened and made corrections to transcriptions to make sure I did not miss the participants' nuanced expressions;
- Sent the file to participants for member check;
- Made any changes to the document following member check;

- Deleted extraneous talk and irrelevant text;
- Started summarizing the interview text;
- Used a peer reviewer to read field notes and interview transcripts;
- Divided texts into topics and subtopics that helped to format the text and reveal meaning;
- Used a left flush margin and a 2 inch right had margin for manual coding;
- Precoded data from the digital recording, field notes, and my researcher reflective journal;
- Made preliminary jottings to have tangible pieces of each interview as I commence the analysis;
- Created primary codes, which was the first round of identifying codes;
- Created secondary codes, which was the stage where I built categories; and
- Created third round codes, which were the final categories and cases.

I followed these procedures to ensure rigor and systematic analysis of the data. This helped me to maintain the credibility of my study. I also paid attention to the ethical considerations for qualitative research to maintain the privacy and confidentiality of the participants.

Ethical Considerations

Qualitative researchers agree that an interview inquiry is a moral enterprise (Janesick, 2011; Kvale & Brinkmann, 2009; Rubin & Rubin, 2009). As such, researchers are expected to abide by the ethical considerations of an interview inquiry. I considered the ethical issues Kvale and Brinkmann (2009) outlined for the seven stages of the interview study:

- Thematizing – I was concerned with the improvement of the participants' practices with technology in their early childhood classrooms;

- Designing - I obtained participants' informed consent to participate in the study and secured their confidentiality;
- Interview situation – I attempted to make the interview interaction as stress free as possible;
- Transcription – I maintained confidentiality to protect the interviewees and use pseudonyms for participants and the school site instead of actual names;
- Analysis – The participants had a say in how their statements were interpreted through member checking;
- Verification – I reported knowledge that was secured and verified; and
- Reporting – I maintained confidentiality when reporting interviews.

In addition to the procedures outlined above, I was opened to holding interviews in places other than classrooms in order to protect participants' identity. I obtained informed consent from each participant. See Appendix B for Informed Consent. I explained to participants that their involvement in the study was voluntary, and they were free to withdraw at any time. I used pseudonyms for names, school, school location, and other information that could identify a participant.

To increase the credibility of my findings from the data I did member checks, peer review, adequate engagement in data collection, and triangulation of multiple sources of data. The member checks included soliciting feedback from participants on my emerging findings (Merriam, 2009). See Appendix H for Member Check Form. I sent interview transcriptions to my participants to ensure that I was not misrepresenting the meaning of what they said. I also kept in contact with participants during data analysis to get participants validation of my

findings. I ensured that participants were able to recognize their experience in my interpretation and suggest fine tuning to better report their perspectives (Merriam, 2009).

My peer reviewer was a colleague who was familiar with my research methodology. My peer reviewer did a thorough examination by scanning some of the research data and assessed if my findings were plausible (Merriam, 2009). I presented my interpretations to my peer reviewer for discussion about their validity (Kvale & Brinkmann, 2009). I followed up on feedback from my peer reviewer, by revisiting the data and assessing my data triangulation. See Appendix I for Peer Reviewer Form.

In order to collect rich data, I spent adequate time collecting data coupled with intentional looking for variation in understanding the teachers' perceptions and practices (Merriam, 2009). In order to produce rigorous research, I interviewed each participant three times. I spent considerable amount of time in the setting to avoid grandiose interpretations due to limited contact (Mayan, 2009). I used multiple sources of data for triangulation. My data sources were interviews, documents, and my researcher reflective journal. I compared and cross checked data collected through interviews, teachers' lesson plans, and my researcher reflective journal.

Theoretical Framework

Teachers' experiences with technology do not have identical meaning in different contexts. Rogoff (2003) notes that a phenomenon should be interpreted within the context it is experienced. To determine the implications of technology for Jamaican early childhood classrooms, this interview study focused on teachers' perceptions, beliefs and practices about technology for young children's learning. Teachers' perceptions and attitudes are central to the pedagogical adoption of ICT, their practices with ICT depend on the cultural, social, and organizational contexts in which they work (Somekh, 2008). In light of this, a socio-cultural

framework is helpful in understanding the teachers' beliefs and practices with technology within their unique school context.

The social implication of the technology from the teachers' perspective was the focus of this interview study. For the analysis of data I took into account the teachers' perceptions, and beliefs as well as their community of practice (Rogoff, 1995). Rogoff extended Vygotsky's interest in the mutuality of the individual and the socio-cultural environment. The technology was the unit of analysis that I used to preserve the essence of the teachers' perceptions and beliefs. The teachers developed a practice of teaching with the technology resources they had access to. This practice of teaching was investigated from a socio-cultural perspective to illuminate what Rogoff identifies as apprenticeship, guided participation, and participatory appropriation.

Based on Rogoff's apprenticeship plane, I sought to identify how the teachers actively participated in teaching with technology within their culturally organized teaching activities. Research question one addressed this: What are teachers' perceptions and beliefs about the role of technology in young children's learning? The interviews generated rich data to identify and analyze the elements that make up the teachers' perceptions individually and collectively. The participants had peers who served as resources and challenges (Rogoff, 1995) for teaching with the technology as well as peers who were still developing their skill and understanding in the process (Rogoff, 1995) of using technology with young children.

Rogoff described the guided participation as the processes and systems of involvement between people that determine culturally valued activity. The guided participation was applied to the analysis of research question one: What are teachers' perceptions and beliefs regarding the role of technology in young children's learning? Rogoff (1995) defined the guidance as the

direction offered by cultural and social values and the social partners that are involved in the activity. Interview questions for teachers shed light on the value they placed on the technology resources at the research site and the extent to which the resources were integrated with young children's learning. For research question two: What are the practices regarding technology among Jamaican infant school teachers? An application of Rogoff's participatory appropriation helped to describe the extent to which each participant engaged in the activity of teaching with technology, or her appropriation of the technology in her teaching.

Role of the Researcher

As a qualitative researcher, I was the main instrument for obtaining knowledge. I had a moral responsibility for integrity, sensitivity and commitment to moral issues and actions (Kvale & Brinkmann, 2009). In addition to ethical issues, my knowledge of the research topic and methodology, and my experiences in the Jamaican context were decisive factors in the research process. I have over ten years of experience working in the Jamaican context as an early childhood teacher, administrator of a Jamaican Basic School, and teacher educator. I was aware of my Jamaican lens, which has been influenced by practices in American classrooms for the duration of my doctoral studies. My absence from active participation in the Jamaican education system for the past four years helped me to focus on enhancing my inquiry and helped me to be more attuned to the participants' stories. My familiarity with the research context helped participants to be more comfortable in sharing their experiences with technology.

In order to meet the ethical considerations for my study I updated my IRB certification by completing the course requirements for social and behavioral investigators and key personnel. See Appendix F for my IRB certificate. As the research instrument, I had to be persistent, indomitable, creative, disciplined, and diligent (Janesick, 2011). I had the desire to communicate

the research findings to reflect the social setting of the participants. In preparation for my role as researcher, I completed three qualitative research courses in my program of study. I conducted a pilot interview study and learned how to structure interview questions and probe an interviewee to elicit depth and detail about a research topic. I also learned to analyze my interview data and identify codes and themes from interview transcripts. I kept a researcher reflective journal throughout the process to keep check of my assumptions, which helped with my data analysis. My experience with a pilot interview study sharpened my research skills to design an interview study for my dissertation.

I have great aspirations for technology integration in Jamaica but I am aware of the challenges such as access to resources and teachers' competence with technology integration. I would like to see technology integrated with the Jamaican early childhood curriculum. In spite of my great aspirations, I was aware of the social embedded nature of ICT4D. I was cognizant of the need to understand teachers' perceptions and practices with technology to begin the discourse about technology integration in Jamaican classrooms. At this point I would like to reiterate the goals of ICT4D, which is to find out what should be done with technology and how it should be done in the unique context of Jamaica. The teachers' perceptions and practices helped me to paint a picture of technology integration at Beta Infant School. I am hoping that the implications from my study will motivate further investigation into the technology phenomenon in Jamaica to sharpen the hues and tones of the technology picture I initiated with my study.

I was captivated by the opportunity to engage in qualitative research in my home country. My familiarity with the participants' culture was both an opportunity and a challenge. My conversational partners were comfortable with my interviewing techniques because of my familiarity with their cultural nuances. The challenge I had was my ability to view every aspect

of the process from the standpoint of a researcher rather than that of a Jamaican colleague. I used my researcher reflective journal to help with the tensions that emerged in this process. I also used practical wisdom to describe events in the value-laden context of my research.

Another important part of my role was my ability to provide thick descriptions from my data analysis to help readers understand the research findings. I provided detailed descriptions of the research setting and participants, and used words to paint a picture of the findings with sufficient evidence from the data. I used quotes from participant interviews and documents as evidence in my discussion of the findings. The data analysis was a tedious process. The knowledge produced from an interview study should be useful (Kvale & Brinkmann, 2009) and I was anxious to ensure this characteristic with my study. While it was up to me to ask the right questions, I also had to depend on the participants' articulation of their perceptions and practices to find useful data.

On some days when I listened to the data, read the interview transcripts, and reviewed teachers' lesson plans I was unable to find anything to code. I had to reorganize myself to look deeply into what the teachers were saying to find substance and make sense of the findings. I reread my qualitative research text books and clarified the concepts of codes, categories, and themes from my data. I was able to develop a comfort with ambiguity and the mess of data analysis. This helped me to deal with the fantasies I had in mind regarding technology integration for Jamaican classrooms.

Perhaps my fantasies resulted from my submission in the US classroom culture and my dual roles as insider and outsider. The outsider position focused on a 'fix it' mentality, and this was interfering with appreciating the teachers' stories and experiences. I sometimes heard myself thinking – 'What do I need to teach the participants in order for them to make better decisions

about technology with young children?' These thoughts were later useful for the implications of the research findings and further thoughts I had about the research topic.

I had heard horror stories about the IRB process and was anxious to gain IRB approval. I had a positive experience with the IRB and was surprised with how soon I received approval for my study. See Appendix C for IRB Approval Letter. The staff was supportive and willing to answer my questions even when I had to submit a reportable event for using unstamped informed consent forms with my participants. See Appendix E for Acceptable Reportable Event. I received a continuing review for extension of my study. See Appendix D for IRB Continuing Review. I learned that the IRB process was not as bad as some persons made it out to be, although it depends on individual experiences to define what that process entailed. Once I met the criteria they had outlined for my research methodology and participants it was a smooth process to achieve IRB approval and subsequent extension to continue my study.

Timeline

Table 2

Dissertation Timeline

Task	Date
Completion of Qualifying Exam	March 2012
Admission to Candidacy	April 2012
Completion of Coursework	May 2012
Concept Approval by Committee	August 2012
Chapters One and Three Draft	December 2012
Chapter Two Draft	January 2013
Submission of Proposal to Committee	January 2013
Proposal Pre-Defense	February 2013
Proposal Defense	March 2013

Table 2 (continued)

IRB Submission and Approval	March 2013
First Round of Interviews	May 2013
Second Round of Interviews	June 2013
Third Round of Interviews	July 2013
Data Analysis	August – October 2013
Chapter Four Completion	March 2014
Chapter Five Completion	April 2014
First Complete Draft of Dissertation	April 20, 2014
Pre-Defense Committee Meeting	May 5, 2014
Dissertation Final Defense	June 9, 2014
Final Copy Completed	TBD
UMI Registration	TBD
Graduation	August 9, 2014

Chapter Four: Presentation of the Data

Introduction

The purpose of this study was to describe and explain the perceptions, beliefs, and practices about technology among selected early childhood teachers in a Jamaican infant school. The questions that guided this study were:

1. What are teachers' perceptions and beliefs about the role of technology in young children's learning?
2. What are the practices regarding technology among Jamaican infant school teachers?

As discussed in Chapter Three, the techniques for data collection included semi-structured interviews conducted with four teachers, my researcher reflective journal, and lesson plans from the participants. To begin the process, I emailed each participant an explanatory letter describing the purpose of the study and requesting her participation. Subsequent to issuing letters of participation, I held face to face meetings with the aim of answering questions or clarifying concerns respondents had regarding the study.

At this meeting, each participant signed the consent form and gave the researcher permission to record the interview sessions with a digital audio recorder and use the data collected for the purpose of the study.

After numerous site visits, phone calls, emails and text messages I established a friendly rapport with each of the four participants. I assigned each participant a pseudonym based on her

personality and passion for early childhood education. I explain the pseudonyms later in this chapter. The participants' school was also assigned a pseudonym. This chapter includes a description of the setting, the four conversational partners, and their perceptions, beliefs and practices regarding technology. The descriptions include information that was relevant to the research focus as well as information about the participants.

Setting

All four participants taught five year olds at the Beta Infant School (BIS) in Jamaica. As explained in Chapter Two, infant schools serve children four to six years old. The school had five classes for four year olds and five for five year olds. The children leave the school at six years old for local primary schools in the vicinity of BIS. The Beta Infant School was one of the largest infant schools in Jamaica. The total enrollment of the school ranges from 360 to 400 children each academic year. The teacher pupil ratio at BIS was 1:40 with assistance from a classroom aid. The classroom aid assisted with lunch and general supervision of the children.

BIS is located in the southeastern area of Kingston, Jamaica. The school is part of a larger complex of institutions owned by the Catholic Church. BIS was opened on August 4, 1896, with four (4) children. The school has preserved all its admission data from its opening date. As a result, the school remained an excellent source for statistical records regarding birth certificates and registration of children's birth data.

School began at 8:00 a.m. and children were able to enter the compound from 7:30 a.m. BIS was located in a volatile community. The school gates were closed from 9:00 a.m. to 1:20 p.m. The school employed security guards to prevent unauthorized persons from entering the school grounds. Any person who wished to enter the school compound had to present a valid ID and sign the visitors' log. To ensure the children's safety a metal perimeter fence surrounded the

school with a main gate for entry and exit. The protection of the students and staff was a main priority of the school's administration.

The school handbook outlined that parents who were consistently late for pick up after school were reported to the local Child Development Agency and the Early Childhood Commission. Upon registration of a child at BIS, parents received the school handbook with the rules and regulations. Parents were expected to acknowledge receipt of the handbook and confirm their commitment to adhere to the rules and regulations, functions, and policies of the school.

The handbook also mentioned BIS's affiliation with the Catholic Church, and as such, the school respects Catholic religious observance of special days. It was customary for the children to engage in devotional activities, which involved the singing of choruses, repetition of bible verses, and prayer. Devotional exercises were a common occurrence in both public and private schools across Jamaica. The children at BIS wore a uniform to school, and there was a dress code for parents and visitors. The dress code was displayed on the school fence near the security check point. I was barred from entering the school grounds one day because I was wearing a sleeveless top. The guard insisted that I had to get a jacket or a sweater.

The technological resources available at BIS included desk top computers, DVD players, television sets, multimedia projector, Wi-Fi for Internet connection, teachers' personal laptops, and CD players. The classrooms had one or two desk top computers, a DVD player, and a CD player. The teachers shared one multimedia projector, which was the personal property of a staff member. BIS was part of a Tablet in Schools project that was launched in September 2013. The teachers anticipated tablet computers for each child and teacher at BIS for the beginning of the

2013 to 2014 academic year. BIS was one of the five early childhood schools selected by the Ministry of Education (MoE) to pilot the Tablets in School project for a year.

Participants

One of the customs in Jamaican early childhood institutions was for children to use the title 'Teacher' along with the teacher's last name to identify their class teachers. I was known as Teacher Kelly when I worked at the early childhood level in Jamaica. I decided to continue this trend with the pseudonyms for my participants. Instead of regular last names, I ascribed the role that best fit the personality of each participant. My participants were Teacher Manager, Teacher Missionary, Teacher Fun, and Teacher Builder. The four participants were female teachers at the Beta Infant School (BIS). The four participants were continuing their education and attended classes in the evenings after work.

The table below shows a brief summary of the participants' profiles including assigned pseudonym, age, qualification, and years of teaching experience.

I collected data from May 2013 to July 2013. I scheduled three rounds of interviews with each participant. I conducted a total of 12 interviews with the teachers. Each interview lasted between 30 and 60 minutes. I conducted the interview sessions at recess, lunch, and after school. We had our conversations in either the Guidance Counseling room at the participants' school or the school auditorium. We completed the first interviews on May 16th, May 20th, and May 21st.

Table 3

Participants Profile

Pseudonym	**Age**	**Qualifications**	**Number of Years Teaching**
Teacher Manager 	40 years	Diploma in Early Childhood Education Diploma in Child Psychology B.Sc. in Counseling Currently pursuing a Masters in Education	18
Teacher Missionary 	36 years	Diploma in Early Childhood Education Currently pursuing a Bachelors degree in Early Childhood Education	15
Teacher Fun 	31 years	Diploma in Early Childhood Education Pursuing Bachelors degree in Early Childhood Education	6
Teacher Builder 	34 years	Diploma in Early Childhood Education Bachelors Degree in Early Childhood Pursuing a Masters in Education	12

During the conversations, I focused on building rapport and contextualizing each participant's experience as it relates to the topic of study (Seidman, 2013). For the initial round participants described a typical day at work and some of their personal and professional use of technology.

The participants also explained their understanding of information and communication technologies and the forms of technological resources available at their school. The participants talked about their institutions of study and what influenced their decisions to teach at the early childhood level. In the introduction of each participant, I shared the information I learned about her life history to contextualize the perceptions, beliefs, and practices with technology.

We completed the second interviews on June 13th and June 14th. For the second round, I was interested in the details of participants' experiences (Seidman, 2013) with technology in the Infant school. Seidman suggested having the second round of interviews for participants to "reconstruct the details of their experience within the context in which it occurs" (2013, p. 21). For this round the participants focused on how they made decisions regarding what technology to use and the role of technology for students' learning. They also described their successes and challenges with technology and explained what technology integration meant from their perspective.

We completed the third interviews on June 25th, June 26th, and July 3rd. For the third round, I invited the participants to reflect on the meaning of their experience and provide descriptions of the emotional connections (Seidman, 2013) between their perceptions of and practices with technology. In this chapter, I provide a detailed description of each participant before a thicker description of their perceptions and practices with technology. These descriptions of the participants explain their pseudonyms and a visual representation that captured each participant based on the information she shared in the interviews.

After the description of participants, I present the themes I identified as crucial to the participants' perceptions and practices with technology. The interview data along with teachers' lesson plans and my researcher reflective journal were used to inform the themes. The themes

were derived from triangulation of the data sources. The themes were described in detail after the brief introduction of participants and explanation of their pseudonyms.

Teacher Manager (TM). Teacher Manager was organized and business like in her interactions with me. When I visited the school for our scheduled interviews she was often involved in appraisal of her colleagues or assisting with grade level administrative issues. She was hesitant about participating in the research initially but later agreed because she thought this would be her contribution to building the early childhood sector locally. She was a young woman in her early 40s with a passion for order and achievement of outcomes. She has a background in business education and is focused on children's learning as the end product of her teaching activities. TM had a diploma in early childhood education, a diploma in child psychology, a Bachelor's degree in counseling and theology, and was pursuing a Masters in educational management.

The name Manager suited her because of her businesslike approach to education and her executive approach to teaching in general. She had eighteen years of teaching experience at the early childhood level. Teacher Manager described what her work meant to her in the following transcription:

> My work means having the responsibility to make educational change with groups of students in the sense of taking them to another level where they are comfortable working at their developmental stages. That is a lot in one sentence but that is what my work really means to me now. Because the face of education has changed not only with the type of children that we are now seeing but the culture at hand, the demand on the educational system on a whole, parenting, how children view things it's not just like before where children are not seen or heard but children are now given voices, they have

a voice and especially with the different organizations and institutions that also back them and give them rights.As I listened to her discourse about what her work meant to her, I could sense a passion for teaching and an excitement for working with young children. She further explained how she became interested in early childhood education.

> I wouldn't say that I chose to teach the age group, based on my personal belief from a spiritual level, I felt called to the profession to teach early childhood students. My first love at the time, I thought, was business education and because I was exposed to the business world I wanted to teach mostly high school students. But I had the experience in teaching at a Basic School, and based on the feedback from other persons they thought I was doing a good job, which I didn't because it wasn't my first love. But from a spiritual aspect, I felt led to go into early childhood education and as a result of that I realize my purpose as an individual to make change not from an educational point of view but given the sense that the formative years are very important and what they learn now is 70% of what they will carry over to their adult life. And so in making a difference I knew that whatever I did as a teacher, as an educator, as a caregiver will help mold them not only for now but for later life. That's one of the reasons I am teaching this age group.

Teacher Manager was very concerned about making changes, which was why I gave her the pseudonym Manager. Her focus on making change was one of her executive functions as Teacher Manager. She also described some of the things she would change if given the chance to do so.

> It would be the ideology of those who are superior over us like the Ministry of Education. How they view teachers, we are not machines. You cannot at all times implement new policies every year or every three years and expect us to accomplish that when we are

> working with limited resources and time. Put some measures in place where you know that some of the things they want to implement is unrealistic in the sense of the culture of the children we are working with. Where I understand that they want to meet first world guidelines, millennium goals and so forth where Jamaica is concerned our culture is different and it speaks to a lot of things. We have to make many decisions and put in double work when the home work is not done to reinforce a concept or a lesson. We put in extra time that nobody sees or is being documented by photographs, we are committed. There might be those who are not pulling their weight but there are those who are committed. And at the early childhood level, at this institution I can speak to that without hesitation that we are committed and we will put in all that needs to be done where our students are concerned and that's the part that I don't really like, the demands that are placed upon us. We are physically starved and intellectually drained but more can be done in terms of how policies and where different persons are coming with implementation and so forth. Don't get me wrong there is room for it but it goes against what we are trying to achieve throughout the day where contact hours are concerned with the children. Sometimes it can be too much but outside of that we love what we do.

Teacher Manager was concerned about the various projects the Ministry of Education was trying to implement and how the changes might affect the outcomes teachers plan for the number of contact hours with children. The teachers had five hours of contact with the children in their class, and it could be a bit overwhelming to fulfill all the curriculum expectations and meet the needs of the children. Figure 4 is a visual representation of Teacher Manager. Teacher Manager attempted to create a balance with curriculum goals, MoE expectations, and the resources available for children's learning. In Teacher Manager's opinion, the early childhood teacher

wore many hats, and the task of teaching young children should not be underestimated or treated lightly. The children's learning, which she described as output, was of major concern to Teacher Manager. A major part of this output was the children's readiness for grade one.

Figure 4. Visual representation of Teacher Manager

To paint a picture of her teacher duties at BIS, Teacher Manager described her typical day as follows:

> You in a sense may not see everything but you can attest to that based on the fact that at the time you came for the interview, you had to wait to receive me for this interview. I was in the office doing an appraisal [teachers are allowed to sit on appraisal team of their colleagues] with a teacher. My typical day at work is a very busy one so at the end of the day I am very tired. I said to my colleague today that I think we should add a foot spa to our school. It is usually a typically busy day.

She further explained,

> I am learning also to appreciate them [her students] individually and that as a teacher you are not going to get what you want at all times but somewhere along the line they will get it. So it is rewarding knowing that at the end of the day they may not get it when you want it, but they will get it when it is right for them. The aim is really and truly to help them master where they are at in their developmental stages but sometimes as a teacher you get anxious and the curriculum sometimes can interfere with that because you are trying to cover a lesson in the curriculum over a period of time so sometimes that can be an interference but I feel good when I see the end product at a time when they are most comfortable with themselves.

Teacher Manager not only identified the importance of managing resources for children's learning, she also explained her role as teacher in more details.

I would really like to be an ambassador in early childhood education. During my last study I've learnt that there are so many children who have not been exposed to early childhood education for one reason or the other and I was just blown away by that because as much as Jamaica has its struggles we are blessed. And when I look at what we do even at our school and in my own class I was saying as a teacher I think that sometimes when we compare we really do take a lot for granted. The children too may not even understand and parents too may not understand but in comparison to other countries we are way ahead in terms of the whole ideology of being educated. There are countries that girls are not allowed [an education] based on their culture and beliefs and so I would really and truly like to make a difference in that way to be an early childhood ambassador/child psychologist.

Teacher Manager seemed concerned about curriculum interference and the time limits for teaching particular concepts. She expressed her concerns for the needs of the children as well as meeting curriculum expectations for the five year olds she taught. She expressed the importance of acknowledging the children's access to early childhood education and her desire to make a difference as an early childhood ambassador. She had a diploma in child psychology and also indicated an interest in making changes using her child psychology background. TM enjoyed her role and explained how it felt to be an early childhood teacher.

> It feels very good; it feels very good because I have [teach] them first. The ability to try to make a change whether socially or academically, it's really fulfilling, especially when you see them five years coming back to you, to say "Miss you remember me?" And you are like "But you were this age or height when I had you". But it feels good to know that we had them first. And that is why the responsibility is even greater, because they started out with us. And so what we would have tried to impart then the other teachers or caregivers would be using that foundation as stepping stones to other levels. So it feels good to be an early childhood educator.

She also described her teaching style as flexible and dictated by children's ability levels.

> My teaching style, I like to be flexible with my students, I try to be honest and real with them in terms of my rapport. My concern too as a teacher, my teaching style is trying to pull the children a part from each other in groups. To help to try and motivate and to mold where they are. For example, I have found based on my experiences with children and in working with them that you are going to have different groups. You are going to

> have the advanced groups, the semi advanced, and those who are in the middle and so my teaching style is to challenge wherever they are by placing them in groups and working with them accordingly.

It was crucial that I garnered each participant's definition of technology. TM defined technology as follows:

> Technology is using teachable resources or materials in an effective way where children can be taught and where children can learn using or taking into consideration the different learning styles. So I am taking into consideration the audio child, the visual child, the kinesthetic and the tactile. So that's how it is important to me.

It was also important to learn about the teachers' personal use of technology to get an idea of their comfort zone or technological competence.

> I think I am technology savvy and I think I learn easily using technology. There are some basic principles that most technology will carry, and if you are informed in terms of the basics of one, there is always a way to detect to use the others where that is concerned. But I love using technology, I love the idea of using it and I do use it to my advantage whenever the need is necessary. I can use the personal computer (PC), overhead projector, phone, ATM machine, I have only held an iPad tablet but I would not have a problem learning to use it. The microphone (public address system), television, and I can help myself with DVD and VCR players.

Teacher Manager made sure to include her ideas about managing the use of technology during our interview sessions.

> We have to be careful of how often and which technology we use. Because you can't always have a DVD program running for the children, but it should be used in

> appropriate measure to enhance a lesson or to bring about a point. Separate and apart from leisure time, and it is not shown in a way that they get so accustomed to it so that when they have to move away from it and use other tools of instruction that they can't do that. So we try not to make it in a slavish way, but in a way where it is not too limited or it is not too much but in appropriate measures.

In my attempt to make sense of Teacher Manager's ideas, I reread her interview transcripts and paid attention to how she made reference to technology, teaching, and children's learning. She viewed technology as one of the many tools a teacher used to manage children's learning in order to meet curriculum goals. She described the teacher's competence with technology as the ability to meet the diverse needs of children based on their learning modalities and multiple intelligences.

> What I take to the teaching learning process, is my expertise. In terms of technology, the stimulation that technology offers, to the students, because with technology I was teaching children on a mode you can't teach them in abstract form, so even with technology whether or not they are manipulating a practical object, I have to make it as real as possible to stimulate all learning modes.

When she shared her expectations of the tablet computers her school would be receiving, she came across as the teacher who liked to be in control. I asked her about this and she explained her position.

> Because of the generation of students that I am teaching; some of them, not all based on their culture, they're not as gentle. And, I am telling you Miss, when they take up one finger alone, they don't even need a whole hand and touch that tablet; it will not be a touch. And, I can't afford for that tablet to be destroyed in one lesson, within five minutes

> time. So, I wouldn't be the teacher who'd want to hold on to that tablet, but I know that as an early childhood teacher we are taught to allow the children to explore, and to manipulate, and to learn from their own mistakes, and to see what will happen. But based on my experience on how they are my table top activities are an example of what will happen. So, I would prefer to hold on to it. When they have mastered certain techniques or skill, then I will give them free will.

Teacher Manager explained that it was her responsibility to evaluate the appropriate use of technology. The appropriate use of technology for her meant that the device was able to support the children's learning of a concept. Technology should augment concept building and address the learning needs of children.

> If I am using a technology, and the children are really not getting it, there and then, it means that whatever concept I am trying to bring out or communicate through this device may not be working for this lesson or concept or that particular child. This means I will have to review and evaluate, and see how best I can reshape or redo that lesson to communicate effectively where I want it to be.

Teacher Manager reviewed and evaluated lessons to determine if her goals were met. Teacher Manager described her use of teachable moments with the children and how she used technology to capitalize on teachable moments with the children.

> I have also used my cell phone. I have had lessons where I recorded my children and have it played back to them and they were excited. There are moments when I will see them, I like taking anecdotal records of them, memorable moments for me. For example, I saw two students doing a puppet show on their own; they were just doing a puppet

> show. We did the ethnic groups and China was one of them. And they were doing a puppet show on their own in make believe Chinese language, and that was memorable for me. I captured that moment. I remember also a student, who liked banging the desk, and I used it as a teachable moment and I went for a drum. I realized he liked to bang, so instead of reprimanding him about hitting the desk I used it as a teachable moment and a memorable moment for both of us. I videotaped it, with permission of course because we have a consent form for when we take pictures and videos in the school. I showed the video back to him and he was speechless, he was covering his face the entire time because he could not believe it was him. And it was also an opportunity to say to mommy, "Mommy I captured your son on video, do you want to see what it looks like?" It was a moment for us to have conversation as teacher and parent. The parent's response was "Yes, you know Miss, I really need to buy him that drum because he is gifted in that way". So I use my phone to record them, to play back for them, for them to see themselves what they look like and audibly for them to hear what they sound like. So, I use my phone from time to time too.

Teacher Manager used her cell phone to document a child's behavior, which enhanced her conversations with the child's parent about his performance in class. This resourceful use of the cell phone in the classroom was evidence of Teacher Manager's creative use of the resources available for teaching and learning. She also mentioned her goal for parent involvement.

> One of my plans that I have yearly for my children is for their parents to be involved. Parental involvement is important and so I structure lessons that the parents have to come in and teach. It is not always a formal lesson, for example, we try to make them comfortable, because they are not early childhood trained I say to them come and teach

> us about your profession. Come and tell us what you do throughout the day so the children can appreciate that about parents or a child can appreciate his/her parent coming in. Also it makes the parents aware and understand what we do daily, what interaction with the children is like and it also just gives them exposure to say come and give us five minutes of your time to teach these little ones and it also exposes the children to what we call resource persons. So my parents will come in and they will teach a lesson, and they have also used the projector to teach where it is necessary.

Teacher Manager alluded to her colleagues' commitment at BIS, which was evident in their monetary contributions for Internet access in their classrooms. According to Teacher Manager,

> We have Internet access in the classroom at a paid cost. The teachers in their own way make contributions; we do that because we are committed. These are the sacrifices we make; we make sacrifices to contribute where it benefits the children. In our own little way we make contributions to the Internet.

The teachers' contribution to Internet access in their classrooms showcased their commitment to teaching in what one participant described as the 'technological' age.

Teacher Missionary (TM2). Teacher Missionary was a religious young woman who saw her teaching as a calling to minister to children. She was basically on a mission to help children learn while fulfilling her calling to teach. She was in her late thirties and had fifteen years of teaching experience. Teacher Missionary had a diploma in early childhood education and was pursuing a Bachelors degree in early childhood education. She was of medium build with a very captivating smile. The pseudonym Missionary suited her because of how she viewed her teaching. She had a concern for the boys in early childhood education and especially the boys

she had in her class. She was on a mission to save the boys from underperformance and was eager to learn more about how technology can be used to improve her boys' learning.

> My work is not just my work, it is also my ministry. I say it is my ministry because it is my calling, it is God given, it is what God has called me to do and as a result, I go about my work carefully, whatever I do, I do to the best of my ability to give glory to God. My work involves caring for young children. And I am aware of the fact that at this stage, the early childhood stage, children are very fragile, in that everything they learn at this stage it doesn't go away. They are like sponges and they soak it up. So I am very careful with children, I love them. As I say I love what I do and I do my best.

Teacher Missionary was often at school from 6:00 a.m. until 2:30 p.m. in the afternoon. She left between 3:30 p.m. and 4:00 p.m. to attend classes at one of the teacher training institutions in Kingston. She beamed with pride as she described her day of activities and the elements of the daily schedule. The schedule included free play, learning centers, devotion, circle time, guided learning, break, outdoor play, story time, lunch, and creative activities (music, visual art, and movement). After dismissal she explained that she participated in extra-curricular activities such as environmental club, Red Cross, and the reading club. In her opinion, her day with the children would be more productive if she had more autonomy as a teacher.

> I would love more autonomy as the teacher to make more decisions as it concerns my class, my students. But we are governed by a lot of things, policies, regulations, and rules and all that. But I still function within the confines and have been doing a good job but I am telling you, if they let me loose (laughter). Sometimes I really feel restricted and really confined. Like for example, as an institution there are a lot of things that require

uniformity across the board but a lot of times I feel in my mind this is what I want to do. I would prefer to do this my way, but because of this red tape or policy I am not able to.

Figure 5. Visual representation of Teacher Missionary

The pseudonym Teacher Missionary suited her because she saw her goal for teaching as creating an integrated link between children, technology, and the curriculum. She believed she was called to teach and was driven by her passion to ensure that children learn.

She described her personal use of technology on a daily basis.

> In my personal life, I use technology every day. Right now I have a Kindle Fire, my Kindle Fire is right here and I use my Kindle Fire for the bible, I study from it, a lot of the books I am using for college now are on it. I also use it to communicate with my classmates as well as my lecturers. I use technology to do my assignments. I use it to help my children because like on my Kindle Fire (that is why I say I need probably a ten inch like the Samsung Galaxy), I have downloaded this software that children can use for writing stories. Children can write stories and based on the fact that it's a touch screen, it is very easy to use and the children love it. So, I use technology every single day in my classroom. In my classroom we have the Whiteboard (not an interactive white board), we have charts. I own a multimedia projector and sometimes I take it to school. Technology plays a big part in my life daily.

She defined technology as:

> For me technology means growing, enhancing your holistic development. It means going to another level, it means knowing more about the world. To me technology means empowerment. When you look at the fact that technology like electronics, for example, the computer, you can go anywhere in the world. Story books you can go anywhere in the world. Technology takes you places. As it concerns my job my work, technology for me means my children will become critical thinkers. They will be able to solve problems, they will be able to make decisions. So if my class decides that "Miss instead of just reading a story to us, why not let us watch it on YouTube. They can make decisions, they have choices, which give them some amount of autonomy and let them know that it's not about me so much. And I believe in the constructivist approach where children take the lead. They are not blank slates, they know that I am human and I have choices, I can

> make decisions, I have feelings. So that's really what technology means to me. It means taking you to another level by all means necessary because we are no longer limited neither by geographic location nor by knowledge. Because technology opens a whole new world that helps you to grow in all ways. And keeping in mind that technology is not just [electronic] technology but we have the charts, and pictures that the children interact with.

Teacher Missionary viewed herself as the technology teacher at BIS. She was the go to person when teachers had challenges with technology. She was determined to learn all she could about technology to enhance the teaching leaning process at BIS. In the words of this woman on a mission, she explained her intentions for using technology in the classroom.

> I am passionately in love with technology. I mean I am very intimate with technology. I will do whatever it takes, a mean it doesn't matter how far I need to go to make it happen as it concerns technology. I will do that. I will do that, I will go all out. I am just a lover of technology.

TM2 also shared her vision for BIS and hoped to see more integration of technology in the school.

> My vision and dream though for this institution as it concerns technology is that each class will have a multimedia projector, and an interactive whiteboard, as well as computers. I would like to see each child owning a tablet; so learning will be easier. I think that is where the government wants to go too as it concerns technology. That's really what I would like to see.

TM2 was excited about the research study and described how she felt about teaching and technology.

> I do what I love and I love what I do – I am passionate about technology, and I am passionate about teaching. I am contributing to the nation's children and I am being empowered and I am free at any time [for interviews].

She was enthused about her work with children and was committed to make the most of the technological resources at her disposal. She viewed technology as having great potential to enhance children's learning. She focused more on what technology can offer to support the children's learning and autonomy.

> Children are very hands-on; they love interaction, they love to explore, they love to discover new things and as a result technology provides an avenue for all that to take place. Technology also allows them to be themselves and to help them to understand that nothing is wrong with making mistakes. So if you make a mistake you can correct it and move on and you don't have to sit there and cry and worry that you made a mistake and how are you going to correct that. Technology also excites children, stimulates them and makes them think, and solve problems. So the role of technology for me is one of discovery, excitement, stimulation and fun as it concerns young children and learning as well.

The focus on the learner was evident in Teacher Missionary's perceptions about technology. The technology should support children's discovery, stimulate their learning, and bring excitement to the teaching learning process. Teacher Missionary's perception of technology was focused on exploring all the potentials of the available technological tools to optimize children's learning. According to Teacher Missionary teaching with technology "means no more chalk and talk, no more boring lectures, it's no more teacher-centered, it's no more me- me and what I want, how I

want and when I want. It means there are options. It means there is a whole big wide exciting world out there for you to explore". The agency was transferred from the teacher to the student with different options to discover their world. The teacher should also be on a path of discovery and find new ways to teach children and support their journey to explore.

> So technology means that we are not confined or subjected to any one mode or way of doing things. There are many ways and new ways and it also takes us into that way. I mean everyone is using technology. Anyone who is not using technology now is in nomad's land [*chuckles*]. It's like people who are using the monarchy system of government when democracy is really the best way to go.

She described her high point of the day as the point when children grasp a concept they were initially struggling with. In her opinion this is the best part of her day at work.

> The part of the day I enjoy the most is interacting with the children. What gets me bubbling and blooming is when the children grasp a concept that they were struggling with. When I see they get it. If a child, who wasn't able to do something finally accomplishes the task that gets me really excited. A mean those are my high moments, a mean the MoE cannot pay me for those moments (laughter).

She described technology as another important medium for teaching and learning, which provided children with the opportunity to interact with their environment. She noted the importance of teachers having the 'know how' to align the use of technology with learning objectives. The intentional use of technology was crucial to meeting the needs of children for all domains of learning. She identified her charts and the hopscotch game she made as technology because they were used to enhance lessons.

> Technology is very important, it's one of those medium that speaks to all the domains; can address all the learning styles and multiple intelligences. I believe that when you think about technology you look at multimedia projector, interactive whiteboard, you are looking at charts, you are looking at hopscotch on the floor. I made a hopscotch they can open up and fold up. As Piaget says, the way children learn they have to interact with their environment. They have to do a lot of hands on and technology provides that for children. I believe it is very important and I also believe it depends on how the teacher uses the technology. If you are not so versed this might pose some challenges. But once you know what you are about and you have your objectives, it goes back to objectives. You are not going to use technology without no focus, no aims, no goals, or what you want to achieve. Technology plays a big role.

Teacher Missionary would like all early childhood teachers to use technology with young children; in her opinion, if you are not utilizing technology in your teaching in one way or another, you are likened to a nomad. In order for teachers not to drift away from the technological age, it was crucial that they learned how to use technology to support children's learning. She identified the various slots on the daily class schedule that she used technology with the children in her class.

> Circle time, guided learning, group rotation, and also physical activity. We use a CD with music "Move to the Right" they use their bodies and they get moving. So, they understand concepts, directions – left/right, and other concepts like fast/slow. Every day, technology in my classroom is like food. If I stop use it we are going to die (laughter). Because when you look at Howard Gardner's multiple intelligences that can cover all the learning styles especially the multimedia projector. A mean you can play music the

> children can see pictures, they can go there and touch, they can interact – all the learning styles are being catered to – tactile, kinesthetic, visual, a mean it's just wide so wide.

She explained further how she used technology during circle time to have discussions with the children about Jamaican reggae icon, Bob Marley.

> I think it was Black History month and we were looking at Bob Marley and I downloaded a stage show where Bob Marley was performing. Yes, and there was also an interview in the same video. The children were able to see Bob Marley (knowing that Bob Marley is no longer a live). They were not just seeing a picture of Bob Marley but they were seeing him performing live, and in living color. They were able to talk about how he moved, when he is singing, how Bob Marley played the guitar. The children were able to talk about all that, after that they were able to dramatize and role-play Bob Marley singing "One Love". The students sang "One Love" and shook their heads. They were able to see pictures of Bob Marley's children, his wife; it was just so beautiful, a mean it was like a real life experience for the children. It wasn't just me telling them about Bob Marley, they were seeing Bob Marley perform on stage with the Wailers. They were able to identify musical instruments; and talk they were able to talk about his energy on stage. When they looked at the audience he was performing for they were actively involved in the performance. These were some of the things the children were able to talk about. It allowed them to appreciate Bob Marley as an ambassador, and reggae icon. It was really a powerful moment because the children learned a lot about a man who has contributed so much to Jamaica.

For Teacher Missionary, having access to the video was a good alternative to the traditional use of charts with pictures of historical figures for lessons. The children heard their parents' stories

about reggae icon Bob Marley, so the video was a way to connect them with the experiences of their parents and provide a spring board for discussions at school and in their homes. Teacher Missionary believed that providing a video for the children enhanced the experience and helped them to appreciate the person they were discussing beyond what they would see in a picture.

Teacher Missionary also allowed students to use her cell phone to play games. She believed it helped her boys to calm down and get rid of their pent up energy.

> I allow them to use the phone, some of them play games on my phone. Especially the boys who are very energetic and have a lot of bottled up energy a lot of times, playing games on the phone is like de-stressing. They just sit there and (mimics clicking sounds) and when they reach a new level they say "Miss I reach a new level". With learning as well, like with the Kindle, stories. The multimedia projector, the computer. It really helped them. Technology is like staple in your diet. You can't leave it out, it helps.

She described an incident with one of the boys in her class and how she used the cell phone game to distract him from what was triggering his angry outburst.

> One specific boy in my class gets angry very easily and I give him the phone and he is good, as long as he gets the phone he searches for the game and he finds the game and he is good to go. By the time he starts playing and, I start asking him questions "So why do you get so angry?" And he speaks but it's like if he doesn't have something in his hand manipulating that takes his mind off the immediate incident that took place. So even while he is playing the game and I'm talking to him he is more relaxed. So his answers are not expressed in an angry manner, it's more on a milder tone.

The technology was not only used to introduce and reinforce lessons, but helped to distract children from incidents that could get out of hand and cause disruptions in the class. The cell

phone in this instance was used as a time out tool to get the child to calm down, refocus, and then rejoin the group for activities. Teacher Missionary was determined to use whatever it took to meet the needs of the children in her class. She viewed technology as tools to empower children, especially her boys.

> For the boys I hope that technology will help them to understand that they don't have to be too competitive – because the world is so competitive and a lot of times the classroom we make the boys feel like they are under performers, like they are non-achievers. I want technology for them to realize that 'yeah' – it's not like writing on a piece of paper where you are going to get it wrong – with technology you can do whatever you want and say Miss OK I figure it out. ..I realize that this is not supposed to be there or that is not supposed to be there. And you can make your move and do whatever you want to do.

Teacher Missionary was on an assignment to save the boys in her care. She explained that the Jamaican statistics showed that girls were outperforming boys at all levels of the education system. She would like to make the best use of technology to help boys to become better performers in school and by extension the wider society.

Teacher Missionary taught her children Spanish, although Spanish is not included in the curriculum. She included songs in her lessons to teach Spanish names for numerals.

> I have used it in, even though Spanish per se is not a part of the curriculum, but at some point in time I like to teach Spanish to my children. I believe like with some Spanish songs with numerals communicating using Spanish the multimedia projector and the laptop where they can see persons speaking, singing and the symbols, the representations of those numerals help them to recall and memorize and retain the information for longer periods in their minds.

Teacher Missionary included Spanish in her lessons as an attempt to help her children reach their full potential and maximize learning. Technology integration for her means maximizing learning with available resources.

> Technology integration means for me using all you have the best way you can to achieve the objectives that you have for your students. It means helping your children to maximize their potential, to understand the content, the information, everything in such a way that it is fun. It is exciting but at the same time it makes sense. They can use it when they step outside the classroom.

Teacher Missionary wanted to ensure that children were gaining useful knowledge and skills in school to enhance their functioning outside of the classroom. This seemed to be a core value of her lessons and she wanted to maximize teaching learning resources to help children master the skills they need to function in life. It was a mission she embraced with confidence and determination in order to capitalize on teaching and learning with technology. In order to do this teacher Missionary emphasized the importance of reading and doing research to keep up to date with the technology in early childhood education.

> I do a lot of research, I do a lot of reading. I read plenty journals, I also connect with the NAEYC [National Association for the Education of Young Children] website and keep abreast with what's happening concerning technology because I believe that as a teacher, I am in Jamaica I am at BIS Corner, I don't know everything what's happening out there. So I have to stay connected with the world of technology. If I am not informed, I have no excuse, because the information is out there. And what I do as soon as I read about something, you have YouTube that I go to and watch videos. And as soon as I see

something I say- I know my children will love this. I maybe want to try it out in class to see how they would respond to it. So that's how I stay on top of things.

Teacher Fun. Teacher Fun was in her early thirties and was the youngest of the four participants. She had six years teaching experience. She had a diploma in early childhood education and was pursuing a Bachelors degree in early childhood. She talked a lot about allowing the children to have fun and making sure lessons were exciting and interesting. She described herself as the 'vibes teacher'; energetic and agile with a sense of humor that grabbed her children's attention. For her teaching young children should be about play, excitement, and hands-on experiences to ensure learning. The visual representation in Figure 6 depicts the happy demeanor of Teacher Fun.

Figure 6. Visual representation of Teacher Fun

She described her interaction with the children as having fun.

My work is everything, it is the driving force behind me getting up every morning to come and see my students to interact with them and just to have fun.

She specialized in early childhood education because she thought it was a good fit for her and because children enjoyed her charisma.

> I think I can more interact on their level, I am happy that they look forward to be in my presence. I think that is one of my strongest attributes in being a person overall and I guess that is why I come to this age group and I am just loving it.

She also added that the attention she received from the children motivated her. The feedback she received from parents about the activities the children did in class was one of the indications that her children were learning. She indicated that she was passionate about early childhood education and valued the influence she had on children's growth.

> The students look forward to seeing me in the mornings. I look forward to seeing them in the mornings. Just that love that they give, and you know it just gives you a sense of belonging, I feel happy to know that when I do my work it pays off and they learn. And then I will get the feedback from their parents. So I kind of encourage them that whatever we do at school, they are to go home and tell their parents. So I use that as a mark now to see if they got it.
>
> I am passionate about early childhood. I just love children, I just love how they interact, and as I said before the fact that I can influence their growth it makes me feel very special. So it's good, it's really good.

Teacher Fun described herself as being organized and explained how she followed her daily routine.

> I am an organized person, so I am a routine person. So I will change within the day but I will stick to a particular routine. I will come, I will have breakfast I will have additional work for my lesson, I will wait, accept my students, and I will let them have devotion,

play time based on their timetable. I will do the register and the lunch book, every day that is the routine. And then the teaching part is the best part. So basically a lot of work a lot of repetition reminding them to do things. At their level you have to keep reminding the children.

Teacher Fun believed in providing children with pictures to augment concepts they were learning about. She talked about "going all out" and "we go wide", which indicated to me that her lessons provided children with visuals to enhance the breadth of their study.

I am going all out. If I am talking about Blue Mountain, I will go all out as in carry a lot of pictures showing the different aspects of Blue Mountain. I will go as far as show them pictures of persons hiking to the peak. I will go as far as tell them how high Blue Mountain is. And you know at their level some will remember some won't. But we will go wide so somewhere during the discussion the children will remember. Even if they don't remember now, when they go to primary and they start the Blue Mountain topic, they will be able to recall that [Teacher Fun] told them about the height for that mountain. I will tell them, why the mountain is called blue. So I go wide because that is how my parents brought me up, they gave me a wide range of things and then eventually we start putting the pieces together.

Teacher Fun accredited her love for helping children make connections to how she was taught at the teachers college she attended.

At… Teachers College, they don't just teach a straight road, they teach all roads leading off. Just in case you lost your way, you remember something that maybe one of the tutors said. To me they all connect, they might teach different courses, but when you sit down and you are studying and you are realizing they all connect so they try to allow you to see

the picture on various levels. And that is what I love about them. It's a lot of work, and trust me they kill you with work but it's good and it pays off.

Although she liked to have fun with the children, it was not unstructured and chaotic. The timetable for the five year olds was the same so the elements of the schedule were similar to the ones described by Teacher Missionary. Teacher Fun described her teaching style as getting to the children's level in order to meet their needs.

> Well I cater for all the domains, the auditory, the visual, the kinesthetic. I cater to everybody because when I am teaching I use my laptop, I use my whiteboard, I use my charts, and I love to act. If you realize I am a funny person, I get down to their level; I may do two dances so all my students get it. If they are not visual, they are auditory, they are one of them. When I am teaching I cater for all the students in my class, I don't just stick to one way, because when you stick to one way you take the chance of leaving out some of the students.

Teacher Fun could not imagine anyone in her age group not being interested in technology. According to her technology was the way of life and every person had to use some form of technology or another especially teachers of young children. She provided her definition of technology and also described briefly the forms of technology she had for personal use daily.

> It's the way of life, to me it's everything. In the mornings I use my phone as alarm to wake me up. I use the Internet for interacting with other people; I call to check up on my friends and family. And I watch the television for the news. It's just everything; it's the way of life. And as I said before technology, I just can't see anybody not into technology. And I need to get a new blackberry.

Although they have limited technological resources at the school, Teacher Fun emphasized the teaching staff's willingness to share the resources or exchange their classrooms in order to allow another teacher to have access to an overhead projector or desk top computer. The teachers were proud of the Wi-Fi access they had in their classrooms.

> It's good the fact that I can get wireless that's great and you have the library where there is a big television and DVD player, so sometimes we can carry the students there for them to watch a show or anything to do with the library. Maybe you have a book and it has a CD with it, so we read to the students but we want them to have that feeling of the library. And it's good that is really where they can go to interact with others outside their classroom. Every classroom has a DVD player, DVD, television, computer; some classes have more than one. Some classes have overhead projectors. So, it's good it's really good. And the good thing that I like about the teaching staff if I don't have or unable to use an overhead projector, I could ask a teacher who has one in her class and we would exchange rooms for that lesson so we have access to the overhead projector to enhance a lesson. Everyone shares here. That helps us to give the students a better understanding of a concept or lesson using technology.

At BIS the teachers had some access to technology, which is a lot more than what other Jamaican Infant schools had. There was no access to computer technology in some schools, and the teachers at BIS are appreciative of the resources they had. The staff's willingness to share the resources was testament of their commitment to use what they had to the best of their abilities.

Teacher Fun's perception of technology had to do with the elimination of boredom from the teaching learning process. She believed technology had the potential to keep the fun in

learning. Her focus was on the excitement technology added to keep children happy and motivated to learn.

> Technology is a way of life. Way of life in the sense that everything is becoming technology so they have their laptop, they have their interactive whiteboards, and tablets. They have everything now that is part of life. Soon some of the children will have social media through their parents, not at school. It helps you know, to just have fun. Even if we are looking at the Skype, you know they can interact with a parent that is abroad [living outside of Jamaica]. And they can have fun, the fact that they are actually getting to see their parent/s. You know fun in the classroom with the games that they use on the computers and just fun. That's just fun to me.

She used the word 'fun' a lot in her description of the role of technology for children's learning. As the 'vibes' teacher she relied on technology to keep the children interested. According to Teacher Fun, "the role of technology for students' learning, to me it's the way of life, the nowadays way of life. It helps to foster development for the students within the classroom. It helps to motivate, it helps to enlighten and it helps to just add fun to teaching using technology".

Teacher Fun described how she allowed the children to access the technology in her classroom.

> It just happens because they love to go on the computers. I have fun games on it, so if they are being very nice for the day, I can send a set there [the computer], not everyone because they are going to be fighting for it. So I send a set there and others will be in the different areas. So, when that set is over, I might give them a little time and another set goes. They have some little games on it...matching, they manipulate it so they know nothing rude, nothing out of order. I make sure it is strictly child friendly. They do so

> with my guidance; there are nice games that I download from PBS for kids. They play the games with the keyboard and they love it. They love it. They know how to put in the DVD and they know how to turn on the television. So, I kind of train them that way. I let them feel independent, cause maybe at home they can't do it. They don't interact with the laptop; they use the computer, the television, the CD player and the DVD player. I give them that chance to change CD's also and press play.

Teacher Fun's approach included allowing the children to play games, rotating children in small groups to use the computer, and teaching them the basic knowledge of how to use the tools. She did not allow the children to use her personal laptop. Teacher Fun indicated that she used the groups as a classroom management technique. Her use of the word 'control' indicated her concern for keeping children on task even when they were using the computer. In spite of her emphasis on 'fun' she was also aware that with 39 students and one computer there had to be a system in place to ensure all the children had access.

> I have 39 students. My class is divided into three groups, so inadvertently three sets of tables - table red, table yellow, and table blue. When I say to my students "bottom half of table red" your time to the computer. And that will be like maybe 5 to 6 children at the bottom half. When I was doing whole and half, that's where I came in with the half. My students know when I say "bottom half", "top half" of table red you go. That is how I do it and then I would rotate it. If table yellow has been the best for the day, they will get to go first and they love being first. So that is a way to control them. That's how I do it.

The groups were based on where the children sat in class. According to Teacher Fun, "it's how they are seated. I don't put like all the brilliant ones together, everybody just sit. I just give them the names because of how they are seated".

Teacher Builder. Teacher Builder was in her early thirties with twelve years of teaching experience at the early childhood level. She had a diploma in early childhood education, a Bachelors degree in early childhood, and was pursuing a Masters in education. Teacher Builder had a pragmatic approach to teaching and learning with technology. She was aware of her personal limitations and those of the school. She was also aware of what needed to be done for her and other colleagues to enhance their use of technology for children's learning. Teacher Builder shared her ambitions to one day become the Minister of Education or the president of the Jamaica Teachers Association. I assigned her the name Builder because she referred to early childhood education as the foundation years and thought that this level is where 'the cement settles'.

> I like early childhood education because this is where the cement settles. This is the launching board for them, where they launch off into higher education and if they don't get it right here there will be problems in future learning. So I want to be the one to mold them and get them ready for future education that is why I like early childhood.

She wanted to "mold them and get them ready for future education". Teacher Builder was determined to move early childhood education from the 'back burner' as she so eloquently described below:

> Within the next three years I will be the president of the Jamaica Teachers Association; and within the next ten years, I will be the Minister of Education. Why I say that I think early childhood education is at the back burner in Jamaica and it shouldn't be that way. The focus should be on us because we get the children coming in from home, where we help them to learn more, to build more, to understand how the world works around them.

> And I think it should be on the front burner and persons need to understand that early childhood education is the most important aspect of a child's development. So that's where I am going.

Her vision for the early childhood field was that of a builder, who designed how the field should be viewed and the positions of influence she thought would get the job done. She was a builder at heart, which fueled her role as teacher.

> To be an early childhood education teacher it is most fulfilling. First and foremost a teacher can make a child or break a child. And I think as an early childhood teacher I have the ability, I have the desire and the drive to mold them positively, to pass on positive values and morals. So it's important because these children will move on to primary school and so they will go on to primary school with something efficient and beneficial. They will be going there with something vital to build on.

Figure 7. Visual representation of Teacher Builder

The Ministry of Education (MOE), and technology are two areas that are important to aid Teacher Builder in the building process. The end goal of this process was to ensure the children's readiness for their next level of education. She valued the use of technology to enhance children's readiness for primary school. She identified the need for more resources to help with the building process for children to learn. Teacher Builder was in need of more resources because there were areas of the building project that could be further developed.

> First I would address the classroom size. Because if I have two computers in my class with 40 children it is going to be difficult for each child to get enough time to manipulate the computer and understand how it works over time. So what I would do is to address the class size first. Then I would get different technological aids like a smart board, tablet PCs. It would be good if we have more computers in the class too. Like a technology area where children can go and learn more about it. We are in the technological age now; I would like to see each class with their own multimedia projector. I would like to see each class with their own camera so we can capture images and build them up to put in the class to write about our experiences. But I think more focus needs to be placed on technology.

In the words of a true builder, she explained the support she needed and the purpose for that support at the early childhood level. An effective building project is maintained through the concerted effort of a group of workers. In order for children to become productive citizens later in life, Teacher Builder identified the resources and workers that were critical to this process. She believed technological tools were necessary for educators to enhance the growth of the next generation of nation builders.

> Early childhood is the launching board on which young children launch off into society, and as a result, we as educators as well as the students need different technological aids that will help them to evolve to become active participants, creative thinkers, you know. Helping them to grow up to become positive nation builders. So, we need all the technological tools that we can get. We need all the help that we can get to help these young children to move from one area to the next area.

The launching board denoted the prerequisite skills that children needed to function in first grade. A builder was cognizant of how important it was to lay a strong foundation in order for the building to stand the test of times. When children transitioned to first grade, there were many challenges for them to overcome at the 'big' school. A strong foundation was crucial to their successful transition and subsequent success in meeting the expectations of first grade. Technology was one of the building tools that teachers could employ in laying the foundation for children's successful launch to primary grades. Teacher Builder defined technology as "any electrical device that can be used to assist in learning, making the teaching learning process more meaningful and exciting". In her opinion, the new curriculum for five year olds supported the integration of technology for children's learning.

> The new curriculum gives the students autonomy, they are given choices so while you are working with one group, the other group is involved in something else. They could be using the computer to research something. I think it allows for the use of more technology and is child centered. The teacher uses it as a guide; we used to follow the Self Reliance curriculum slavishly. It was so narrow that you couldn't even explore beyond the boundaries.

The Self Reliance was the 1983 curriculum also referred to as the Readiness Curriculum for Four and Five Year Olds. In 2010 a new curriculum was implemented, the Jamaica Early Childhood Curriculum Guide: Four and Five Getting Ready for Life (Dudley Grant Memorial Trust, 2010). Teacher Builder believed this new curriculum had potential for teaching with technology. She believed the technology supported the curriculum focus on language and Mathematics because of the opportunities to visually reinforce concepts that were explored.

According to her "technology is the way to go".

> Technology is the way to go- it's not like we are back in cave man days (laughing). With these children everything is all about technology. Even the cell phone- its technology; it's a technological tool that they're exposed to. When I was going to Basic school I didn't see a computer screen or TV in my class. All I saw was some writing and sometimes the writing wasn't even looking too good. These children are seeing computers, TV, DVD players and they can actually manipulate those things for their own use. So technology is the way to go because it stimulates them; it appeals to young children and this is what they want to do. They want do more and more, to learn more and more and find out how this thing works, how the world around me works and what can I learn from this and so on. They can even go on the Internet and find out the differences between a boy and a girl without me telling them. So I think technology is the way to go and teachers should be prepared to go that way with the students we have to interact with.

Teacher Builder acknowledged how early childhood classrooms had changed over the years. She noted children's access to various forms of technology, which were not available in her childhood years at a Basic School. She also identified the added value for children in terms of

stimulation for learning and research. Children can research concepts online without depending on the teacher to tell them everything. This further supported the move away from "chalk and talk' described earlier and children's autonomy in the teaching learning process.

Teacher Builder described the technology course she had to complete as part of the Bachelor in early childhood education program.

> While in college doing my Bachelors, we had to do an advanced technology course. And I found it very interesting because I learned things I had never learned before. I learned how to create activities for the children to actually manipulate the mouse and participating in activities rather than writing in their books or getting worksheets. I became so advanced and at the end of the course I got an A+ so I think I did very well at it.

In order to maximize the learning opportunities with technology, Teacher Builder would like the classroom size to be addressed. She also believed that more computers in the classroom could increase children's access to technology on a daily basis.

> I use technology in my class but not as it should, mainly because of the classroom size. We don't have enough for each student to really manipulate. Two students are allowed on the computer for a day. Students will not be using the computer all day because they have other things doing. So maybe if we had more computers more students will be able to manipulate the computer on a daily basis.

She also mentioned other technology tools she would like in her classroom to support the children's learning.

> Well these children they are smart. They are smart and they want to know more. They are very inquisitive, they have inquisitive minds. I want a Smart Board, and I would like at least five computers in the class. I would like a big printer in the class so when they do their work they can actually print to see what they have done. I would like more CD's so they can hear more nursery rhymes and lullabies.

She wanted to send an appeal to the MoE to ensure children in early childhood classrooms had more access to technology. Her message to the education ministry was " I would say to the [Minister of education] that we are in the technological age and these students are so advanced, I think they should be given the first hand opportunity seeing that they will be the future men and women, future nation builders".

Teacher Builder described the children as young nation builders who need technological skills to contribute to their communities. She described early childhood as the foundation and would love to have more technology available to young children in her class.

During the interview sessions, I felt an urgent need to intervene and share strategies with the teachers for introducing multi-touch devices to young children. I also wanted to share strategies to support the child as agent with the technology tools at BIS. It was difficult for me to remain in researcher mode and not plan workshops to prepare the teachers for their transition to tablet computers. In order to overcome this conflict I wrote my thoughts in my researcher reflective journal. The following was an excerpt from my journal entry for June 20, 2013.

> The constant conflict between my 'teacher' role and 'researcher role' continues. I want to intervene and share some resources I have about the developmentally appropriate use of technology with young children. In my head I was planning a sequence of seminars for the teachers to explore tablet computers – how to introduce them to young children and

> also how to help children use them as tools of learning and not tools of instruction for the teachers. I have to remind myself of the purpose for my study, which is to describe and explain the teachers' perceptions and that means I have to respect their stance and try to make sense of their articulated practices.

I had to revisit what developmentally appropriate practices include, especially the dimension of cultural appropriateness. Here I was trying to build a research base with a socio-cultural lens on teachers' perceptions and practices, but I was doing my analysis from a western cultural stance, where individual learning is valued over collective efforts. This realization brought some clarity to what the participants were trying to explain. The children at BIS were not accustomed to individual learning tools, and tablet computers for each child would require careful management by the teacher.

Themes

In this section of the chapter I described the themes I derived from the analysis of the data and the perceptions of the participants that contributed to these themes. The themes highlighted the connections between participants' perceptions and articulated practices with technology. See Appendix K for Sample Data showing categories, codes, and themes.

My data analysis involved an interrogation of the data to find patterns, identify themes, discover relationships, develop explanations, and engage in sense making (Hatch, 2002). My search for meaning involved reflection, triangulation, and being skeptical about my own assertions (Stake, 1995). I started by using codes, "a word or short phrase that symbolically assign a summative, salient, essence capturing and evocative attribute for a portion" of the data (Saldana, 2009, p. 3). I noticed that some of my codes were repeated, which allowed me to organize and group similarly coded data into categories based on shared characteristics. I had to

use my intuitive sense to determine the parts of the data that shared similar characteristics in order to have meaningful categories. Some of my initial codes were teacher as agent of change, planning for technology, decisions about technology, creativity, technology for literacy, curriculum connections, and teaching practices. I also had to recode and recategorize the data (Saldana, 2009) in order to refine the categories. This involved a review of the codes and categories then I decided what portions to be relabeled, grouped, or dropped all together.

Some of the codes that remained were teacher productivity, teachers' willingness to learn, creativity, learning in a different way, limited resources, and concerns about tablet computers. The research literature on technology highlights two broad categories of appropriation: teacher as agent and child as agent. Based on Jennings' analysis of teacher education in selected commonwealth Caribbean countries, although "the teacher as facilitator and guide is the ideal voiced in the educational discourse of the region" (2001, p. 121), the teacher as knowledge giver emerged as the dominant teacher type in teacher training programs. Jamaica was included in the selected countries for Jennings' research. This attitude of teacher as knowledge giver was transferred to teachers' in-service experience in Jamaican classrooms. The teacher centered nature of the classroom was evident in the themes that emerged from the data. In this study, the teacher as agent described the teachers' use of the technology as a tool of instruction for knowledge building. The teachers envisioned affordances of the technology described how children could appropriate technology for their own knowledge construction. The teachers identified the barriers that affected their practices to facilitate children's appropriation of technology.

Roopnanarine & Metingodan (2006) cross national research on early childhood education reveal that low income parents from the English speaking Caribbean view good children as

academically competent, cooperative, respectful, compliant, and obedient. The parents prefer more structured, academically laced instructional approaches and view play as frivolous to development. In spite of this, the language of play based practices has seeped into the early childhood curricula. Jamaican administrators and teachers embrace virtues of child-centeredness and extol the benefits of play and creative activities in engaging children's minds. However, in practice children are given few choices within structured educational settings. It would seem that curriculum designers are attempting to keep up with globalization by adopting Western influences in the design of curriculum, resulting in an articulated curriculum, which is extolled by teachers but is in stark contrast to the actual approaches that teachers adopt in early childhood classrooms.

The themes that emerged were technology as knowledge building tool, which was discussed as readiness for first grade and replacing charts with technology. The other themes were teachers' disposition towards technology, envisioned affordances of technology for children's learning, and actual and envisioned barriers. The teachers' perceptions about the role of technology for children's learning at BIS are summarized in technology as a knowledge building tool, and teachers' dispositions towards technology. The teachers' articulated practices with technology are summarized in the themes envisioned affordances of technology for children's learning, and actual and envisioned barriers to teaching with technology. Figure 8 shows the alignment of the codes, categories and themes. Figure 9 shows the themes and the connections with practices and perceptions.

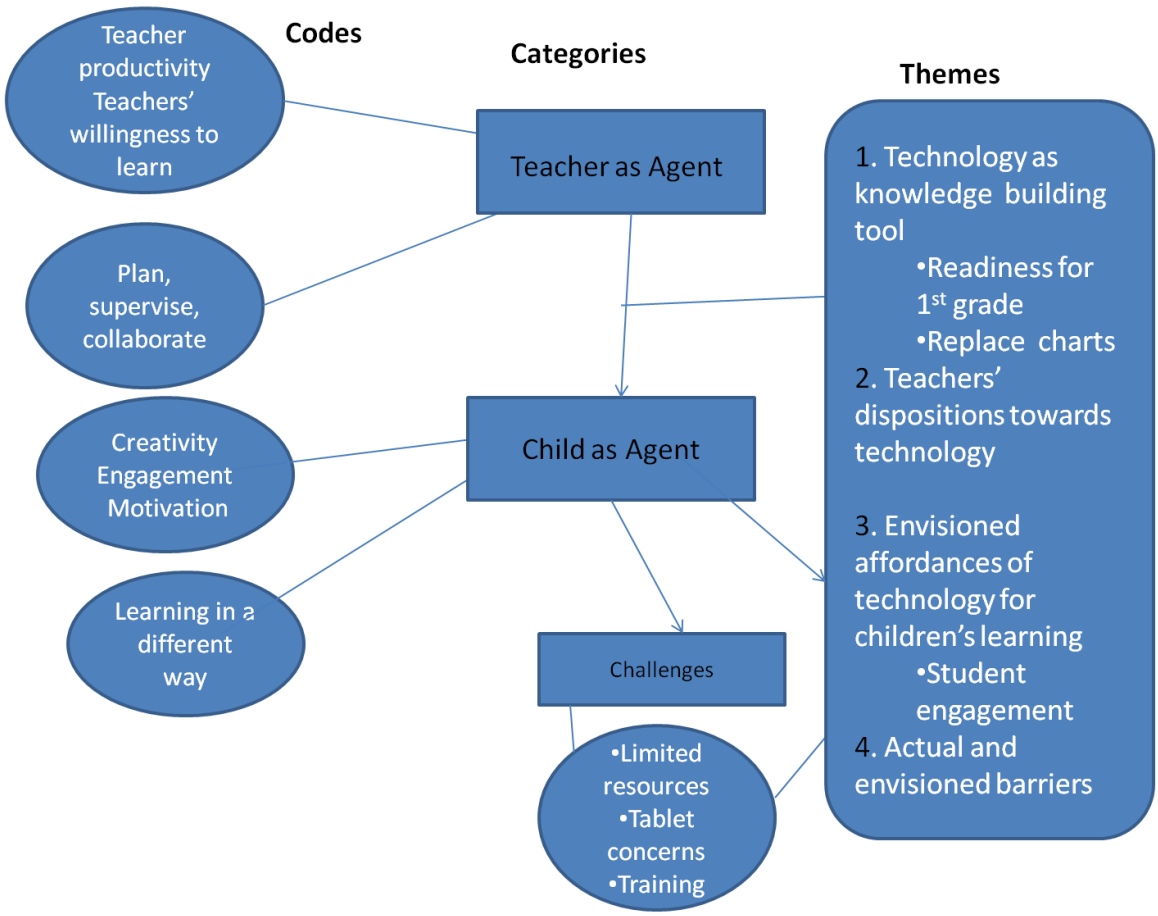

Figure 8. The alignment of codes, categories and themes

Technology as knowledge building tool.

Readiness for first grade. The teachers described technology as a knowledge building tool to prepare children for first grade. The knowledge construction described by the teachers focused on the prerequisite skills children needed for first grade. The Grade One Individual Learning Profile (GOILP) was designed to measure students' academic progress and their social readiness for primary school. It was administered to students prior to the start of Grade 1. Some of the skills the GOILP was designed to measure were reading readiness, numbers, concepts, oral

language, writing and drawing (Ministry of Education, 2013). The teacher's description of their practices with the technology at their school was focused on fostering the children's reading readiness, drawing, and number knowledge.

Figure 9. Themes from data

Teacher Missionary described her use of software for phonemic awareness.

> When I bring an educational software before them that have these letter sounds, like for example, Leap Frog, a mean letter sounds come alive and they are singing, 'A'says 'a' and it really cemented in their minds so even if I ask what sound does this letter make for a moment it might have slipped their memory, immediately it comes back because there is a rhythm, and there is a picture and that comes back to them.

Teacher Builder also made reference to phonics and the resources used for letter knowledge.

> For example we were doing the phonics game, and you have this leap frog software that we use to teach them about letter sounds. How to put letter sounds together to make words and teaches them that the vowels are the sticky icky letters. So we use the DVD player and the TV to introduce that lesson and the students were very excited as it was colorful and it's like the thing was jumping out at them and they really learned and they were excited.

Teacher Missionary described other skill areas that she used technology to support.

> They can use technology and while they are developing their fine muscle they are developing language at the same time, critical thinking is taking place, they can interact, and they can do it along with another peer. While they are doing that, learning is taking place.

These skill sets were important for children to achieve mastery on the Grade One diagnostic test. The results of the test should be used to inform instruction for children in first grade. However, teachers in Infant Schools, Basic Schools, and Kindergartens in Jamaica were aware that comparisons were made with the children based on the school they attended prior to first grade. As a result the teachers often overemphasized the readiness skills in an attempt to ensure the children's mastery on all sections of the test. The Minister of Education, Ronald Thwaites, noted in his sectoral debate to parliament that more than 30% of children who move from early childhood institutions to grade one, cannot satisfy the GOILP. He noted that these children are on an escalator of failure from six years old unless something is done. The teachers at BIS were attempting to do something with the technology resources they had.

Teacher Builder explained the role of technology for children's learning.

> Technology plays a very significant role in the society in which our young children are living, and it is only natural that they learn how to use these tools, learn how these tools work, and the systems that they rely on daily. I think our students are inspired by technology. You know, I can research this topic on my own and I feel independent I don't need my teacher behind me to tell me XYZ, and plus you know most of the games, educational games that we play it comes with auditory, so you know they could listen to the instructions follow the instructions on their own and do whatever it tells them to do by manipulating the mouse.

She further explained that children were more engaged when they had a sense of autonomy. Teacher Builder mentioned that she had children that were visual, tactile, and auditory. In her opinion the computer helped children with all learning modalities. The visual and auditory skills were crucial components of readiness for first grade.

Teacher Missionary mentioned the Leap Frog and the assessment of children's letter knowledge. She also noted that assessment of children should be based on the modality that best matched children's needs as well as enhances their self-esteem.

> They have Leap Frog, and it has the letter factory. So they [children] can go into the letter factory and you [teacher] can do an assessment and there is no writing involved. So while you are there with Leap Frog, they sing the songs and you can go back and ask them questions and if they answer incorrectly, you can let them go back and listen again just to make sure - so you're not putting them down. They are within that zone where if you give

them a little push they will jump over into what they can do independently with little or no help from the teacher.

Teacher Missionary's focus on the learner was evident in ensuring children's readiness for their next level of learning. It was important that the children had some autonomy and were able to feel good about their learning process to gain mastery of prerequisite skills for first grade. With an emphasis on prerequisite skills teachers often resorted to a skill and drill approach to help children with the GOILP. In Teacher Missionary's words "no more chalk and talk". Teacher Fun also described the use of technology to enhance children's literacy skills.

> Especially with the programs that you have online. You have Encyclopedia Kids that focus on literacy development, then you have the letter sounds. You can look at even Leap Frog DVD; it tells you like the letter sounds, it tells you how to put letter sounds together to create words. It gives you fun ways, so it plays around with letters for the literacy skills. It just helps, once you have catchy songs or catchy way of teaching the students they will learn it. You have to be able to repeat it maybe more than once or maybe more than five times, however I guarantee you at the end of the month they will get it. Some will take the month, some will take a week, some two weeks but it's good. The children's literacy skills can be developed with technology all the time, all the time…through numeracy, through letter recognition, putting letters together, anything – making words, reading some things, just overall it's good.

Teacher Manager used technology to add animation to her lessons and support learning. She believed that animation held children's attention long enough so they could understand difficult concepts.

> Children learn a lot through animation, and a lot of animation can be derived by using technology. I can show a video presentation to support learning, and also problem solving and it's mysterious. There is a video that I have used with my children called number jacks. And what number jacks is all about, it's raining numbers. When I showed them that video one of them said to me, "Ms. we know that those numbers are not real, you know. They just bring them to life so that we can enjoy them". For numeracy, the number jacks video was all about using numbers in terms of opposites, and the sets of 10. Different numbers come together to make 10, and there is always some evil trying to overcome good. In the video it says, there was a man who was trying to get rid of all the numbers, and one way in which to stop the man was to find five ways in which they could make number sets, to bring about 10. So, that technology using the video was one way to bring about numeracy concept, And that is one of the methods I use, because not only, is it stimulating in terms of colors, but the cognitive, the cognition of the child, is being stretched, and so they have to figure out, they have to go into their brain, they have to go to previous knowledge, they go to their fingers, so, manipulation is still taking place. You're gonna have some children who may know it, some will have to be using their fingers. So, all aspects of learning are taking place.

The use of videos to reinforce concepts was a common strategy among the participants. Teacher Fun also described her use of videos for numeracy concepts.

> Especially with numeracy, like you are teaching a number concept, you have some nice little songs that you can find on YouTube. And they will enhance the concept, you may be like do a little dance with the numbers you know, or something like that, that will attract the students.

Teacher Builder acknowledged that even the parents were sharing their use of technology to support children's learning.

> For literacy skills we have like phonics games, interactive games, and interactive reading games. Someone was telling me bout Pou but I've never played it before but I heard about it yesterday and it sounds really interesting so I plan to find it and use it. The child would have to feed Pou and buy clothes for Pou and all of that. It is interactive so they're actually developing skills. The parent was saying that while driving downtown the child saw a homeless man. The child turned to her and said 'Mom, why is no one taking care of that homeless man like how I am taking care of Pou?" She was speechless because she didn't know he was learning something else from Pou other than the ordinary. So I think those games will help with their vocabulary development, thus enhancing their literacy skills. So the teacher should prepare activities. Young children like things that are colorful. They like the bold prints- things that they can see and it seems like they can actually touch it. So teachers have to prepare and plan the right way for the children to learn.

Pou was a cross platform learning application for android, blackberry, and Macintosh devices. Teacher Builder was excited to learn that such an application existed and wanted to learn more about how the application supported learning. This experience with the parent allowed her to engage in an informal conversation about a learning application to support children's literacy skills and connections with real world contexts.

Teacher Missionary elaborated on literacy in children's environment and the role of technology to reinforce everyday literacy skills that children need. She noted that literacy also

involved comprehension, which was one of the areas Jamaican children were failing in the grade four literacy standardized test.

> Everything in the world speaks to literacy- if my understanding is correct. When children get up in the morning and they go to the bathroom, even choosing their own toothbrush is literacy because they have to think and process information. When they're travelling on the road and they see signs and symbols they see the Kernel and they say Mommy KFC! They see the stop sign and they know it means Stop. Technology reinforces, clarifies, and reinforces learning. As it concerns literacy, children will learn to spell their names, write their names. Everything that has to do with literacy, comprehension, phonemic awareness, vocabulary, fluency in reading- all that technology helps children with. There are software that highlights each word as they read, so even if they can't read, after a while they will become familiar with the words, because if they say the word, a little light goes over it and they know that that word is the word they have just said. So they're learning and technology reinforces learning and adds a little more light- it's like a ray of hope as it concerns literacy. Fluency too and comprehension- this is one of the biggest problems in Jamaica. The other day I overheard a discussion about the comprehension task [of the Grade Four Literacy Test) and that a lot of children fail their assessment because they read and they don't understand. Technology helps them with that as well because they listen to the story and answer the questions. Reading isn't reading if you don't comprehend, so technology helps with all areas of literacy.

Teacher Missionary viewed technology as a ray of hope to enhance children's literacy especially their fluency and comprehension skills. The grade four literacy test was part of the national assessment program, beginning with the GOILP. The participants' literacy concerns for children

were not only based on the expectations for the GOILP but also other stages of their assessment in primary grades.

Technology to Replace Charts. It was common for Jamaican teachers to create their instructional materials from recyclables. They spent hours making charts from boxes and discarded card board. These teaching materials included charts for weather, alphabet, phonics, and calendar. Teacher Missionary explained, "technology makes life easy and takes the hustle and bustle out of teaching". I knew exactly what she was talking about.

Teacher Manager's reference to 'other tools of instruction' made me think about the instructional nature of classrooms in Jamaica. The technology as a tool of instruction supported the teacher centered classroom that was common for Jamaican teachers. This was further supported by her idea, "technology for children's learning actually plays an integral part in the sense of aiding the teacher in the teaching learning process with the students". Technology as a tool of instruction assisted the teacher to achieve the curriculum goals and provided a visual aid for students to understand the concepts being explored. The technology added variety and excitement to lessons. According to Teacher Manager, "the children have different learning domains and, there are different learning outcomes based on the curriculum. For the early childhood level, learning cannot be monotonous, neither can it be monotonous for the teacher, and so, it's our way of enhancing, or aiding that lesson in the teaching learning process".

Teacher Manager talked about bringing creativity and value to her lessons. She described creativity as a characteristic the teacher brought to the teaching learning process to enhance lessons.

> For me technology I want to bring a sense of creativity to the lesson I don't want to only go out there and do picture discussions which can be used with technology but it is not

> using the charts, it's not using the usual charts it's not using the usual text books it's not taking them outside on a field trip it is using technology where they can see the same environment being projected on a screen in a picture format in a different way. So I would want to bring creativity in using technology so it's one of the reasons why I try to use technology to bring creativity to learning and teaching. How the teacher brings out certain lesson or concept in her lesson it's other than being creative its adding value to the learning experience its bringing out creativity and also tapping in to the different multiple intelligences.

Teacher Manager described the traditional use of charts and textbooks but also described technology as providing a different way. She believed that technology added value to lessons and provided opportunities for different learning modalities. Her description focused on picture discussion, a common practice of the language experience approach to teaching reading in Jamaican classrooms. The emphasis was on the teacher's creativity and not the creative skills of the children.

Although the teachers talked about choosing technology based on the objectives of their lesson, this was not evident in the lesson plans reviewed. The lesson plans provided details on elements such as objectives, materials, content/concepts, learning activities, assessment, and guided learning. The technological tools were sometimes listed under materials for learning but were not mentioned in the development of the lesson to indicate how they were used to support lesson objectives. The systematic instruction for the five year olds at BIS took place during the guided learning block of the daily schedule. See Appendix L for Sample Lesson Plans.

The common thread in the teachers' lesson plans is the teacher directed activities outlined in the procedures of the lessons. For example, the teacher will: Ask the children to listen to the

introductory song as she sings it. Ask the children to say what words they hear in the song. Ask what they think the word means. Ask the students what an island is. Ask the students if they knew that Jamaica is an island. Explain to children that she will be using the laptop and projector to show the picture of Jamaica as an island. Show pictures of Jamaica as an island surrounded by the Caribbean Sea. Ask the children what they think of the pictures. Name at least two other islands and ask children to name others.

Guided learning was added to the schedule for the new curriculum. The period for guided learning allowed teachers to focus on the learning needs of individuals and small groups of children. The focus for this period was either the reinforcement of concepts previously introduced or the introduction of new concepts. Grouping can be effectively applied in this period since the emphasis is on small group activity. The teacher may engage one group in a teacher initiated activity, while the other small groups work with self-correcting or self-directed activities (Dudley Grant Memorial Trust, 2010).

The teachers mentioned grouping children for guided learning with the computer but this was not evident in the lesson plan samples reviewed. Teacher Fun described how she engaged children during guided learning.

> Guided learning is allotted a specific time and how it's carried out is putting the students in 3 groups. Each group should be doing something different within the same time. For example, you have maybe one set doing like number sentence. Another one maybe looking at something like a drawing, another one may be at the computer doing something and like every 10 minutes or so rotate, so each group would be getting a chance to participate in the different activities for that day.

Teacher Fun later explained that children were sometimes engaged at the computer with educational software to reinforce letter sounds and numeracy skills. Teacher Manager liked the multimedia projector because it provided a visual for her lessons. She shared how the multimedia projector added visual appeal to a lesson about Jamaica Land of Beauty.

> One lesson that I can think of is one that was entitled 'Jamaica land of Beauty' and for that lesson I used a multi-media projector to project Jamaica as an island and even though descriptions were given to the children before this lesson, the expression on their faces when it was projected on the screen they were in awe and they said to me teacher "Is that really Jamaica?" and I was like "Yes, this is what Jamaica looks like" and because of the screen and how it is projected and the image as it is shown they were fascinated and they went into their own conversation and one said "I really want to go deer suh man" (I would like to visit that place). We were looking at tourists and how tourists come to Jamaica, when they saw the Corals and they saw the cliffs and they saw the waters and the water shed they were really fascinated seeing a pictorial view and a big pictorial view. It wasn't small in the book, it wasn't a chart, it wasn't a little clip art picture that was pasted in their book. It was a big projected screen that showed the beauty of the island.

Teacher Manager highlighted the value of adding visual aids to the lesson especially for children to view parts of the island they had never visited before. The videos supported children's learning and were effective substitutes when field trips were not possible.

In the case of the four teachers at BIS, the technology they had access to was often used as instructional materials to introduce or reinforce a lesson. Teacher Missionary described how the technology reduced the work load caused by making charts for lessons. She mentioned 'chalk

and talk' which referred to teachers instructing from the chalkboard or reading from a chart to teach children new concepts.

> It's not chalk and talk, you know, there is a whole lot more. It has helped me to realize that a lot of stress that I usually go through as it concerns planning my lessons and getting teaching learning materials, I don't have to go through that stress anymore. I can practically relax. There were times when I remember that a lot of my charts I had to sit and draw; draw things to go on the chart and then take the crayon and color them. Now I can go to the computer I can find whatever I want, I can print it and you know, so it has helped me in those areas. It has reduced my stress level, so I focus more on the students than on - where am I going to get this, or where am I going to get that.

She further added that

> It makes life easier for the teacher. In the Jamaican context our classes are grossly overcrowded. For example you have the ones who are performing below the set standard, the average performers and those who are very advanced. A lot of times in the classroom you find out that the advanced learners will complete the work way ahead of the others who are say average or slow. So technology provides what you call enrichment activity where they [advanced performers] can go to top-up. So if you're doing addition, with technology you can take them to an area where they can top it up a bit using technology.

The idea of 'topping up' the lesson was used to describe the enrichment activities that the teacher made available for the more advanced learners in the class. The top-up can be made possible with technology because as Teacher Missionary added "If you're using single digits for example, 1 + 2, you can top it up and you can now use 10 + 1 and they use technology to solve the problem". Although not the ideal example of the child as agent, there was evidence that the

teachers were aware of the possibility of modifying instruction and assessment with the use of technology.

Teacher Manager reinforced the idea of technology replacing charts to enhance the children's interest in lessons.

> Okay, I think that the role of technology for children's learning actually plays an integral part in the sense of aiding the practitioner or teacher in the teaching learning process with the students. Because the children have different learning domains that are use and, there are different learning outcomes based on curriculum, for the early childhood level, learning cannot be monotonous, neither can it be monotonous for the teacher, and so, it's our way of enhancing, or aiding that lesson in the teaching learning process.

According to Teacher Manager the technology became more of an instructional tool because the children did not have individual computers to work with.

> Basically using technology is to really learn a new concept, it's not that they have their own individual personal computer where they can actually manipulate so the most I can say about using technology is learning new information in a different way and it fosters great group discussion other than when they have a text book in front of them.

The teachers' references to drawing and coloring charts triggered memories of creating my own charts to teach. I collected boxes of all shapes and sizes for charts, table top games, and sorting trays. My siblings would save their boxes for me so that I could have resources for teaching materials. During my pre-service years, my colleagues and I would make trips to printing companies to collect paper and cardboard. We spent sleepless nights creating charts for phonics, weather, duties roster, alphabet, and many others. Our planning time was spent designing creative charts for the concepts we had to teach, which then affected the amount of

time allotted to ensuring our objectives were aligned with curriculum standards and assessment of children's learning. This often resulted in charts with creative designs but poorly implemented lessons. The idea that access to technology reduces the stress for teaching materials resonated with me because I could relate to the teachers' experiences with chart making.

Teachers' dispositions towards technology. The teachers shared their ideas about their colleagues' readiness for technology. They identified teacher attitude as an important factor in describing the role of technology for children's learning. According to Teacher Builder, diligent planning and preparation was required for technology integration. She believed technology integration with the five year old curriculum, required planning and making decisions about what technology to use. The teachers also described how they made decisions regarding which of the available technology to use for their lessons. For Teacher Manager, the lesson objectives guided her technology decisions.

> What I try to do is to look at the objective of the lesson to see what is it that I want the students to learn and to see how the use of technology can help to inform whatever information I want them to learn. The objective of the lesson is crucial in terms of determining how to use the technology as well as creativity. As you know that we are moving away from the chalk and talk methodology of teaching and that has been replaced with whiteboard but it is still a form of standing in front of the students and giving whatever lesson you are doing so it depends on the objective of the lesson and what I want to bring out in it.

All four teachers mentioned using a whiteboard, initially I thought they had interactive whiteboards at the school (IWB). These were regular whiteboard used in the classroom with dry

eraser markers. The teachers viewed the whiteboards as a form of technology because it replaced the wooden chalkboards with which they were familiar.

Teacher Missionary saw the Tablet in Schools project as an opportunity to extend her mission at the school. This mission included helping other teachers with their technological skills and fostering children's learning with the tablet computers.

> I see myself as the technology teacher here. That's how I see myself. I see myself structuring the multimedia resource room. I see myself on the floor, a mean on the mat with the students, a mean having fun and learning. I am very happy and it was divine prophecy that came out of my mouth and Madam Principal reminded me of that. Because Job 22:28 says "thou shalt decree a thing and it shall be established". And I believe it, I am not afraid to make decrees. I see myself helping other teachers who are not as grounded as I am in the area of technology. I see myself teaching them and helping them, taking them to the next level. So that as an institution we can all celebrate the glory, you know. When the students start to perform and we can measure, a mean we can look at the fact that last year when they did this, you know, this was the result but I noticed since we got the tablets this is what has happened. And that information can be presented on a pie chart so that you can see the progression and the difference. So, I am really looking forward to it.

According to Teacher Manager,

> I love to surf the Internet a lot and it's one way in which I can keep up to the flow. Also, I like to observe persons using technology. So, sometimes I don't have to be taught literally one to one. I do well at observation sometimes. So, if I observe you doing a particular concept using a technology, I will, I will learn easily, because I, I am

> intrinsically motivated to learn more about the technology. So, I am going to put everything in it. From this research, I am challenged to go after other things in technology like graphic designing. Ways in which you can make your technology creative in using it in the classroom. So, it means that I will have to, not only surf the Internet; I may have to enroll in a program that will help me. Because now the tablet computers are coming on stream. One advantage I would say I have already is the e-Learning program that is going to be implemented in July. So, we're going to be doing a three weeks course. It's an e-Learning project, which will help us, in using the tablet. So, I think that, that's one way in which I'm capitalizing on. So, that's a plus for me.

She went on further to say that,

> Doing this research has really opened my eyes as an early childhood teacher, as an educator where technology is concerned. It also opened up some of the areas that I thought were closed. I didn't really pay any mind [attention to], but the more I did, this research, or the questions that were there, and the discussions, I realized how important technology is, and the more I realize that I also have to make myself marketable. Because I was doing this research, the other day when representatives for the tablets gave us a

form to complete I was better prepared to respond to the questions on the form. This research helped me on that form, because some of the discussions that we had, were some of the questions that they asked, and because I was already processing the questions that were asked by you, I was able to fill out the form confidently. It really allowed me to take a look, take a step back and differentiate what technology really means to me, because what I had thought of in terms of technology this interview brought another dimension to what technology is really about. I will also challenge myself to be more trained where technology is concerned. So, it has been a really,

really, really, wonderful experience doing this interview. I've not regretted it one bit. I have learned more over the three times that I've been with you, and that's, that is really a plus, and I, I just want to say thank you very much for the exposure, the experience, and the discussions. You have given thought to me, indirectly, you know without saying it, just by the questions that you ask, you know I really have to process it. So, I just want to say thanks very, very much for the opportunity.

Teacher Manager's reflection on the interview sessions made me realize how important it was to give teachers a chance to think about what they were doing in order to make decisions about moving forward as a professional. She was committed to learn more about technology to enhance children's learning.

Teacher Fun also gave her reflection on the research study.

> To me, it's good to do these researches, it's good to participate, it's good to allow others to see the quality in you, and help to bring out some qualities you yourself was not aware of. Maybe if you were aware of it you were not like looking at it. And it's just good you know, to actually sit down and reflect. Because most teachers don't take time out to really question themselves to find out what they could do better. Some teachers don't even know that the DVD is technology. To know certain things and to be more aware it helps me as a teacher, as an individual to get better at planning my lessons. To be prepared for something new that is coming, to be excited, to be eager to learn. So it's just good overall and I do thank you again and I am happy I took the opportunity to do the interviews with you and to actually allow you to jerk my memory to sit down and reflect on myself. I think about the technology I have in my classroom and what I can do to plan

> a lesson for my students. A lot of teachers at the early childhood level don't believe they can go online and research certain things. I know and it helps me now to think about trying it a different way. We are going towards that [technology] so why not welcome it with opened arms.

Teacher Builder also gave a positive response in her reflections.

> I am happy that you're here because the tablets will be coming on stream, so it's like they've followed you in ([laughs]. It's like they saw you and they said she is going after technology so let us follow behind her. So they've followed you in like a puzzle coming together. So I am happy that you are here and that you have the passion for early childhood education and I am looking for great things from these interviews that we have been doing with you concerning our students at this level and technology.

Teacher Missionary added her reflection as well.

> Technology as was said is the way to go. Technology is it! It is what is happening now in all countries all over the world. Children should be allowed to keep up to date and abreast with what is happening. Teachers should be informed and we should not be afraid to share and as I said this is my plan - I am going to start that website for early childhood teachers and parents and I am going to put that link 'Technology and your child'. I just want to say personally thanks for this opportunity. It was fun, I enjoyed it!

The teachers' reflections indicated their positive dispositions towards technology and they were eager to learn more about the effective use of technology with children. They were aware of the challenges but remained hopeful and positive about the possibilities with additional training and support.

The teachers also commented that technology requires more planning, collaboration and supervision. According to Teacher Manager,

> For my teaching practice, it means more planning, more collaboration, and more supervision. Because, technology and, teaching goes hand-in-hand you can't separate the two, and mandated by the Ministry of education and ECC, which is early childhood commission. There is a standard curriculum that we have to use for readiness for grade 1. Based on the curriculum, there is a skill area the children must master. So, in terms of using tablets with the regular school curriculum and other skill areas, and social areas, and other interactive areas. It's more planning, it's more collaboration, and especially it's more supervision, because all entities will have to come together. So, that at the end of the day you can reach your targets, you're still, exploring possibilities and different avenues of learning. Children have their different learning modes and also the scope and sequence of learning. There must be an objective that is achieved at the end of the day. So, it's more planning, more collaboration, and more supervision.

Teacher Fun also talked about planning and finding ways to incorporate technology such as the tablet computers in her lessons.

> Well I will just have to find ways of incorporating it [tablet computer] into my lesson. It's not like I am going to say it cannot work, it has to work. The fact that it has to work, I now have to go and search and see how it is that I can make it work with my students. Yes, I will still have group activities; all of them can be doing the same things on it. They can share experience so you know they are interacting within their groups and they can show 'this is what I have on mine'; "what do you have on yours?" So it fosters

> development as in speech development, it fosters interaction; it brings out the moral as in sharing and taking time to understand each other. So it still can work, it's just that I have to find activities that will bring out those concepts.

Teacher Builder had a lot to say about planning,

> The teacher has to plan more though, because I think that using these tablets the students will become more advanced in all the skill areas and the teacher will have to go out of the box [think outside the box] to research and to plan what else can I do with my students, because they might be gravitating so much to the tablets and actually remembering things that we do from September and it never used to happen before. So we just need to plan the right way and plan in the right way and write interesting and excellent lessons so that we can reach our children in all the right areas.

She further added,

> You have to plan your lessons based on the interest of the children; their age- so developmentally appropriate. It should be challenging but not too much; so challenging in a way that the students can work it out for themselves. So in planning the teacher has to sit down and think about her students, know the students that she has in her class. How do I plan for Ronaldo- he likes football? What activity can I put into my lesson plan that will really appeal to Ronaldo? How do I care for Susie- because she likes reading? What activity can I put into my lesson plan for Susie to participate in? So that takes in the whole activity of planning.

Teacher Builder also talked about collaboration in order to meet the demands for planning with technology.

> For me it means collaborating with colleagues. What is your take on so and so? What activities can we plan, that by the end of the week all of our students will be doing the same thing? So collaboration is all about how you work with your colleagues. So here at [BIS] we have our two weeks meeting so we sit and plan for what we will do for two weeks ahead. We would write our lesson plans and pick out our objectives that we would use. So it all boils down that at the end of the two weeks, all the students in class two would have learnt the same thing.

Teacher Manager emphasized the need for supervision often during her interview sessions.

> Supervision is going to take more time with the tablets because you are looking at 30 or 40 students to one teacher. And so, supervision is going to take more time. They're going to be those who are going to manipulate faster than others. I'm not sure what the frame is, or what it looks like, I don't know yet. I am yet to know what we're going to be using fully. So you have to be walking [teacher circulating] like never before, but it's going to take more effort, more supervision, when using the tablets.

In Teacher Fun's opinion the onus was on the teachers and parents to create boundaries regarding children's use of technology.

> It depends on you the teacher and the parent. If you allow your child or your student to manipulate and go over boundaries with technology now there you will have a problem. Just like everything else, like play, just like watching TV, just like playing games you have to have a limit. You have to ensure that they have a limit. So you as the parent or teacher will have to know that OK, no more than a certain time for this and go out and play. Sometimes you need to tell them that listen, no video games today, go out and play.

> Because you have to remember that although technology is taking over you don't want them to like cram the child's mind to say this is the only way to life. We don't want that because you still have socialization with the peers that you need to develop, you still have the need to become street smart. You still need to know that you have to do your work, do your schoolwork, listen to your parents, and listen to your teachers. So you know these social principles that they need to have.

Teacher Builder described how she planned to introduce the tablet computers to her class.

> It will be something new and I think at first some students will get distracted, because most of them are not used to having a computer much less having their own tablet. So some of them will go haywire but again if we do it like one-to-one…. How I plan on doing it, is not to have the entire class with the tablet. I plan on going with one child first then another child and maybe I will find a child that is really good at it who can help another child so that as we go by everybody will gradually be using the tablet at once, so that's how I'm planning to take it. I will have peer-groups, smaller groups, interest groups as well. Because there could be activities that the boys are interested in that the girls aren't interested in so I'll plan activities based on their interest.

Teacher Manager's explanation summarized the need for a positive disposition towards technology.

> The fact that the children whether or not we teach them technology they're already ahead of us. They are already ahead of us, and because they are already ahead of us and we are taught to explore and learn and teach with them, it should be used as an opportunity for them to learn, also to point out that they may have challenges with some students that

> they cannot reach. Their parents will tell you, just give them the phone. They can't read a book, but just give them the phone. So, use it as an opportunity; as a teaching learning opportunity and experience. So, you're not frustrated as a teacher in reaching a particular child or group of children. They're already ahead of you. It's not something I'm asking, I'm telling you they are already ahead of us. My students are already ahead of me. So, instead of fighting against the use of technology with the students, I would really encourage it, because it's already out there, and they're ahead of us. So, take the advantage while it's there.

Technology supported learning opportunities for both teachers and students, which teachers should capitalize on to reach students diverse needs and abilities. According to Teacher Manager the children were exposed to one form of technology or another and that should be teachers' impetus for using technology to enhance teaching and learning. In their descriptions of the affordances that they envision, the teachers were aware of some of the challenges they will have to deal with. I did not hear any of them backing down from the challenges. It was obvious that with adequate support these teachers were willing to learn more about the appropriate use of technology with Jamaican children. They seemed eager to hear about how they can enhance learning with technology in the Jamaican context. This was evident in their reflections about the study we were engaged in and they were positioned to be more intentional with their technology use with children.

Envisioned affordances of technology for children's learning. The technology at BIS included a desktop computer in each class, DVD player, CD player, the teachers' lap tops, and a multimedia projector that was shared between classes. The teacher pupil ratio of 1:40 with one or two desktop computers made it challenging for teachers to provide opportunities for student

engagement with the technology. As a result, the teachers defaulted to traditional use of the technology for their lessons. The teacher as agent had control over the technology and the children were passive recipients of knowledge projected from a screen. Some efforts had been made for the children to use search engines to research topics, and videos had also been used to reinforce concepts. The children had opportunities to work with Leap Frog but it seemed more drill and skill than the kind of engagement that would lead to critical thinking and discovery learning. In spite of this the teachers were aware that with additional technological resources there were many possibilities for children's active engagement with technology. They envisioned the affordances of technology for children's learning in addition to what they were able to do with the resources they had at BIS.

Teacher Missionary was focused on meeting the needs of her students to achieve meaningful learning. She mentioned that her decisions were based on the children's interests and their learning styles. This helped to determine what mode of technology to use. Teacher Fun and Teacher Builder both made decisions based on the content of the lesson and what attracted the children's attention. Teacher Missionary expressed her passion for boys' learning at BIS. According to Teacher Missionary "in Jamaica where all the statistics are saying girls are performing better than our boys, technology will help them to become great performers". She further explained the role of technology to empower children and enhance their self-esteem. Teacher Missionary had a personal Kindle, and she was not afraid to allow her students to use it.

> Some of my children who have low self-esteem, the Kindle helps them because they sing the songs, and I have songs on it and all that. And they sing the songs and they play the games. You know it settles them, it relaxes them. They don't need my permission to go and touch a picture on a chart or to go and play with a game or something like that. What

> is most important is what it does for the child. How does it help the child to be a better person? How is it helping the child to learn more? How is it helping the child to connect with his/her surrounding or environment? How is it helping the child, a mean because it is said that reading takes you many places I believe the same is true for technology. Technology takes you places you probably would never go in your lifetime. So I think it is mainly what it does for the child. It empowers the child, similar to the Dress Up corner in the classroom.

Teacher Missionary also highlighted the visual opportunities that the computer and the multimedia projector provided for the children.

> For example the multimedia projector, you might have one picture but when I project it on my whiteboard everybody can see and they don't have to move their chairs to come closer to the front of the class. A mean it's big everybody can see.

Given the large teacher pupil ratio in the classroom, the multimedia projector seemed to be the most loved technology because of the visual capabilities during story time and for picture discussion. In this sense student engagement did not refer to the child as agent. The teacher had control over the technology to provide a visual or auditory enhancement to the lesson. This was important for the teachers to be able to ensure that all 35 or 40 children were able to see what was projected, instead of fussing over a picture they had to wait their turn to view. In this sense, student engagement was attributed to the students' attentiveness and interest in the lesson. Although the projection of images from the laptop and multimedia projector is similar to a lecture method of teaching, the teachers' aim to provide visual enhancement encouraged children's participation in class discussions.

Teacher Fun described the affordances of technology for children with an emphasis on the fun and laughter for children.

> Technology is very important. Very, very, very important and as I said before it brings them a reality. It open up, it opens their imagination and it just, and it just allow them to have fun. You know, they see something and they just burst out in laughter and they just find that funny and those are the things that allow children to remember. I remember when the gentleman flicked off the cliff and in the water and you see the tourist in the water at Negril. So it helps them associate, it brings a lot of things to the students when I can't afford to carry them. So if I can use technology to bring it to them that's good.

Teacher Fun was doing a lesson about tourist attractions in Jamaica. She showed the children a video of tourists enjoying the island in Negril, Jamaica. The video was used as an alternative to a field trip, which would be more costly to meet curricular goals on the topic. In this context, student engagement was connected to the children having fun and enjoying the lesson. It was important for the teachers that children were not bored during lessons. Teacher Builder talked about how technology removed the boredom from teaching.

> Well so far it has made the teaching learning process more exciting, more meaningful. You know it removes boredom. And the students seem to gravitate more to it. So for example, I'm doing a PowerPoint presentation and they see the words jumping across the screen. You understand by the time the letters come together, they are able to tell me that the word is 'tourist' or whatever it is. I think it has made a tremendous change, and I think that it is of utmost importance that we as teachers engage our students using technology even though our class sizes are so huge. We can find creative ways and means of helping them to use technological tools.

Student engagement was also connected to children's attentiveness especially with the visual prompts that triggered excitement in the lesson. The affordances the teachers discussed were also connected to their perceptions of the curriculum. Teacher Missionary thought there was no connectivity in the curriculum and would like to have more emphasis on number concepts and phonics for her five year olds. A part of her mission was to make up for the gaps in the curriculum, which she believed could be fostered with technology.

> I have to go through the entire curriculum, make jottings and look at it as a big whole. And pull from it and group the things. With numeracy I don't see a lot from it, it could be more. Even with Phonics too, there could be a bit more hands on, more interactive and try not to make it so boring. Because children see life as a whole, it's not segmented. So we have to plan for the children and ensure that even in the curriculum guide…even though you know that the teachers are trained you have to keep in mind also that some of the teachers are not trained.

All the teachers at the Infant school had their teaching diploma; however Jamaican Basic Schools had teachers who were certified by the National Council on Technical and Vocational Education and Training (NCTVET). The Basic school teachers had not yet obtained their diploma in teaching from a teacher training institution. Teacher Missionary was concerned about the teachers who do not have formal training in early childhood pedagogy and their use of the curriculum with young children. The curriculum should be designed with these teachers in mind to enhance children's learning while making adjustments for teacher flexibility and competence. This is the social context of early childhood education in Jamaica and this influenced the extent to which teachers may attempt to teach with technology.

Teacher Fun focused on the cultural relevance of the curriculum as its strongest feature to support children's learning with technology.

> The curriculum is wide and it brings in a lot of ethnic groups. It brings in a lot of Jamaica as in Jamaica as a whole. It brings in the tourist visitors to the country, it brings in how to keep your country clean, and it brings in the different heritage. Jamaica's heritage includes like the different dance techniques, brukings, and the national food. It is wider comparing to what it was before, [the former curriculum] emphasis was on numeracy and letter recognition. This curriculum brings in a more culture base, not saying that numeracy and letter recognition are not included. However, it mostly based on culture and our motto "out of many one people". The heritage of Jamaica as a whole, the different parts of the country that are tourist attractions and it is just wider.

Teacher Fun was pleased with the depth and breadth of the curriculum and the inclusion of cultural concepts and practices such as the traditional dance called 'brukins'. Brukins was a creolized traditional dance that celebrated Jamaica's emancipation from British colonial rule. The teachers' were able to find videos of adult groups performing traditional dances for children to watch and have class discussion.

Teacher Builder focused on the nature of the curricular activities for learning with technology and the teacher's role in facilitating the integration of technology with the curriculum.

> Because the curriculum is interactive, it allows to different learning activities, you get ideas that you can use, but it goes back to the teacher in the classroom. The curriculum cannot integrate technology, it is the teacher within the classroom who has to plan, and

> prepare, you know. The teacher has to be diligent in her planning and using different strategies of using the technological tools to enhance the teaching learning process thus making it more meaningful.

For Teacher Manager, the lesson objectives guided her technology decisions.

> What I try to do is to look at the objective of the lesson to see what is it that I want the students to learn and to see how the use of technology can help to inform whatever information I want them to learn. The objective of the lesson is crucial in terms of determining how to use the technology as well as creativity. As you know that we are moving away from the chalk and talk methodology of teaching and that has been replaced with whiteboard but it is still a form of standing in front of the students and giving whatever lesson you are doing so it depends on the objective of the lesson and what I want to bring out in it.

All four teachers mentioned using a whiteboard, initially I thought they had interactive whiteboards at the school (IWB). These were regular whiteboard used in the classroom with dry eraser markers. The teachers viewed the whiteboards as a form of technology because it replaced the wooden chalkboards with which they were familiar.

Teacher Missionary was focused on meeting the needs of her students to achieve meaningful learning. She mentioned that her decisions were based on the children's interests and their learning styles. This helped to determine what mode of technology to use. Teacher Fun and Teacher Builder both made decisions based on the content of the lesson and what would attract the children's attention.

Another form of student engagement was the opportunities children had to do their own research. Teacher Builder talked about the children using Google to search for pictures and their added interest in story time when the CD player was used. The children had the opportunity to search for information on the Internet instead of reading from a chart the teacher made. Teacher Builder also emphasized that when the children had to listen to a story from a CD player they were more attentive since they did not have pictures to distract them.

> We were looking at the cruise ship, so for that the child entered the word cruise ship and we went on images and when it popped up, they gave their experiences, how they felt when they saw this big thing one said "Miss this look like a house". You know they were really excited. I felt good knowing that I could bring something to them that they would like and enhance their learning. With the CD player, when it comes on to story time, it's because they are not seeing what events are happening they, they tend to listen more. I am always impressed by their response when they come for story time and when they listen to the CD player, they are like very quiet! They want to hear what comes next! And they're listening, if you walk into the class during story time you could drop a pin and hear it. And at the end of the story, they were able to retell the story, name the characters, tell you what's happening in the story, and all of that.

These children were in the city and might not have seen the cruise ship that docked on the North Coast of the island. For them to have the ability to view cruise ships online in their classroom was adding to their learning repertoire about their island Jamaica. The children would have to travel for two hours on a field trip to see a cruise ship. For Teacher Builder providing the children with this experience was worth talking about. Teacher Missionary also shared her ideas about software for drawing and the opportunity for children to correct their errors.

> We have software that can actually let them draw 'boy' or find a picture of a boy and say "Miss this is actually what I am trying to say". So I hope that it will help them to express themselves with confidence. Not having any fear, knowing that they are living in a world that everything doesn't go right and when things do not go right there is an option of correcting. That is one of the things I love with technology as well. If you type a wrong letter you can always use the cursor and type the correct letter. So, it helps them to feel good about themselves, and also keep track of their own progress. The information can be used also to share with their parents and let them know what is happening with them. Because I believe that once children feel good about themselves you can't stop them.

The teachers shared their anxieties and concerns for the Tablet in Schools pilot project (TIS) that the Jamaican Government started in September 2013. BIS was one of forty schools to receive Tablet PCs for teachers and students. These forty schools included five early childhood institutions. The participants for the pilot were a mixture of early childhood, primary, high school, and college students. During my data collection in summer 2013, the teachers were scheduled to begin training for the implementation of the pilot project in September. Their excitement, anxieties, and concerns were mentioned as they shared their perceptions about technology at BIS. While the teachers were aware of some of the affordances of the tablet computers, they were also anxious about the possibility of each child owning a tablet and the implications for classroom management.

There was a sense of excitement about the tablet computers; it was kind of surreal for them as well. Teacher Fun, who was usually excited, was exuberant about the possibilities she envisioned.

> First and foremost, I am excited. I am excited about it. I am just expecting greatness. I am expecting to finally have that…Even for me, getting the opportunity to manipulate or get the feel of a tablet. Because, I have never owned one. I don't have anyone around me that has one. So that excites me to know that it is finally there, and I am going to get this to see what it is about. How is it going to enhance the students' learning? Is it that I am going to be on the same network with all of them and I can say 'press this or press that'. I am just, it's just an open mind, just pure excitement. So I am just happy. I am proud of whoever in the government thought of having the tablets in school for children. It shows that this must be the way to go. Because if you are going to look at it from a wide range, the students overall, and you have the tablets to support the students' learning. It indicates to me that this is what is happening and we need to get on. You have other places that have it already and we are just going towards the technological era. And we just need to support it and be on board. So overall I just need technology in everything I do. We say Math is in everything. Now it's technology is in everything that is where we are going.

Teacher Missionary added,

> They say for example the tablets [tablet computers] that we will be getting have an audio system built in where it can speak and they can hear- so it can say 'not correct, try again.' With the slow children who a lot of times are really not into books- they are aware- children know their performance level- So for those slow children the technology also provides that way out. For e.g. leap frog they have the letter factory so they can go into the letter factory and you can do an assessment and there is no writing involved. So while you are there with Leap Frog, they sing the songs and you go back and ask them questions and if they answer incorrectly, you can let them go back and listen again just to

> make sure - so you're not putting them down. Those in the middle all they need is just a little nudge. They are within that zone where if you give them a little push they will jump over into what they can do independently with little or no help from the teacher. So technology helps for the three groups. For the slow one can bring them up to average and the average ones will bring up to advanced and for the advanced ones it will let them feel like they're out of this world. And sometimes it will make them feel like they're bigger than this class but I will let them know that they're still in this class but technology will allow you to understand that there still a lot of things that you can do; there is still a whole lot to learn. Teacher is still learning too. So the children understand that as well. So when they make their new discovery and learn new things they understand that learning never stops, and as long as you're alive- you will always be learning.

Teacher Missionary hinted at the affordances for assessment, differentiated instruction, and children's discovery learning. The resources they had in the classroom did not support individual access for discovery and learning, which would encourage the ideal hands on learning for young children. However, the teachers were knowledgeable of the affordances and they were passionate about the possibilities they would have with the table computers. Teacher Manager described the affordances of technology in meeting children's diverse learning styles and multiple intelligences. She believed teachers need the expertise to be able to use technology to meet the learning needs of children.

> To stimulate the visual child, stimulate the auditory child, to stimulate the kinesthetic child, and to simulate the child who also has multiple intelligences. So, in terms of using the expertise, where technology is concerned is using that in a way that brings about learning, different learning styles as well as different domains.

Teacher Builder acknowledged that the tablet computers will be challenging but rewarding in the long run. One affordance she envisioned was the individualized attention that children would receive and the guided learning for appropriation of the tablet computers as a learning tool.

> It will be something new so it will be challenging but rewarding in the long run, because you'll have to prepare activities for the children to use. So you'll have to prepare [things] like homework for them to do on it, so you know you'll have to guide them because it takes time. In doing that with a class of forty students you will have to give them one–to-one attention for them to understand how this works, what to do on their tablet and how to care for their tablet and all of that. So it will be challenging at first but in the end rewarding.

Teacher Missionary addressed the affordances of the technology for critical thinking skills as well as to foster boy's performance in class.

> I'm hoping that these tablets will help to boost/increase the literacy and numeracy rate in the institutions. We will have more students who are doing well in the areas of Reading, Math, Problem Solving, Critical Thinking Skills etc. The Minister for Education said that in the schools it seems like the higher order thinking is thrown outside the window, because the kinds of questions and the strategies being used are focused only on the lower order thinking. So you will ask a question and it's just 'yes or no' - no thinking takes place, so they're not stretched. With the Tablets you can stretch them. You can ask them a question and they can use the tablet to solve that problem or answer that question. So it takes them outside of their immediate environment. So even though they may be in the classroom or multi-media room, the tablet also takes them out of that setting and takes

> them into a whole new world, filled with ideas and filled with different people. So for example, even though they haven't met Dora- a cartoon character- they've never met Dora- but in the cartoon they have gone to Mexico and begin to speak Spanish because Dora takes them there. So with the tablets, especially for our boys- I think it's all over Jamaica- the girls usually perform better than the boys, so I'm hoping that the boys will begin to come up and reach to that level and even begin to outperform the girls.

She further explained the affordances for student autonomy and inquiry.

> It means less of me- in the sense that I'm not going to leave the children on their own or walk out of the classroom and leave them to play a game on their own. I am going to be there. It means that a lot of things that they will probably ask of me, a lot of questions- they can probably go to the tablet and find that out for themselves. If it is a word that they want to be defined, there will be a dictionary on the tablet where they can go, type that word, search and find its definition and actually tell me what it means. So it builds their autonomy and their independence and so it allows the teacher to be in the back like a shadow guide to boost them, cheer them and motivate them.

I heard the teachers' description of the child as agent when they shared their expectations of the tablet computers. It should be noted that the teachers were aware that children could have autonomy over their own learning, especially with mobile technology. This knowledge was important to note as the teachers prepared for the Tablet in Schools project.

According to Teacher Fun the mobility of the tablet computers was an asset for teaching and learning.

> The desktop is like getting so outdated (laughter). They can have that at home (laughter). But the tablet computer is more fashionable, it's more the in thing. It's moving from the desktop to the Tablet. The Tablet can move anywhere with you, it's portable. Wi-Fi, anywhere you go you can get it. It's like if you have a child and you are taking him somewhere and you need to take a toy to keep them quiet or to keep them active. The tablet is taking over so it's like it brings everything into one.

Teacher Manager made reference to a student in her class who owned a tablet computer.

> There's room and need for technology in the child's life, and I have seen it for my own self with my own students here. There is a student here, her mother travels [to the United States] and in conversation with the mother, the mother said to me she brought back a tablet [tablet computer] for her, and she brought back the tablet for her to learn how to read. Based on my assessment over the three terms that she has been with me I am looking at the scores, and, I'm trying to come up, with a pictorial view of her growth. Her reading has improved a lot! And, so, in reading I realized that the tablet was helping this particular student to read, because she was reading fluently, and she was learning high-frequency words that were outside of her vocabulary. I thought it was really, really tremendous. That's a plus, but with supervision. And, remember whatever you teach them, it is what they accept. So, if you indirectly allow them to use technology without proper supervision, they are going to think it is okay, because you have not yet said to them it's not okay. You only tolerate them because you don't want them to make noise, tear down the place and create a scene, and it's not right. So, only if it's not properly supervised, then it becomes an issue.

Actual and envisioned barriers. The teachers mentioned some actual barriers like limited resources, unreliable Internet access, technology training and the teacher pupil ratio. The envisioned barriers were mainly their anxieties regarding the tablet PCs they would be getting for the next school year. The issue of limited resources and their training needs were recurrent categories in the teachers' descriptions of technology challenges. The teachers saw this as a challenge to their practices and had a wish list of resources they would like to have. Teacher Fun shared some of the challenges she faced with technology in her class.

> If I had more than like 3 or so computers in the class that would be even better, so each child could go to one computer but I don't reach that level as yet but that could be good at least if we had like a little mini computer lab in the class and they have an idea what they are doing, so you have those games that you could have on a tablet could be on that computer and they could make you use interactive games once it support the lesson. Sometimes the Internet drop and you can't get it up, it will not drop for the whole day and it's usually a little time if it cannot come up during that time I would continue my lesson and I let the students know that something is wrong I'm not afraid to let them know something is wrong with my laptop or something is wrong with the Internet however we will get back to it but I have a lovely song or so for you to hear so they will look forward to sitting and listening.

Teacher Fun would like three or more computers in her class so she can provide access to more children at a given time on the schedule. Teacher Builder talked about the teacher pupil ratio and the challenges with a large class size for learning with limited resources.

> I like to have a lot of students in my class, but as it regards technology, when it comes on to overcrowded class, it is kind of difficult for you to assist your students in the way that

> you would want to help them to learn more about using this technological tool, and understanding more about it. So, first I'd address the class-size, the number of students to teacher before anything else would be done.

Teacher Manager also mentioned the limited computers as a challenge.

> I don't have the technology that they can manipulate in the sense of a smart board, the computer is limited so I don't have a computer for each child to manipulate and bring out skill areas. I would say that it is limited because I don't have enough of the PCs for the children to use.

Teacher Missionary described the attitude of teachers as one of the major challenges for children.

> In Jamaica a lot of times I think the classroom is too teacher dominated. I think as teachers we can allow the students to show us what they can do. Instead of going there and saying 'today we are going to'. Instead of 'I am going to' 'show me, show me, I want to know what you can do'. Without even showing them what you can do or you telling them what you can do. Find out, you know, capitalize on their prior knowledge, their experiential background. Capitalize on it, and then when you know what they know, then you find out from them. A lot of times we fail to include children in what is taking place.

According to Teacher Manager,

> My expectations are mixed and still mixed. Especially we've had a recent staff meeting, and even though everybody was excited about the whole aspects of us getting tablets, some people are still in disbelief, because we were saying one tablet for each child they cannot believe that, and they're waiting to see the reality of it happening. Concerns came out to in terms of how the children would really care the tablets, and how would us as

> teachers help to manipulate the process of having them to care the tablets, how to use it, because using the tablet would be very sensitive tool, and some of them may use the tablet as if they're playing with the doll. The boys may use the tablet in terms of playing with a car. And so, it brings a lot, a lot of mixed reaction, but it's really fascinating when you think of you're actually doing this and it's not something you're watching on television from another country. So, I have mixed feelings with it, but I am excited, as well as my staff members are.

She further added that,

> The timeframe that we you would use to supervise maybe a group activity is going to take more, because it's not like a book, that's more soft in terms of material, but this is a sensitive object. If they hit it too hard, or when they are moving their hand from left to right progression, you also have to help them with their fine motor skills. You have to help them in terms of manipulating. In terms of supervision, is going to take more. It's not like you want to say now close the books and pack them up. So, it's going to be new for the students too.

There was genuine concern about the care for the tablet PCs as well as additional time needed for supervision with the mobile technology. Teacher Builder mentioned that planning is crucial to how the tablet PCs will support learning in the class.

> It depends on how the teacher plans and it depends on how the teacher allows here students to use the tablet. [*Very passionate sound in her voice*] Because, as the teacher in the class there should be certain rules concerning the tablets. It's not like you can run around with the tablet as you feel; like you can go outside and whatever. There should be

> certain rules concerning the use of my tablet! Safety rules, how to care for my tablet: what if I'm drinking my juice; should I have my tablet next to my juice? What will happen to my tablet if the juice spill on it? So you need to take those things into consideration. If you know a child is destructive you need to monitor that child carefully with the tablet. Because sooner or later it will be of no use and the child will not even learn from it. So I think it is the way the teacher structures and plans for her lessons concerning the use of the tablets.

According to Teacher Manager she would rather additional desktop computers in her class than the individual tablet computers for the children.

> I would use a desktop/computer, because it's easier to supervise and better for the children to manage. Better manipulation too, and better team work. With the tablets every one of them wants tablets. Me, myself and I. And we know how egocentrism can be in the students. Once they are on the computer you dare not touch it. But, once they have the desktop computer, the personal computer, they learn sharing skills; they learn to take turns. And it's bigger and better, in terms of manipulation, and visual wise. It's better in terms of supervision too. So, if I had my choice, I would use the computer/desktop computer.

Teacher Builder was concerned about the Tablets replacing the writing tasks that her five year olds complete to enhance their penmanship.

> The only problem I have with it replacing the book and pencil, is that our, our students writing skills, I know that is going to go down. You know, we have students who write well, and they will be manipulating their tablets and their computers and their laptops. So

> you know, their writing skills will diminish a little. So, I wouldn't want it to totally replace it, but to be integrated with it.

Teacher Manager was excited about the TIS project at her school. Her excitement was coupled with anxieties and uncertainties as well. She mentioned that the idea of getting tablet computers at BIS was somewhat surreal for the teachers, especially since the teachers and children would be getting individual tablets.

> It is frightening because in terms of what we have been taught to teach some of us may not even have the thought or the idea of even using tablets with our children so it's exciting but it's kind of frightening because you would wonder if you would really and truly get it right in terms of learning. You also wonder how you will learn with the children too in terms of bringing across the information. In terms of even the care of the tables in storing them, where you put them and how you guide them. If you have to be saying to them go and sharpen your pencil you now have to say to them don't touch it too hard and don't poke it. It's frightening, it's exciting but it's something that we all really want to be a part of and also I think it is going to be challenging too because the expectation would be more and it also means that you will have to align your curriculum to foster this.

She was also concerned about the children becoming hooked on the tablets and disinterested in other learning media.

The issue of training was also mentioned, which I added as one of the challenges to the teachers' practices with technology. The teachers described their training as self-taught with reinforcement from college courses. Teacher Missionary shared the following:

> I learned about technology in college. College, well college was just like reinforcement, based on what I already knew. I think the only thing new, two things I learned new. I learned how to evaluate a website and I also learned, how to create activities like in Microsoft Word, Microsoft Excel, put it on a CD and the children can work from it; and would have options. I think it was more focused on knowing how to use the technology rather than how to teach. So we designed PowerPoint presentations but we were never taught how to present the PowerPoint presentations. I think it was what they call a basic introductory aspect of using technology.

Although she was introduced to new technological knowledge, Teacher Missionary highlighted that it was lacking what Mishra and Koehler (2006) referred to as technological pedagogical knowledge. The technological pedagogical knowledge would help her with how to teach with technology. Teacher Manager also talked about technology training:

> I don't think I am adequately trained, may have some basic knowledge in terms of the use of technology and I would use my teacher skills that I have learnt and try to apply my methodology in terms of delivery. I don't think I am adequately trained to teach technology to children in term of a lesson content area.

Teacher Fun added,

> I have thirty-nine 39 students and I am not sure how much I am getting next year but I know it's over thirty and to actually have all of my students including me having a tablet that's a major step so to me that's good. They can have more workshops because you know that technology is the way to go so maybe they can have one of the staff development days they can maybe have one of the technology experts coming in and

> giving us a free workshop or maybe the Ministry of Education will cover that but giving us a workshop and getting us kind of certified to know that at least we have done the training.

Teacher Builder also shared about training. She was adamant that early childhood teachers should seek their personal development concerning technology in order to be efficient in the classroom with this generation of learners.

> Well [very passionate sound in her voice], as it relates to early childhood or practitioners, I think most of them- about 80%- will have to get in-depth training, because some of them have left college many years ago and they haven't been back to college to upgrade their skills or to get familiar with any new thing that is happening as it concerns technology. So I think the training might be more intense for them. Some of them may not even want to be trained because they don't see the need for it. But if they don't want to be trained some other measure should be taken because these children are the future nation builders; these are the children who need to understand how important technology is, how it works so that they can even apply it. When they get older they can say they have learnt this in school and even decide to take a career path concerning technology. So, early childhood practitioners need to get on board. Technology is now! Technology is up-to-the-time! So they need to get training, find some institution that they can get training. It can also cause embarrassment because as a teacher in the class and your students know more than you and are ahead of you, then it doesn't feel good. So they should get training.

Teacher Builder was also concerned about the timeframe for training in the summer. The teachers all agreed that they would need continuous support to be able to use the tablet computers effectively with the children.

> I think I would need some more training concerning how to use the tablets; the dos and don'ts. In order to help me to be better able to assist my students who will have their tablets and maybe one or two students might have a tablet at home that they actually know how to use. I need training in that area.

In spite of the challenges the teachers used the technology resources they had in the best way they knew how. The teachers' articulation of their practices with technology seemed to focus on the acquisition of knowledge especially for the readiness skills the five year olds need for transition to first grade. Readiness for grade one was at the center of the early childhood curriculum. The teachers were aware that how the children performed on the Grade One Individual Learning Profile (GOILP) also determined the quality of early childhood education at BIS.

Chapter Summary

In this chapter I presented the data to answer the research questions about teachers' perceptions and practices with technology. I described the data sources and outlined the participant profiles with narratives to explain the pseudonyms chosen for each participant. I described the themes that emerged from the data to answer the research questions. Two of the themes related to perceptions and the other two were related to teachers' articulated practices with technology. In Chapter Five I will elaborate on the meaning derived from the findings as

well as discuss my role as researcher and lessons learned from this study. I will also discuss the implications of the findings for the early childhood sector in Jamaica.

Chapter Five: Data Analysis

This study described and explained the perceptions, beliefs and practices of four teachers in a Jamaican infant school. The study examined the teachers' perceptions of the role of technology for children's learning and their articulated practices with technology. The exploratory questions that guided the study were: What are teachers' perceptions and beliefs about the role of technology in young children's learning? What are the practices regarding technology among Jamaican infant school teachers?

In Chapter Three, I explained that I employed a qualitative study research design to describe the perceptions and articulated practices of the teachers. My study was an in-depth interview study because I wanted to capture the participants' stories regarding their perceptions and articulated practices with technology. In Chapter Four, I summarized the participants' experiences by describing their profile and a more detailed explanation of their perceptions and practices with technology. I provided the reader with a description of the themes that emerged from analysis of the data.

In this chapter, I describe the gaps in the literature on technology for Jamaican children's learning, my responses to the research questions as well as the implications of the findings for the Jamaican early childhood sector. I also recommend directions for future research based on the findings from this study.

Gaps in the Literature

I was inspired to conduct this study because of the sparse literature on early childhood education in Jamaica and my interest in technology for young children's learning. I was also interested in information and communication technologies for development (ICT4D) and the potentials for sustainable early childhood education in Jamaica. There is urgent need for research in Jamaica to influence education policies and to help teachers create local evidenced-informed practices regarding the use of technology with young children.

In order to add to the discourse about technology for young children's learning in Jamaica, a literature base is required that contextualize the use of technology in early childhood classrooms. In light of the government's Tablet in Schools pilot project, I have developed a greater concern for teachers' perceptions about the role of technology for children's learning and the practices that support children's learning with technology. Our over dependence on literature from Western researchers may have clouded the focus of Jamaican teachers and curriculum designers about what is considered culturally relevant and appropriate Jamaican practices. In light of this, my research study allowed me to shed light on some of the perceptions teachers had about technology and the practices they employed with the technological resources they had access to.

I developed greater interest in the TIS project from the teachers' concerns and anxieties. I was excited about the implications of the project but also cognizant of the research opportunities that could generate from the initiative to further inform teachers' local practices with technology. I realized the need for research on ICT4D in the Jamaican context. I also saw opportunities for investigating teachers' TPACK to inform teacher education programs about the integration of technology, early childhood pedagogy, and curriculum content.

The teachers' reflections on their perceptions and practices regarding technology helped to situate their concerns about the Tablet in Schools project and their current practices with technology. When the teachers consented to participate in my study, I did not know that their school was part of the Tablet in Schools project. During my conversations with the teachers, they mentioned the project and I sensed their excitement and anxieties about the tablet computers. All four teachers seemed to welcome the opportunity to voice their concerns. The participants said that my research was timely. The interview questions challenged them to reflect on how they used the technology they had while looking forward to the new technology they would receive.

Addressing Exploratory Questions – Data Analysis

In Chapter Three, I used the metaphor of a traveler visiting an area to "walk along with local inhabitants, asking questions and encouraging them to tell their own stories of their lived world" (Kvale & Brinkmann, 2009). I was a local inhabitant myself, who had been living outside the locale for four years. I had never visited the research site before but I was familiar with the Jamaican early childhood context. As an 'insider' with experiences as a classroom teacher, administrator, and teacher educator I entered the research with my own preconceived notions about what was lacking and what should be happening in our classrooms. My experiences in another culture influenced some of the aspirations I had for Jamaican classrooms. I used a socio-cultural framework to remain authentic to the experiences of the teachers and their cultural context.

My reflections during the interview process allowed me to confront my biases and attend to the stories of my participants. The following excerpt from my reflective journal helped me to quiet the voices in my head.

May 25, 2013

> Over the years my writing was motivated by my ability to see the end from the beginning. I was able to write imaginative stories when I knew how the story would end. Knowing how the story would end helped me with character development, plot, time, and keeping the story cohesive. I was even able to write the conclusion of my course papers before the introduction at times. This could not work with my dissertation. The story was not my story but the story of my participants. Total dependence on the participants for the story was very uncomfortable for me. At some points I felt powerless and uneasy because I did not have control over this story and how the narrative would play out. My most uncomfortable place, was the many "what ifs" going through my head. This was a distraction for me and being able to acknowledge it and put a label to it made it less of a burden and more about acknowledging my reality. My discomfort with ambiguity was the greatest challenge throughout this process. I remember my philosophies of inquiry professor telling us to "trust the process". Trusting the process meant giving up control and this was where the transformation started for me. It was then that I had to redefine my role as researcher and connect the dots between the participants' experiences – so in a sense I am the storyteller but it's not 'my story'. I will have to make sense of the teachers' experiences and report it in an understandable way for my readers.

During the data analysis phase, I realized the above concerns illuminated my discomfort with ambiguity. One of the strengths of a qualitative researcher is being comfortable with ambiguity. I had to confront my discomfort in order to tune in to the participants' experiences. With the voices quieted, at least for a while, I was able to tune in to the participants and listened to their

conversations to make sense of their perceptions and articulated practices. The following sample from my researcher reflective journal indicates the constant self-talks I engaged in.

> June 13, 2013
>
> I am having challenges…this is hard to do. There are many voices in my head – I am hearing the teachers' ideas, I am reflecting on what I read in the literature and I want to help the teachers with ideas for technology integration but my researcher voice says no – do not meddle – record, transcribe, analyze, and report. This is much harder than I thought it would be.

Each interview day began with my informal chats with the security guard at the school gate. After my first two visits I was known at the school as the research lady from the foreign university. The 'foreign' label allowed the teachers to relate to me as a researcher and not a teacher educator from Shortwood Teachers College. I was usually at the school an hour before my scheduled interviews, which gave me time to clear my head and acclimatize myself to the setting from the perspective of a researcher. I also used this time to recheck my audio recorder and set up my laptop as backup for audio recordings. I conducted some of the interviews during recess or lunchtime and we used the auditorium or the Guidance Counseling room to escape the noise of children playing in the background.

I was able to transcribe some of the data myself. I eventually got help with the transcription to be able to finalize my data analysis within a reasonable time frame. I did my data analysis over a period of three months (September to November). I engaged in manual coding of the data (Saldana, 2009) by printing hard copies of the interview transcripts in order to "work with traditional writing materials such as red pens and highlighters to explore data in fresh ways"

(Saldana, 2009, p. 22). I then returned to my computer screen and sorted my jottings from the hard copies of transcripts to highlight codes and label categories. I also had to recode and re-categorize the data (Saldana, 2009) in order to refine the categories. This involved a review of the codes and categories then I decided what portions to be relabeled, grouped, or dropped all together.

The teachers' shared a lot during the interview sessions. At times, it seemed they were happy to 'let of steam' about issues related to local education policies from the Ministry of Education. While I tried to allow participants' candidness, I was bounded by my research focus and I constantly had to redirect their attention to the topic of the study. As a result there were sections of the interview data that were not reported in the themes that emerged since they were irrelevant to my research questions. After allowing the participants to talk about their concerns both on and off the research topic, I realized they became more comfortable and their responses were more thoughtful and detailed.

I applied Rogoff's socio-cultural lens to the types of interview questions asked and analysis of the interview data. I made sense of the data from a socio-cultural stance, which involved observation of development in three planes of analysis corresponding to personal, interpersonal, and community processes (Rogoff, 1995). I employed Rogoff's interacting planes to understand the teachers' participation in a cultural activity. Teachers are members of a community of practice, which involves apprenticeship, guided participation, and participatory appropriation (Rogoff, 1995, 1990). The cultural activity in this sense was the teachers' perceptions and practices regarding the role of technology for children's learning. Individuals mature in cultural events within a social medium (Rogoff, 1995). The social medium for my

study included a Jamaican infant school as well as the larger socio-cultural context of teaching and learning in Jamaica.

As we consider different ways of grappling with early childhood issues in Jamaica, Rogoff's socio-cultural theory provides a relevant lens from which to understand teachers' perspectives on issues related to curriculum, teaching, and learning with technology. I applied Rogoff's interacting planes to contextualize the participants' perceptions and articulated practices. Rogoff (1990) used the terms apprenticeship, guided participation, and participatory appropriation to describe individuals' involvement across interacting planes. Rogoff identified 'activity' or event as the unit of analysis with dynamic contributions from individuals and their social partners. The dynamic interactions involve historical traditions, materials, and their transformations (Rogoff, 1995). The teachers' perceptions, beliefs, and articulated practices were analyzed in relation to their social context. The reflections on their practices with desk top computers, DVD players, CD players, multimedia projector, and laptop was a form of preparation for subsequent integration of tablet computers.

Apprenticeship is the plane of community activity involving active individuals participating with others in culturally organized activity, which has as part of its purpose the development of mature participation in the activity by the less experienced people (Rogoff, 1990). The community activity for this study included teachers' perceptions and articulated practices regarding technology. "To continue to function, a community also adapts with changing times, experimenting with and resisting new ideas in ways that maintain core values while learning from changes that are desired or required" (Rogoff, 2003, p. 81).

At the guided participation plane the teachers described their use of technology within the context of BIS. The teachers were able to explain their perceptions and make connections with

classroom practices with the technology resources they had available at BIS. Rogoff extended Vygotsky's (1978) concept of scaffolding individuals across the zone of proximal development. The participants acknowledged that the staff willingly shared ideas and resources with each other. This was an indication that the teachers would scaffold their peers. The teachers indicated their need for more training to improve their technological knowledge as well as their pedagogical knowledge. The training was needed to enhance their participatory or individual appropriation of technology.

First exploratory question. What are teachers' perceptions and beliefs about the role of technology in young children's learning? The teachers' perceptions regarding technology were described in the themes: technology as knowledge building tool, and teachers' dispositions towards technology. Technology as a knowledge building tool is divided into two sub themes: Readiness for first grade, and technology to replace charts. For the four teachers at BIS, the technology was valued for building the foundational social and academic skills children need for a smooth transition to first grade. The academic foundational skills included reading readiness, number knowledge, concepts, oral language, writing and drawing. The knowledge construction for reading readiness and numeracy was given more emphasis in teachers' perceptions of the role of technology for children's learning. The teachers used Leap Frog for phonemic awareness. The teachers also described online programs like Encyclopedia Kids to enhance children's literacy development. The knowledge construction with the technology enhanced children's letter knowledge and phonemic awareness.

The use of YouTube videos such as the Number Jacks series was viewed as a valuable resource to add animation to lessons and build children's understanding of numerical and non-numerical concepts. The Number Jacks video enhanced knowledge construction as described by

Teacher Manager, “the cognition of the child is being stretched, and they have to figure it out, they have to go into their brain, they have to go to previous knowledge”. The teachers also used YouTube for what was described as “nice little songs”, accompanied with a number dance to maintain children’s interest.

The technology was believed to “add a little more light” to new concepts for children. In other words, the technology supported children’s literacy development and enhanced their comprehension, phonemic awareness, vocabulary, and reading fluency. The teachers believed technology had the potential to improve children’s mastery of the prerequisite skills for first grade, while also laying the foundation for mastery on other national assessment tasks such as the Grade Four Literacy Assessment.

The four participants believed in providing visual enhancements to support children’s learning of concepts. The teachers welcomed the replacement of charts with visuals from the computer and multimedia projector. The teachers believed technology increased their productivity by reducing the time spent on creating charts for the purpose of instruction. Instead of drawing and coloring pictures for phonics charts, the teachers said they were able to find suitable pictures online and project them for lessons. They also projected suitable pictures to enhance discussions and oral vocabulary development. The technology was described as a tool of instruction, which added variety and excitement to lessons. The teachers’ perception of a creative lesson involved the use of technology to maintain children’s interest in the activity. They perceived technology as the instructional tool that provided another way of presenting concepts to children.

The descriptions of technology to replace charts positioned the teacher as agent, and the children as passive recipients. The teachers explained that this was due to the limited resources

they had available for children to construct their own learning with the technological tools. The lessons often involved a video from the DVD player, a story from a CD player, or the visuals from the computer and multimedia projector. The teachers attempted to rotate children for access to the computer/s in the classrooms; they tried to maximize use of the computer through whole and small group instruction.

The teachers had a generally positive disposition regarding the role of technology for children's learning. They mentioned the Jamaican government's Tablet in Schools project, which aimed to provide individual tablet computers for children and teachers. With the exception of Teacher Missionary, who owned a Kindle Fire, the teachers had no previous experience with tablet computers. In spite of their lack of experience with tablet computers, the teachers were excited about the project and were looking forward to learning about the potentials for children's learning in the classroom. Although the teachers were excited about the tablet computers, they were also a bit apprehensive because of their class sizes. They were anxious about class management and indicated the need for more supervision and collaboration.

I sensed the teachers' passion for the role of technology in children's learning. They were excited about their participation in the study and admitted that they were encouraged to reflect on their practices with technology. The reflections stretched their thinking to envision more possibilities with technology, in spite of the actual challenges they were faced with. The participants saw the teacher's role as a crucial factor in the children's learning with technology especially in maintaining a balance between technological and non-technological activities in the classroom. Teacher Builder planned to introduce the tablet computers to her children in small groups to prevent overwhelming herself and the students.

The teachers perceived technology as a learning tool and were eager to learn more about the integration of technology in their classrooms. They believed the design of the early childhood curriculum supported children's learning with technology, especially the possibilities for children to research information about the curriculum themes for the five year olds. The curriculum themes for the five year olds were: Our Country Jamaica: Our People, Transportation, Sports, Jamaica Land We Love, and The Weather.

The teachers' perceptions of technology are grounded in the social context of their school and the wider Jamaican culture. Technology integration in the early childhood classroom is not a common practice among Jamaican teachers. The schools with access to computers may have a computer lab that children access periodically if any at all. The teachers at BIS have technology in their classrooms. Although the participants talked about their limited technology resources, they have more technology at BIS than the average Jamaican infant or basic school.

The apprenticeship of the four participants involved what Rogoff described as the plane of community activity. The resources available at BIS influence the teachers' perceptions of technology. They described their perceptions of desktop computers, laptops, DVD and CD players, television, and multimedia projector. The teachers' perceptions were relative to the practices and institutions of the community in which they occurred. The economic resources of BIS determine the kinds of technology the teachers and children had access to. To make the best of their technology resources, the teachers coordinate efforts to make financial contributions for Internet access in their classrooms. This cultural activity is unique to the BIS community and the nature of teachers' interpersonal processes. If the teachers did not value Internet access in their classrooms then the financial contributions would be seen as a burden than as their coordinated effort to enhance their community practices with technology.

The teachers' perceptions as guided participation involved their communication and coordinated efforts to participate in technology practices at BIS. The teachers' mutual involvement in the use of technology as a tool of instruction for knowledge construction and to replace charts supports their value of enhancing children's readiness skills as well as providing visuals to augment concepts. The teachers shared a multimedia projector and would need to coordinate their efforts as they use the projector for lessons. The interpersonal plane of sociocultural analysis (Rogoff, 1995) was evident in their perceptions of colleagues' willingness to share ideas and offer help with technology when needed.

The teachers' dispositions towards technology were generally positive. There was a sense of collective excitement with apprehension as they shared concerns about the resources they had and the tablet computers they were anticipating. The teachers' apprehension was not in resistance to the tablets, they were anxious to learn more about technology. Further research could shed light on the teachers' guided participation in the TIS project. This would provide a better understanding of the teachers' involvement with social partners as they engage in the training provided by e-Learning Jamaica. Guided participation included training programs designed by national organization like e-Learning Jamaica to instruct teachers in the use of tablet computers with young children.

The four participants were graduates of the same teacher education program. They shared similar knowledge and experiences from college courses. In addition to their college coursework, the teachers also mentioned that some of their technology skills were self-taught. The teachers' personal perceptions of technology came across in their understanding of and responsibility for activities through their own participation (Rogoff, 1995). Teacher Manager was concerned with controlling the technology to ensure a balance between activities with and without technology.

She was focused on achieving output in the form of children's learning curriculum concepts. Teacher Fun was focused on the excitement technology added to her lessons. Being the 'vibes' teacher meant that she kept children interested in activities and ensured they were having fun. Teacher Missionary wanted to see an increase in the use of technology at BIS, which she thought could reduce teacher dominance in the classroom. She believed technology had the potential to increase the performance of the boys in her class. Teacher Builder was focused on helping children achieve the skills they needed to function at the next level of education. These personal traits influenced the teachers' participatory appropriation of the technology.

From my study, teacher transmission of knowledge was focused on ensuring that children achieve the curriculum goals and would be able to demonstrate mastery on national assessments that determine their readiness for the next level of schooling. As a result, the teachers' perception of technology as knowledge building tool was evident in their descriptions of readiness and creative ways to replace 'chalk and talk'. For the teachers, less chalk and talk meant that children were provided with visuals and as one participant explained "it's not using the usual charts it's not using the usual text books it's not taking them outside on a field trip it is using technology where they can see the same environment being projected on a screen in a picture format in a different way".

Second exploratory question. What are the practices regarding technology among Jamaican infant school teachers? The teachers' articulated practices with technology were first summarized as the envisioned affordances of technology for children's learning, and secondly as the actual and envisioned barriers to technology integration. The envisioned affordances indicated the teachers' attempts to facilitate the child as agent. The teachers identified the actual

and envisioned barriers that challenged their practices for child centered learning with technology.

For this interview study I had to trust the teachers' articulation of their practices, which at first was a bit uncomfortable for me. However, during the course of the interviews I realized their willingness to share their practices and concerns for future practices. This made me realize that the teachers were aware of the potentials of technology and were willing to share their practices with the resources they had available. Teacher buy in is critical for classroom initiatives to be productive. Hence, the disposition of the four teachers concerning the affordances of and barriers to technology integration was encouraging for the future of Jamaican children's learning with technology.

As a tool of instruction, the technology was used to augment concepts in various ways. The technology was used for visual affordances to keep children interested in lessons. The teachers used the Internet to find videos for children to learn about parts of the island they were not able to have field trips for. The children lived in Kingston, the capital city of the island, and may not have travelled outside of the city. The visual prompts added excitement to the lessons and maintained children's attention.

The teachers also described the opportunities children had to use search engines like Google, to find pictures related to concepts they were exploring. This was the popular evidence of the child as agent, but the frequency of this type of activity was limited due to the class size and resources available. The child as agent was articulated in the envisioned affordances of the technology but was not evident in the teachers' lesson plans.

The multimedia projector was used to project the pictures for whole group discussions. The teachers described some of the actual barriers that existed, which had implications for their

practices. The limited technology tools resulted in limited access for the children. One teacher mentioned allowing two children per day to access the computer, which resulted in once a month for each of the 40 children in her class. The teachers believed if they had more desk top computers in each class, the children would have more frequent access to the technology. The teachers used their personal laptops but the children were not allowed much access to these laptops.

The teachers described some of the challenges they envisioned once the Tablet in Schools project was launched. Although the teachers were excited about the tablet computers, they were also apprehensive about how the children would care the tablets. One of the teachers wished they were getting more desktop computers instead of the tablets. She believed the desk top computers would encourage more team work than the tablets. She also mentioned that the desktop computers would be easier to supervise by teachers, and better managed by the children.

Guided participation is the interpersonal plane where people communicate and coordinate efforts while participating in culturally valued activity. Teacher Missionary was the self-appointed technology teacher at BIS. She was the most passionate of the four teachers concerning the role of technology for children's learning. The teachers' reflections throughout the interview process indicated their articulated practices with technology and their subsequent reflections on the need for more training to enhance their pedagogy. The participatory appropriation was related to how the teachers' viewed their practices with technology and made decisions about the way forward. The participatory appropriation refers to how individuals change through their involvement in one activity or another, becoming prepared for subsequent involvement in related activities.

At the participatory appropriation plane, teachers identified the actual and envisioned barriers that impact their practices with technology. The teacher pupil ratio, limited resources, technology training, and their concerns about tablet computers for the next school year were the issues impacting their participation in technology integration as a cultural activity at BIS. These challenges affected their practices for child centered learning with technology.

According to Teacher Missionary, "In Jamaica, a lot of times I think the classroom is too teacher dominated". Teacher Missionary hoped for student centered learning in the classroom, which she believed could be achieved with technology integration. The teacher-centered classroom may be viewed as a result of limited equipment, and large teacher pupil ratios. The teachers were required to engage children in individual and small group activities during the guided learning block of the class schedule. I also wondered if child centered learning is valued by Jamaican teachers. We often articulate child centered pedagogy in the curriculum and teacher education discourse but teaching practices indicate a more teacher centered focus.

Large teacher pupil ratio is a common feature of Jamaican classrooms. Although the ECC is proposing a teacher pupil ratio of 1:10 as a benchmark for quality interaction in early childhood classrooms; Jones et al (2011) note this is a steep challenge for most ECIs across the island. Due to large class sizes, teachers are facing challenges to increase student engagement with technology during guided learning activities. Selinger (2009) contend that, in many developing countries the transmission model of education is still evident and students are learning by rote. Therefore, the development of new teaching models that will ensure greater knowledge retention and conceptual understanding should be at the forefront of capacity building for teachers.

The teachers identified the need for more training with technology to enhance their classroom practices. The teachers completed technology courses in college, but expressed that the focus was on knowledge about the technology tools and not technological pedagogical knowledge. Their experiences in college did not prepare them to facilitate children's appropriation of technology for their learning. The teachers were looking forward to the training for the Tablet in Schools project, but they also wished for continuous support and professional development for the seamless integration of technology with the curriculum. All four participants agreed that they need further training and continuous support to enhance their pedagogical practices with technology. These perceptions indicate the interacting planes of community, interpersonal, and personal activities for the practice of technology integration at BIS.

At the apprenticeship plane, the participants were concerned about the lack of technology training among their colleagues and hoped that the other teachers would become aware of the important role of technology for children's learning. In addition to continuous support and professional development, one participant believed that the onus was also on each teacher to seek professional development for personal technology competence. She mentioned that the MOE could provide workshops, but teachers could use their initiative and find private institutions that provide technology training. The participants agreed that to ensure effective practices with technology required intense planning, supervision, and collaboration.

The participants identified planning, supervision, and collaboration as important factors in their effective use of technology, especially as it related to the tablet computers. While the teachers identified their personal technology use and training, they also mentioned the implications for the wider school community. The teachers expressed that their colleagues would need to 'get on board' with technology in order for BIS to use the technological resources to

capitalize on the affordances for children's learning. The teachers viewed technology integration as a community activity, which all members of the community were required to participate in.

Considerations must be made regarding the social context for learning and technology integration. The teachers' anxieties concerning the tablet computers were understandable. The teachers' transition from one computer for forty children to considering one tablet per child was part of the reason for their anxieties. The anxieties were more of a management issue as the teachers contemplated how they would maximize learning with individual tablet computers for forty children. It was also important to consider the cultural view of schooling for Jamaican educators and parents. While the educational discourse acknowledged the teacher as guide and facilitator, the extent to which this ideal is reflected in classroom practices warrant the need for further research.

The ICT4D efforts are based on Euro-American notions of development, which are social economic, or political progress and growth (Selwyn, 2013; Unwin, 2009). For the four participants at BIS, the emphasis was on finding another way to teach young children to support their readiness for grade one. This finding another way to teach is described as capacity building in the ICT4D literature. The teachers hinted at their need for training as well as the readiness of their early childhood practitioner colleagues to get on board with technology training. "Effective technology integration for pedagogy around specific subject matter requires developing sensitivity to the dynamic, transactional relationship between these components of knowledge situated in unique contexts" (UNESCO, 2013). Table 4 shows the themes and research questions.

Connections with Previous Research

As noted in the review of literature, despite shortcomings Jamaica is one of the few developing countries with a low cost model of provision for preschool education (Jones et al.,

2011). In an attempt to improve children's performance at the primary and secondary levels of schooling, the government embarked on a national development plan to provide quality early childhood education for Jamaica's children. In defining what this quality early childhood education should look like, the ECC developed standards for early childhood institutions. One of the goals for Jamaica Vision 2030 is to develop a technology enabled society. One of the recent initiatives to achieve this goal has led to the provision of mobile technology for teachers and students through a pilot Tablet in Schools project. The aim behind this project is to transform the transmission of knowledge in the classroom to an interactive pedagogy between teachers, children, and their peers.

The findings from this study indicated the teacher centered use of technology and the challenges teachers faced with facilitating child centered learning with technology. Providing schools with tablet computers will not automatically transform teachers' practices from knowledge transmission to child centered pedagogy. The new early childhood curriculum was designed for the purpose of child centered learning. The curriculum outlined six desirable learning outcomes for children: wellness, communication, valuing culture, intellectual empowerment, and respect for self, others, the environment, and resilience. According to the new curriculum, the children should have a guided learning block on their schedule. The teachers articulated that they used small group activities during guided learning. Based on teachers' lesson plans the children were rotated for coloring and counting activities during guided learning.

Table 4

Exploratory Questions and Themes

Themes	Research Questions
Technology as a Knowledge Building Tool Readiness for First Grade Technology to Replace Charts	What are teachers' perceptions and beliefs about the role of technology in young children's learning?
Teacher's Dispositions towards Technology	
Envisioned Affordances of Technology for Children's Learning Student Engagement	What are the practices regarding technology among Jamaican infant school teachers?
Actual and Envisioned Barriers Limited Resources Tablet Concerns Technology Training	

According to the technology integration matrix framework (TIM), the teachers at BIS are at the entry level for technology integration. At this level, students receive information from the teacher via technology. The teachers used presentation software, and also had the students complete drill and practice activities on computers to practice basic skills. At the entry level, the learning environment is usually arranged for direct and individual seat work. The students have limited access to the technology resources and the teacher may be the only one actively using the technology. The setting is arranged for children to view the teacher's presentation, and the locus of control is the teacher (FCIT, 2011).

The limited access to technology is itself a contextual concept. BIS had more access to technology than children at other public early childhood institutions in Jamaica. The children

can only access what is available. The teachers should be commended for their efforts and provided the necessary supports to make the transition to the next levels of technology integration. The positive dispositions displayed by the four participants, was a good sign that they might be receptive to developmentally appropriate support for the seamless integration of technology with the curriculum. This is a crucial transition for the teachers to maximize children's learning with the tablet computers. In developing countries with limited technology resources, focusing on digital literacy rather than enhancing teaching with multimedia resources may lead to a poorer learning environment for students and limited use of expensive resources (Selinger, 2009). The teachers need support to maximize technology to enhance their teaching. The focus of ICT4D is not a technocentric view but how the technology tools may be used to empower communities (Unwin, 2009).

The ICT4D literature addressed the critical issue of capacity building to sustain the effective use of technology with children. The teachers at BIS displayed positive dispositions toward the role of technology to support children's learning. They repeatedly mentioned the need for more training regarding how to teach with technology. The teachers were willing to learn and integrate technology for children's learning, which was a major achievement towards early childhood for sustainable development. In order to ensure sustainability of the TIS project there also needs to be follow-up research with the teachers and children at the target schools to contextualize professional development for teachers as well as support the cultural implications of technology for Jamaican children.

Technology innovation in developing countries is also seen as a process of diffusion of knowledge, which is transferred from advanced economies and adapted to the conditions of a developing country (Avgerou, 2010). Diffusion is "the process by which an innovation is

communicated through certain channels overtime among the members of a social system" (Rogers, 1995, p. 538). The characteristics of innovation identified by Rogers are: relative advantage, compatibility, complexity, trialability, and observability. To have teacher 'buy in' of an innovation, these characteristics need exploration to determine how the technology could best suit the needs of teachers, and students. In other words, how would the TIS innovation be diffused in the Jamaican context? The relative advantage of the tablet computers within the Jamaican context depends largely on the teachers' perception of the advantageous nature of the initiative. If the teachers perceive the innovation as advantageous the more rapidly the tablet computers will be integrated with other classroom practices. The perception of relative advantage might also be influenced by how the tablet computers are presented to the teachers; whether the idea is to supplant their current ideas for technology integration or to complement them.

The compatibility of the tablet computers with the current ideas about teaching is also an area of crucial concern. Jennings (2001) described an authoritarian teaching style in the Caribbean context. She contend that while the teacher as facilitator and guide is the ideal being voiced in educational discourse and national education plans, the reality is that knowledge transmission is the most dominant teaching style of the region (Jennings, 2001). The teachers' tacit understandings of how things should work will certainly be challenged with attempts at technology integration. "Implicit cultural practices are passed down through on the job learning from older to newer teachers and less directly through the reproduction of the larger cultures in which [schools] are located" (Tobin, 2011, p. 4). Rogers (1995) contends that any idea that is incompatible with the values and norms of the social system will not be rapidly adopted by members of that group.

The other characteristic of an innovation is the degree to which it is perceived as complex and difficult to understand. The trialability characteristic has implications for the extent to which teachers are able to experiment with the new ideas generated from their adoption of tablet computers. The teachers need scaffolding through hands on learning for the selection of technology objectives and the interweaving of the pedagogy and content. There are no tailor made solutions for technology integration as the problems often arise while teachers are actively engaged in instruction requiring an immediate solution (Kelly, 2008).

In order to have a curriculum that reflects the planes of participation described by Rogoff, we might need to follow Taguchi 's (2010) recommendation to open up the curriculum tool boxes we have already filled with theoretical and methodological tools and unpack them, investigate the tools inside, decode them, recode them then invent new ones. If the new early childhood curriculum in Jamaica is mainly articulated and not implemented, then Taguchi's ideas for unpacking and inventing new methodological tools are relevant to the Jamaican context. Curriculum practices should be investigated to find out the collective discourse. We need to identify practices based on our collective understanding for the Jamaican child, his family, and teacher. The notion of a hybrid form of curriculum approach seems suited to create the balance between the practices that educators praise and those that are implemented. This will then enable us to figure out how ICT fit into the mix.

As Jamaica embarks on its national development plan, early childhood education for sustainable development should be added to the national discourse. Access to technology is an important achievement for developing societies like Jamaica. E-Learning Jamaica has outlined the systematic training for early childhood teachers (see Figure 2 in Chapter Two). Although I am proud of this initiative by the Jamaican government I am also critical of the implications of

the TIS project model. Technology initiatives should be combined with early childhood education for sustainable development. To maximize and sustain children's learning with technology requires teachers who are committed and empowered.

To achieve early childhood for sustainable development in Jamaica we need to position teachers with a pedagogical advantage to promote children's learning with technology in their school, home, and communities. Early childhood for sustainable development involves learning as a lifelong process for both teachers and children. Training of teachers should therefore be ongoing to meet the needs of the children and prepare them with skills for their lives outside the classroom walls. Sustainability is important for teachers to embrace positive social practices with technology and maintain cultural identity in the myriad of innovative practices. Technology practices in the Jamaican classroom are contingent on capacity building and collaboration between researchers and teachers (Davies et al., 2009).

There is a wealth of technology research in early childhood classrooms in the US, Australia, UK, and some developing countries. Jamaican teachers should be encouraged to complement their oral tradition with documentation of their practices to inform future professional development and children's learning. In order to understand the role of technology for Jamaican children we need to document teachers' practices with technology to investigate the cultural implications of information and communication technologies.

The TPACK framework is a useful model to explore professional development of teachers in Jamaica and the wider Caribbean. It would be useful to explore the TPACK in the Caribbean context to adapt the model in teacher preparation programs and inform policies and curriculum decisions regarding technology and the teacher.

Discussion

Implications for Early Childhood Education in Jamaica

Technology has the potential to enhance the quantity and quality of educational delivery, but only if used appropriately (Selinger, 2009). There has been increased emphasis on a reformed early childhood sector in Jamaica since the establishment of the Early Childhood Commission (ECC) in 2003. The ECC's mandate is to ensure the delivery of quality education to the nation's young children. This focus on early childhood in Jamaica has resulted in a number of initiatives to improve standards of early childhood institutions across the island. In regards to technology, the TIS project is the first government initiative to provide access to technology in early childhood classrooms. Selinger identified the key elements to educational reform: curriculum and assessment, professional development, leadership, infrastructure, learning environment, monitoring, and evaluation. To ensure sustainable early childhood education in Jamaica, these elements identified by Selinger are crucial areas of focus to sustain the integration of technology in early childhood classrooms.

From my experience in Jamaica as a teacher educator, both in-service and pre-service teachers misunderstood the concept of integration. We need to find new methodologies to help teachers implement the integrated curriculum before they can be effective with technology in the classroom. This requires professional development for faculty of teacher education programs and classroom teachers (in-service and pre-service). The leadership of institutions of learning should also be targeted for technology innovations in order to develop a community of practice with technology in our schools. The necessary infrastructure is required in early childhood institutions to support learning with technology. The teachers at BIS made financial contributions to the Internet access at their school. Teachers should not have to take on that kind of responsibility.

The learning environment should be designed to support learning with technology. The classrooms at BIS had small chairs and tables to support small group and individual work. Some early childhood classrooms in Jamaica have wooden desks and benches (especially first through second grades). Monitoring and evaluation is a key factor, which should not be treated lightly.

The TIS project will allow children to take home their tablet computers. The tablets will have tracking devices for monitoring. Some of our children live in volatile communities with limited social capital. In an attempt to protect our children from being robbed on their way to or from school, local government needs a plan in place to build social capital in communities. The plan should address learning with technology as a community initiative before putting an expensive device in the hands of children, which might attract thieves. According to Rogoff, the mutuality of the individual and the social environment is important in analyzing the essence of cultural events. It would be naïve to not think about the safety of children and teachers with expensive tools in the Jamaican context.

A technology enabled society needs a local technology integration policy. The NAEYC position statement for technology integration is used as a guide to help teachers, parents, and caregivers in the United States with the developmentally appropriate use of technology. This position statement was the concerted efforts of researchers, educators, children advocates, and technology experts. In keeping with the socio-cultural theory, Jamaican early childhood stakeholders need to consider developing a technology position statement for developmentally appropriate use of technology with Jamaican young children. While we are able to adopt some of the guidelines from the NAEYC position statement we would still need to address the dimension of cultural appropriateness to contextualize the technology position statement for Jamaican teachers, children, and their families.

Teacher educators need to enact the integration of technology in the courses they teach. Both the TPACK and TIM framework may be applied to help pre-service and in-service teachers explore the integration of information and communication technology in the early childhood classroom. The TPACK and TIM are applicable because of the attention to the cultural context for technology innovation. Teacher education faculty will need to lead the implementation of technology for children's learning. In light of this, there needs to be more collaboration of e-Learning with the early childhood faculty to oversee the TIS project. Only one teacher training institution that offers early childhood education was involved in the TIS pilot project. The TIS pilot should include tablet computers for early childhood faculty to prepare the next generation of classroom teachers.

The teachers need technology mentors to support their integration of technology. An awareness of teachers' comfort level with technology is required to plan professional development programs to address the needs of the teachers. Teachers need scaffolding to cross their zone of proximal development with technology. They need sufficient sand box time with technology tools to overcome their anxieties and misconceptions about devices like tablet computers. This sand box time could be provided outside of their teaching time to share ideas with other teachers and allow peer scaffolding. Communities have book clubs to share ideas from books read by group members. Since children and teachers will have individual tablets, I suggest a technology club for teachers and parents to share practices for young children's engagement with technology at school and in their homes.

The Jamaican government is serious about achieving a technology enabled society by 2030. Therefore, teachers will no longer be able to ignore the implications of information and communication technology for the Jamaican classroom. The teachers will need to learn how to

balance teacher centered practices with their perceptions of child centered learning. The four participants of my study indicated the need for more planning, supervision, and collaboration. This implies that all stakeholders have to come to the technology integration table to make informed decisions about the contextual learning with technology in Jamaican early childhood classrooms. A range of research scholars have argued that knowledge about technology cannot be treated as context-free, and that good teaching requires an understanding of how technology relates to the pedagogy and content (Avgerou, 2010; Koehler & Mishra, 2009; Selinger, 2009; UNESCO, 2013; Unwin, 2009).

Suggestions for Future Research

In order to develop a literature base for teachers' practices with technology in Jamaican early childhood classrooms more research should be conducted on this topic. The early childhood faculty at the teachers colleges in Jamaica should investigate the affordances of technology with both pre-service and in-service teachers. Early childhood faculty could model technology integration in the courses they teach and support teacher inquiry regarding technology. The teacher inquiry may be integrated in pre-service teachers' coursework requirements, especially in the classrooms that will have tablet computers for children. Teacher educators need to model the seamless integration of technology in their own coursework to help pre-service teachers experience learning as active agents, to ultimately provide similar experiences for the young children they will teach.

The rationale for a research base is to provide local literature on children's digital play and what that means in the Jamaican context. Developmentally appropriate practices for Jamaican children must take into consideration the social context and cultural implications of the technology for teachers and children. In the advent of the Tablet in Schools project, teachers

need to explore digital and media literacy. To help children develop digital literacy, they need frequent opportunities to use the technology tools independently. There needs to be teacher intentionality with technology, especially with the tablet computers to address the use of the tablet computers as games. The teacher inquiry may also investigate the ways to encourage the child's agency with the technology to develop their digital literacy.

The research should also investigate the affordances for desktop computers in the early childhood classrooms. The desktop computers in the classroom may be used for digital stories with free software like PhtoStory3 and applications such as PowerPoint, and windows moviemaker. It is important that teachers begin their technology integration with the resources they already have in their classrooms and later transition to other forms of technology. Teachers need support to enhance their teaching with multimedia resources they have available at their schools.

We need a consortium of Jamaican researchers from teacher education faculty, in-service and pre-service teachers, e-Learning, Ministry of Education, Early Childhood Commission, private sector, and parents. This consortium of researchers could document the use of technology by teachers and students in order to influence policy making regarding ICT4D and sustainable early childhood education in Jamaica. The research should also address the unique context of individual teachers, grade-level, school-specific factors, demographics, culture, and other factors (UNESCO, 2013). This implies that no single combination of content, technology, and pedagogy will apply for every teacher, every course, or every view of teaching (UNESCO, 2013).

Jennings (2001) research analyzed teacher education and the ideals of policy versus reality. The research focused on primary and secondary teachers. A similar study is needed for

early childhood teacher preparation programs in Jamaica. The research should aim to analyze the ideals of early childhood policy versus the reality in early childhood classrooms. The rationale for such research could be to shed light on early childhood teachers' preparedness and readiness for technology as well as their willingness to learn and adapt their teaching practices to integrate technology.

There is also the need to identify and use culturally relevant and local resources to enhance teaching and learning with pre-service teachers in order to prepare the 21st century teacher with critical and problem solving skills for inquiry and innovative practices in Jamaican classrooms.

My Insights

I attempted to answer the research questions posed at the beginning of my study. I was able to illuminate teachers' responses and discuss the findings for the study. I was not prepared for the plethora of questions that I was left with at the end of my study. Some of these questions were: Is the child as agent valued by Jamaican teachers? Does child centered learning have a place in Jamaican classrooms? How will the tablet computers change the teaching learning interactions in the classrooms? Are the teachers asking for a lower teacher pupil ratio for technology sake or do they want smaller classes? How will teacher education change to keep up with the increased access to technology being driven by the TIS project? How will the teachers' transmission of knowledge work with the tablet computers? From a research perspective, questions are a good thing since they will lead to further research and new findings to analyze and apply.

Throughout the study, I kept a researcher reflective journal. The excerpt below was my reflection triggered by a comment from Teacher Fun. She said in her childhood her parents allowed her to "play with it, and get to know it", in reference to technological devices.

I was immediately brought back to the first time I encountered a computer. I was in high school in the late 1980s and we had a computer lab. We had two hours of computer class every week. The computer teacher was a sage on the stage. We were not allowed to touch the computers…they were like special jewels. I was so eager to learn how to use this interesting looking machine but never got the chance to 'play with it and learn new things' as Teacher Fun explained. I am wondering if that influenced my desire to learn as much as I could about computers over the years. Maybe unconsciously I wanted to fulfill that childhood dream to 'play with the computer and learn all I can about it'. It's funny how life events sometimes happen in circles and bring you right back to a childhood event that illuminates why a topic or area of interest is of value to you. "Play around with it and get to know new things." Profound! When my sister bought a computer, ten years after I finished high school, I did just that. I played with it and got to know new things. I was able to teach my siblings how to use Microsoft Office and log on to the Internet, create email accounts, and send and receive email messages. There began my journey as the family technology guru. This motivated me to learn more because I needed to be one step ahead of my siblings and friends in order to teach them new things on the computer.

Since my years in high school, computer technology has evolved from large desktop units to hand held devices. I view myself as a lifelong learner to keep up to date with the changes in information and communication technologies. This study has sparked a new interest in technology to support Jamaican early childhood teachers' engagement in teacher inquiry for technology integration. My interest spans both classrooms with advanced technology like tablet

computers and also other forms of technology like desk top computers, television, digital cameras, and audio devices like mp3 players. A part of me wished I could connect with my high school computer teacher to show him how much I have learned about computers over the years. I also would like to tell him that his approach was developmentally inappropriate and we could have had meaningful learning experiences with the computers, instead of gawking at the machines like they were from out of space.

My high school had a computer lab with about twenty computers but students did not have access to them. The computers were basically untouchable. I do not want this history to be repeated for the young children who will have tablet computers in their classrooms. The teachers and parents may be tempted to hide the tablets away to prevent the children from destroying them. While done with good intentions, this will defeat the purpose of gaining access only to have it relegated to adult control. I fear the tablets may be treated as expensive gifts that are hidden away in cupboards until special holidays like Christmas or Easter when children are allowed to play with them but later dusted and repackaged until another special time.

It is normal human behavior to become excited over new tools of learning. Teachers and children will need constant monitoring to ensure the mobile technology does not become obsolete after the euphoria has passed. We have piloted many projects in our classrooms without research evidence to support the benefits or lessons learned from the initiatives to inform future practices. I am hopeful that the TIS project will be different and will reflect all hands on deck to improve teaching and learning in the Jamaican early childhood classroom.

Limitations of the Study

The four participants were selected from one school in the metropolitan region of Jamaica. The purpose of the study was to describe and explain the teachers' perceptions, beliefs,

and practices about technology in a Jamaican infant school. Interview studies are used to describe cultural, historical, social, and material contexts of the participants' lives (Kvale & Brinkmann, 2009). While the interview statements can relate to the broader social and economic context of Jamaican teachers, the perceptions, beliefs and practices of teachers at the research site are not representative of teachers in other infant schools across the island. The teachers'perceptions, beliefs, and practices are shaped by the unique context and available resources of their school, hence the need to interpret the data based on those contextual factors.

Further limitations also exist for the other forms of early childhood programs on the island. The Jamaican programs for children birth to age eight are of four types (infant school, infant department, basic school, and kindergarten). Each program type has its unique structure, criteria for teacher qualification, and availability of technology and other teaching resources. The level of access that teachers and students have to technology at other sites must be considered when attempts are made to relate interview statements to other early childhood institutions in the country. Another limitation is the nature of knowledge that was produced from the interview study (Kvale & Brinkmann, 2009). The hermeneutic principle of qualitative research also suggest that interpretation depends on the cultural context in which it was originally created as well as the cultural context within which it is subsequently interpreted. Although the schools share a common culture, each institution has unique practices and goals of the activities to which they contribute.

The IRB approved my study in March 2013 but I was unable to travel for data collection until my teaching responsibilities for the semester were completed at USF. In order to meet immigration and program deadlines, I had to expedite the process and collect data May, June, and July 2013. This resulted in the challenge of data collection during the last term of school.

Jamaican schools have three terms – Christmas, Easter, and summer. The Christmas term was from September to December. The Easter term was from January to April, and the summer term was May to July. The summer term is filled with end of year reports and preparing the five year olds for their transition to first grade. The teachers had many things on their plate but were very cooperative in completing the interview sessions. The teachers had classes in the evenings after school and I had to schedule the interviews at their convenience, which sometimes changed due to personal or institutional activities.

Another challenge was the member check with participants. The participants were not timely with their responses to emails. I had to follow-up with phone calls and text messages. As a result some time had lapsed between the transcription and data analysis because I wanted to make sure I had documented the participants' authentic responses before doing detailed coding and categorizing of the data. I eventually received responses from the participants and only one teacher had clarifications for sections of our dialogue.

Conclusions

The findings of this research study has illuminated the four participants' perceptions and articulated practices regarding the role of technology for children's learning. The intent was not to make judgments about the appropriateness of the teachers' perceptions and practices but rather to understand where the teachers are and apply a socio-cultural lens to their experiences. The findings have reiterated that technology innovations are not context free and ICT4D initiatives are dependent on the cultural context for implementation. The teacher is crucial to technology integration, hence a focus on teachers' perceptions and articulated practices provided a snap shot of how technology is viewed from the cultural context of teachers. Rogoff's interacting planes of analysis allowed me to provide a deeper description and further interpretation of the research

findings. While the intention is not to generalize to the Jamaican population, there were a number of implications for teachers, teacher educators, MoE policy makers, and e-Learning Jamaica. This study reiterates the recommendations for sustainable development, which are capacity building, learning for change, access to lifelong learning, networks and partnerships, professional development, integrated curriculum, and research (Davies et al., 2009).

As I interpreted the findings from the data, I realized the cultural implications for technology in Jamaican classrooms. The teachers' perceptions on a personal level were influenced by the interpersonal plane as well as the community/institutional plane. As a result the implications from the study are relevant for apprenticeship, guided participation, and participatory appropriation in regard to technology for young Jamaican children's learning. The capacity building of teachers is important for effective use of technology tools. With access to lifelong learning both teachers and children may grow in their appropriation of technology as we move forward to achieve a technology enabled Jamaican society. We should endeavor to maintain our Jamaican culture in spite of increased access to technological tools.

After Thoughts

I was the family nanny for my nieces and nephews and a Sunday school teacher at my church. My experiences with my nieces and nephews and the children at my church motivated me to become an early childhood teacher. I was offered a job as a paraprofessional to teach fifth graders at a primary school in St. Andrew, Jamaica. After meeting the children I felt incompetent to guide their learning. I sat down to write my first weekly lesson plan and I was unable to connect the curriculum with the components of the lesson plan. I realized that teaching involved pedagogical techniques that I did not possess at the time. I turned down the job offer and enrolled

in the teacher education program at Shortwood Teachers College to learn how to teach. After obtaining my teaching diploma I taught first and second graders at a primary school in my hometown, St Ann, Jamaica. I later became the administrator of a basic school and was immediately drawn into larger issues affecting children beyond my lesson plans and classroom activities.

The politics of administration challenged me to advocate for my students' and teachers' needs. Working as an administrator helped me to realize the importance of teachers' perceptions on matters affecting teaching, learning, and the wider school culture. My experiences as a teacher educator later cemented my concerns for teachers and their classroom practices. My love for technology and my experiences as classroom teacher, administrator, and teacher educator helped me to design a research study to address some of the musings I have had over the years. I am positioned to influence early childhood education in Jamaica from the perspective of a teacher, administrator, teacher educator, and researcher.

Jamaica has maintained a strong emphasis on early childhood education over the years. This emphasis has resulted in a buzz of excitement as well as trepidation in the early childhood sector. My research study has emphasized some of these excitements and apprehensions that teachers have regarding their practices with technology. As I reflect on the findings from my study I am cognizant of my role in helping pre-service and in-service teachers make sense of their practices in light of government initiatives for early childhood education. A strong focus of my role is to enhance my understanding of the Jamaican classroom and guide teachers' development of practices that retain cultural relevance and meet the needs of the 21st century Jamaican child. The Jamaican economy continues to face high rates of inflation and with that comes a higher cost of living for children and their families. While we are happy and excited

about increased access to technology, we are also cognizant of the factors that challenge Jamaican teachers, children, and their families.

e-Learning Jamaica has indicated an elaborate plan for various stages of the Tablet in Schools pilot project (see Figure 2). The plan is divided into three levels basic, intermediate, and advanced. The basic level begins with tablet and accessories selection. The extent to which teachers were included in this process is still vague. The participants of my study were unaware of the type of tablet their school was expecting. It seemed as if the Ministry of Science Technology Energy and Mining managed the tablet and accessories selection. I think educators should be included in education initiatives from the initial stages to ensure an education focus relevant to the needs of classroom teachers and teacher educators.

The e-Learning model for training also indicates training for parents at the advanced level of the initiative. In the Jamaican context where family and church are highly regarded, this does not seem an appropriate approach to including families and communities. Many Jamaican parents see education as an opportunity to end the cycle of poverty. As a result they would welcome parent engagement initiatives with technology from the initial stages of the project. Parents would need training to understand the role of the technology in their children's learning. I believe parent and community education should be done at all stages of the project to inform parents and build social capital in communities.

A Jamaican father designed a learning application with a Caribbean cultural appeal (Kelly, 2013). This Jamaican father wanted to provide children with a Caribbean character for a role model as the children were overly exposed to North American characters like Dora and SpongeBob. The application includes a story and activities about the character 'Juice Man'. Jamaican children are familiar with a juice man in their communities. He sells wholesome and

nutritious products like cane juice, sugar cane, and jelly coconut. Juice man is usually a Rastafarian who has developed a friendly rapport with the children and adult members of the community. He sometimes sells at a school gate and is famous for his interactions with the children and teachers. Given the oral traditions of the Jamaican culture, juice man often has stories to share with the children to reinforce life lessons. The parent has had very little success launching his Juice Man animated series in Jamaica. I would think that the mangers of the TIS project would welcome his expertise in designing learning applications with a cultural appeal. The Juice Man application seeks to address the role of family and core values, which are important features of the Jamaican culture. It would make sense to employ this parents' ideas to design e-books that capture Caribbean and Jamaican characters. I have to question the motives behind the initiative. Is the TIS project an attempt to appeal to voting parents for reelection or is the focus on capacity building of teachers, children, and parents?

According to the debate about technology in developing countries, the five key barriers to educational technology are: electrical power, Internet connectivity, training and professional development, value of teachers, and sustainable development (Wright, 2014). Developing countries are not a homogenous group. Of these five barriers the main challenges for Jamaica are training and professional development and sustainable development.

The training and professional development of Jamaican early childhood teachers is managed mainly by the teachers colleges that focus on early childhood education. It is my belief that the Tablet in Schools initiative should be led by the teachers colleges to avoid bipartisan interest and motives. If the colleges lead the project it might help to ensure that teachers are provided with opportunities to develop their TPACK competencies. The colleges could then develop partnerships with the local schools to roll out the tablets in phases. Teachers need

technology mentors to support their teaching with technology. Instead of mass training in a short period of time it might be more productive to focus on training master teachers to guide the training and implementation at local schools. Teachers could then scaffold their peers and develop their unique professional development to meet their needs. The teachers who did not access technology in their teacher training might be more comfortable learning from their peers than from technology specialists in school like seminars.

If the teachers colleges were leading the tablet in schools project it could help to ensure sustainability in the event of a change of government. The political party of the present government currently leads the increased access to technology. I am not sure if the initiative will be sustained beyond a change of government. The teachers colleges will be expected to maintain their mandate regardless of the ruling political party. In light of this I recommend a consortium of teacher training institutions that prepare early childhood teachers should manage the project.

The consortium of teacher training institutions will then have the responsibility of helping pre-service and in-service teachers to enact the TPACK in Jamaican classrooms. The seamless integration of technology pedagogy and content knowledge can be challenging for teacher educators as well as pre-service and in-service teachers. This would be a wonderful learning opportunity for all stakeholders as long as teacher educators are willing to learn alongside their student teachers. Teachers could then be provided with hands on learning opportunities to explore the educational potential of technology for children.

The Jamaican education system continues to prejudice English over the Jamaican dialect that is spoken in children's homes. It is part of our colonial past to embrace the English Language and treat Jamaican Patois as inferior. It takes many generations to shake off the colonial perspective dominant in some sectors of the Jamaican society. We have a strong oral

tradition in the Caribbean and Jamaican children are natural storytellers. I would suggest that we focus on this oral tradition with the technology instead of purchasing learning applications developed in Western cultures and far removed from Jamaican children's realities. The extent to which technology will support Jamaican children's development as dual language learners is another area I have great concerns about. This also has implications for helping pre-service teachers support the language and literacy learning of our children.

The Minister of Education, Ronald Thwaites, expressed the hope that the training of teachers for the pilot will result in new innovative teaching methods, and transform the classrooms from the transmission of knowledge to a more interactive and problem solving-based approach to teaching (Jamaica Information Service, 2014). To address the transmission of knowledge we need to address student assessment in the Ministry of Education. Our children are assessed through a national assessment plan that involves high stakes tests from first to ninth grade. In light of these assessments teachers and parents are anxious about children's ability to retain and regurgitate content for improved performance on these tests. Access to technology is only a part of the solution to address the knowledge transmission in our classrooms. If the assessment practices are not addressed then the transmission approach that we seek to change will outlast any technology initiative we implement in Jamaican classrooms.

Technology initiatives are not a quick fix for education problems in Jamaica. We have overcrowded classrooms and we also have trained teachers who are either unemployed or working in the private sector. The country has invested in teacher training only to lose these teachers to the private sector or overseas recruiters. The $J1.4 billion Tablet in Schools project seeks to address changes in students learning to increase use of research processes and techniques and the use of higher cognitive processes and strategies (Jamaica Information

Service, 2014). While we are happy for access to technology in our schools, maybe building more schools would be more beneficial in the long run for both teachers and students. We could either build more schools or add to the infrastructure of existing schools to provide smaller teacher pupil ratios and employment for the many early childhood teachers without jobs. We do not have resources to waste and should focus our attention on how technology initiatives will be sustained.

In order to sustain the Tablet in Schools project we have to address the extent to which mobile technology can improve the lives of Jamaican children. Are we providing tablets for children who live in deplorable conditions? Are we misappropriating resources to fake development in order to keep up with the Jones? Is the Jamaica 2030 development plan realistic in light of the increased rates of inflation? Is the development plan in the best interest of our children or is it in favor of investors and the tourism industry? Who is investing in teacher education?

I wish for the seamless integration of technology in Jamaican classrooms. My exposure to classrooms in the United States for the past five years helped me to realize that the US has challenges of its own. Jamaicans tend to think that the US is a perfect model for early childhood education. The Minister of Education noted, "already a module on culture change and how to adapt to learning with the use of the tablets has been introduced for principals of teachers' colleges" (Jamaica Information Service, 2014). I would like to get a better understanding of the 'module on culture change' that has been introduced to the principals. Do we change our culture to learn with technology or do we need to contextualize the use of technology in our Jamaican classrooms?

The excerpt below from Bob Marley's 'No woman No cry' has helped me to deal with my musings by reflecting on where we are coming and where we are heading.

> No woman no cry; No woman no cry;
> No woman no cry; No woman no cry;
> (Please do not cry)
>
> I remember when we used to sit
> In a government yard in Trench town,
> Observing the 'ypocrites – yeah!
> Mingle with the good people we meet, yeah!
> Good friends we have, good friends we have lost along the way
> In this great future, you can't forget your past,
> So dry your tears, I sey. Yeah!
>
> Everything's gonna be alright!
> Everything's gonna be alright!
> Everything's gonna be alright!
> No woman no cry!

I will not lament about the implications of the study. As I reflected on my own trajectory as a teacher, I am also hopeful for the early childhood sector in Jamaica. The Jamaican early childhood sector will be 'alright' as long as we do not forget our past and remain true to our cultural heritage as we face the future. We should not replace our cultural heritage with attempts to become like Western countries. Things will only be 'alright' if we contextualize technology to meet the needs of the Jamaican child and teachers. The hypocrites Bob Marley alluded to could be the developers who design initiatives with an education tag. The education tags sometimes give the appearance that they are focused on the nations' children but the reality is the lives of children in developing countries sometimes do not improve with mere access to technology. So, I will use my research voice from this point forward to address the challenges and help pre-service and in-service teachers to develop problem-solving skills for the seamless integration of technology in Jamaican classrooms. We should not attempt to follow the 'foreign model' in our endeavor to meet Jamaica's Vision 2030 goals. While we seek to meet the national development

goals we also need to help our children and teachers meet their current needs and achieve maximum learning with the technology tools they have access to.

I will conclude my thoughts with an excerpt from a poem by my favorite Jamaican poet, Louise Coverly Bennett. In the1970s Louise Bennett wrote "Dutty Tough" to describe the economic challenges of the time. Many Jamaicans will agree that a similar reality exists for some children and their families in the poorer communities of Jamaica. As we contemplate the implications of educational technology for Jamaican classrooms we cannot ignore the economic challenges of Jamaican communities.

> Sun a shine but tings no bright; (The sun is out but the place is dark)
> Doah pot a bwile, bickle no nuff; (Although we are cooking, the food is not enough)
> River flood but water scarce, yawl; (The rivers are overflowing but water is scarce)
> Rain a fall but dutty tough. (It is raining but the soil is still hard.)

In spite of our educational technology initiatives, some poor communities in Jamaica are still facing challenges to provide the basic needs for their families (Dutty Tough). Who stands to benefit from ICT initiatives? Whose lives will get better? How will we support children's learning for their lives in Jamaica before preparing them for a global village? I end my musings with a dub poem, 'Tablet Nuff' in Appendix N. The poem is inspired by Louise Bennett's 'Dutty Tough'.

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Appendix A

Interview Protocol

1. To familiarize myself with your background, briefly share your experiences with regard to technology in your personal life.
2. How would you describe yourself as a technology user?
3. Tell me how you have used technology in places other than school.
4. Tell me about the kinds of technology that are available for you at home/school?
5. What technology is available for day-to-day use in your classroom?
6. Tell me about the kinds of technology that are available for your students to use.
7. Think about how technology is used in your school. How would you describe the current use of technology in your school?
8. Think about how technology is used in your classroom. How would you describe the current use of technology in your classroom?
9. What forms of technology do you use with your students?
10. How often do you implement technology in your classroom?
11. Describe how you make decisions regarding what technology to use in your classroom?
12. In your opinion, what is the role of technology in students' learning?
13. How important is technology to students' learning? Why do you think so?
14. What do you do with your students in the classroom with technology?

Appendix A (Continued)

15. Describe a lesson/activity in which you used technology with your students.
16. Did you have any successful experiences with technology in teaching? What were they and what made them successful?
17. What does technology integration mean to you?
18. Did you have any difficulty with technology integration in the classroom? Why?
19. What impact do you hope technology will have on your students, and what impact have you seen so far?
20. What is most important about having technology available for your students?
21. What difference in learning do you think this technology will make for your students?
22. In your opinion, what types of technology engage students most?

    Possible Probes:

    a. You observe increased student attention/participation

    b. You observe fewer students off-task

23. a. Do you feel that your students are more engaged when technology is used?

    Explain

    c. What observations have you made that support your opinion?
24. How do other teachers use technology with their students?
25. What skills and knowledge do you find important to draw on in using technology in your classroom?

26. What types of professional development activities have helped you learn to use available technology?

b. How would you describe your technology training?

27. To what extent did your college coursework help you to integrate technology in your classroom?

28. What other types of learning experiences have helped you learn to use available technologies?

Possible probes:

1. Where have you learned such technology (college courses, community classes, personal training with family and friends, self-taught)?
2. What technologies have you learned and from whom?

29. Do you feel you are adequately prepared to teach early childhood content using technology? Explain

30. What additional training do you feel would be necessary to prepare you to use technology to teach young children?

31. What are your perceptions of how your teaching has changed through the use of technology?

32. Is there anything that can be done at the policy level to help with the efforts of technology integration from a teacher's point of view?

33. a. Can you think of anything that the policy makers might not be aware of but need to know about your situation as a teacher?

b. If there was one thing you could change or ask for with respect to technology and technology integration and your teaching, what would it be?

33. Is there anything else you would like to tell me about this topic?

Appendix B

Informed Consent

Study ID:Pro00010867 Date Approved: 3/8/2013 Expiration Date: 3/8/2014

USF
UNIVERSITY OF
SOUTH FLORIDA

Informed Consent to Participate in Research
Information to Consider Before Taking Part in this Research Study

IRB Study # 00010867

You are being asked to take part in a research study. Research studies include only people who choose to take part. This document is called an informed consent form. Please read this information carefully and take your time making your decision. Ask the researcher or study staff to discuss this consent form with you. Please ask him/her to explain any words or information you do not clearly understand. We encourage you to talk with your family and friends before you decide to take part in this research study. The nature of the study, risks, inconveniences, discomforts, and other important information about the study are listed below.

This is a research study about Perceptions, Beliefs, and Practices about Technology among Teachers in a Jamaican Infant School. In this research study, I am trying to understand the experiences of teachers using technology with young children at an Infant School. I am also interested in knowing about their practices with technology to support young children's learning. By participating in this study, you can help researchers better understand more about how you use technology with Jamaican children. You will also become aware of how your perceptions and beliefs about technology affect how you use technology with young children in Jamaica. There are no foreseen risks associated with this study.

We are asking you to take part in a research study called:
Perceptions, Beliefs, and Practices about Technology among Teachers in a Jamaican Infant School.

The person who is in charge of this research study is *Suzette Kelly*. This person is called the Principal Investigator. However, other research staff may be involved and can act on behalf of the person in charge. She is being guided in this research by *Dr. Ilene Berson*.

The research will be conducted at [redacted] *Jamaica.*

Study ID:Pro00010867 Date Approved: 3/8/2013 Expiration Date: 3/8/2014

Purpose of the study

The purpose of this study is to:

- *Find out about teachers awareness of technology to support young children's learning. Also, to find out about teachers beliefs about technology for young children's learning, and their practices involving technology.*
- *This study is being conducted in partial fulfillment of my dissertation research.*

Study Procedures

If you decide to participate in this study, you will be interviewed three times between May 2013 and July 2013. Each of the interviews will take no more than one hour. The interviews will take place at your school. I will forward you the interview questions two weeks in advance of each interview so you may become familiar with these. After the interviews are conducted, I will transcribe your responses electronically and use them to find out more about how you describe your technology use and experiences with young children. All transcriptions will be stored on my (the principal investigator's) password protected computer. Only I, (the principal investigator, Ms. Suzette Kelly), will have access to your records and keep them completely confidential. All recordings from the interview will be destroyed by permanently deleting the files from my (the principal investigator's) computer five years after the close of the study with the USF Institutional Review Board (IRB). Following transcription, I will forward you a copy so you can verify that I have transcribed everything you said correctly. I will then analyze your responses as well as that of the other participants so I can find patterns across the responses. I will use the information I obtain from these patterns for my dissertation. I may also use information I obtain to complete a manuscript, which I may present at conferences and/or submit for publication.

Total Number of Participants

Approximately *five* individuals will take part in this study.

Alternatives

You do not have to participate in this research study.

Benefits

The potential benefits of participating in this research study include:

I am unsure if you will receive any benefits by taking part in this research study.

Risks or Discomfort

This research is considered to be minimal risk. That means that the risks associated with this study are the same as what you face every day. There are no known additional risks to those who take part in this study.

Compensation

You will receive University of South Florida memorabilia for participating in this study.

Cost

There will be no additional costs to you as a result of being in this study.

Privacy and Confidentiality

I will keep your study records private and confidential. Certain people may need to see your study records. By law, anyone who looks at your records must keep them completely confidential. The only people who will be allowed to see these records are:

- The research team, including the Principal Investigator and the researcher's advisor.
- Certain government and university people who need to know more about the study. For example, individuals who provide oversight on this study may need to look at your records. This is done to make sure that we are doing the study in the right way. They also need to make sure that I am protecting your rights and your safety. These government and university people include:
    - The USF Institutional Review Board (IRB) and its related staff, who have oversight responsibilities for this study, staff in the USF Office of Research and Innovation, USF Division of Research Integrity and Compliance, and other USF offices who oversee this research.
- Department of Health and Human Services (DHHS)
- Office for Human Research Protection (OHRP)

I may publish what I learn from this study. If I do, I will not let anyone know your name. I will not publish anything else that would let people know who you are.

Voluntary Participation / Withdrawal

You should only take part in this study if you want to volunteer. You should not feel that there is any pressure to take part in the study. You are free to participate in this research or withdraw at any time. There will be no penalty or loss of benefits you are entitled to receive if you stop taking part in this study.

You can get the answers to your questions, concerns, or complaints

If you have any questions, concerns or complaints about this study, or experience an adverse event or unanticipated problem, call *Ms Suzette Kelly* at [redacted] *email her at* sakelly2@usf.edu

If you have questions about your rights as a participant in this study, general questions, or have complaints, concerns or issues you want to discuss with someone outside the research team, call the

Appendix B (Continued)

USF IRB at (813) 974-5638.

Consent to Take Part in this Research Study

It is up to you to decide whether you want to take part in this study. If you want to take part, please sign the form, if the following statements are true.

I understand that by signing this form I am agreeing to take part in research. I have received a copy of this form to take with me.

_____ _____

Signature of Person Taking Part in Study Date

_____

Printed Name of Person Taking Part in Study

Statement of Person Obtaining Informed Consent

I have carefully explained to the person taking part in the study what he or she can expect from their participation. I hereby certify that when this person signs this form, to the best of my knowledge, he/she understands:

- What the study is about;
- What the potential benefits might be; and
- What the known risks might be.

I can confirm that this research subject speaks the language that was used to explain this research and is receiving an informed consent form in the appropriate language. Additionally, this subject reads well enough to understand this document or, if not, this person is able to hear and understand when the form is read to him or her.

_____ _____

Signature of Person Obtaining Informed Consent / Research Authorization Date

_____

Printed Name of Person Obtaining Informed Consent / Research Authorization

Appendix C

IRB Letter of Approval

USF
UNIVERSITY OF
SOUTH FLORIDA

RESEARCH INTEGRITY AND COMPLIANCE
Institutional Review Boards, FWA No. 00001669
12901 Bruce B. Downs Blvd., MDC035 • Tampa, FL 33612-4799
(813) 974-5638 • FAX (813) 974-7091

March 8, 2013

Suzette Kelly
Childhood Education and Literacy Studies
EDU 105
Tampa, FL 33613

RE: **Expedited Approval for Initial Review**
IRB#: Pro00010867
Title: Perceptions, Beliefs and Practices about Technology among Teachers in a Jamaican Infant School

Study Approval Period: 3/8/2013 to 3/8/2014

Dear Ms. Kelly:

On 3/8/2013, the Institutional Review Board (IRB) reviewed and **APPROVED** the above application and all documents outlined below.

Approved Item(s):
Protocol Document(s):
Interview Study Research Protocol

Consent/Assent Document(s)*:
Informed Consent.pdf

*Please use only the official IRB stamped informed consent/assent document(s) found under the "Attachments" tab. Please note, these consent/assent document(s) are only valid during the approval period indicated at the top of the form(s).

It was the determination of the IRB that your study qualified for expedited review which includes activities that (1) present no more than minimal risk to human subjects, and (2) involve only procedures listed in one or more of the categories outlined below. The IRB may review research through the expedited review procedure authorized by 45CFR46.110 and 21 CFR 56.110. The research proposed in this study is categorized under the following expedited review category:

(6) Collection of data from voice, video, digital, or image recordings made for research purposes.

(7) Research on individual or group characteristics or behavior (including, but not limited to, research on perception, cognition, motivation, identity, language, communication, cultural beliefs or practices, and social behavior) or research employing survey, interview, oral history, focus group, program evaluation, human factors evaluation, or quality assurance methodologies.

As the principal investigator of this study, it is your responsibility to conduct this study in accordance with IRB policies and procedures and as approved by the IRB. Any changes to the approved research must be submitted to the IRB for review and approval by an amendment.

We appreciate your dedication to the ethical conduct of human subject research at the University of South Florida and your continued commitment to human research protections. If you have any questions regarding this matter, please call 813-974-5638.

Sincerely,

John A Schinka, Ph.D.

John Schinka, Ph.D., Chairperson
USF Institutional Review Board

Appendix D

IRB Continuing Review

RESEARCH INTEGRITY AND COMPLIANCE
Institutional Review Boards, FWA No. 00001669
12901 Bruce B. Downs Blvd., MDC035 • Tampa, FL 33612-4799
(813) 974-5638 • FAX (813) 974-7091

2/14/2014

Suzette Kelly
Childhood Education and Literacy Studies
EDU 105
12902 Magnolia Drive
Tampa, FL 33612

RE: **Expedited Approval for Continuing Review**
IRB#: CR1_Pro00010867
Title: Perceptions, Beliefs and Practices about Technology among Teachers in a Jamaican Infant School

Study Approval Period: 3/8/2014 to 3/8/2015

Dear Ms. Kelly:

On 2/13/2014, the Institutional Review Board (IRB) reviewed and **APPROVED** the above application and all documents outlined below.

Approved Item(s):
Protocol Document(s):
Interview Study Research Protocol

The IRB determined that your study qualified for expedited review based on federal expedited category number(s):

(6) Collection of data from voice, video, digital, or image recordings made for research purposes.

(7) Research on individual or group characteristics or behavior (including, but not limited to, research on perception, cognition, motivation, identity, language, communication, cultural beliefs or practices, and social behavior) or research employing survey, interview, oral history, focus group, program evaluation, human factors evaluation, or quality assurance methodologies.

The PI used an unstamped consent form with which to consent subjects. There are no differences between the approved stamped version and the unstamped version signed by the subjects. This non-compliance was not serious and not continuing. No further action is needed.

As the principal investigator of this study, it is your responsibility to conduct this study in accordance with IRB policies and procedures and as approved by the IRB. Any changes to the approved research must be submitted to the IRB for review and approval by an amendment.

We appreciate your dedication to the ethical conduct of human subject research at the University of South Florida and your continued commitment to human research protections. If you have any questions regarding this matter, please call 813-974-5638.

Sincerely,

John A Schinka, Ph.D.

John Schinka, Ph.D., Chairperson
USF Institutional Review Board

Appendix E

Accepted Reportable Event

USF
UNIVERSITY OF
SOUTH FLORIDA

RESEARCH INTEGRITY AND COMPLIANCE
Institutional Review Boards, FWA No. 00001669
12901 Bruce B. Downs Blvd., MDC035 • Tampa, FL 33612-4799
(813) 974-5638 • FAX (813) 974-7091

3/5/2014

Suzette Kelly
Childhood Education and Literacy Studies
EDU 105
Tampa, FL 33612

RE: **Accepted and Reported Reportable Event**
IRB#: RE1_Pro00010867
Title: Perceptions, Beliefs and Practices about Technology among Teachers in a Jamaican Infant School

Dear Ms. Kelly:

On 3/4/2014, the Institutional Review Board (IRB) reviewed and **ACCEPTED** the Reportable Event for the following:

Internal Event Tracking Number: RE1_10867
Submission Type: Noncompliance

Event Description:
PI used four unstamped consent forms. There was no difference between the stamped forms and the unstamped forms.

This Reportable Event was considered:
Non-serious, non-continuing noncompliance. There was no harm or increase risk to participants.

No further action is required.

We appreciate your dedication to the ethical conduct of human subject research at the University of South Florida and your continued commitment to human research protections. If you have any questions regarding this matter, please call 813-974-5638.

Sincerely,

John A Schinka, Ph.D.

John Schinka, Ph.D., Chairperson
USF Institutional Review Board

Appendix F

IRB Certificate

Certificate of Completion

Suzette Kelly

Has Successfully Completed the Course in

CITI Social & Behavioral Investigators and Key Personnel

On

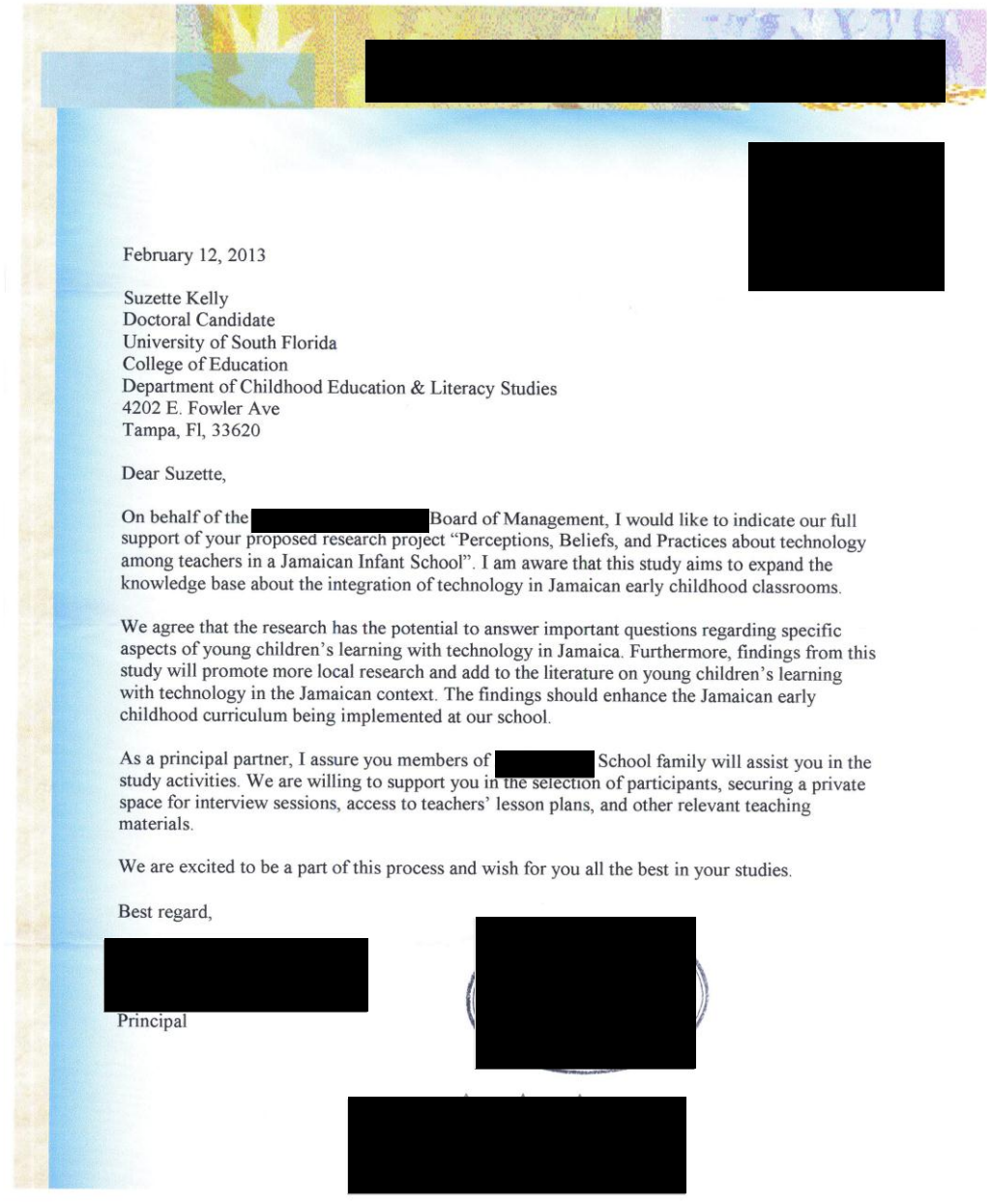
Saturday, October 06, 2012

USF
UNIVERSITY OF
SOUTH FLORIDA

4/17/2014 1:29:57 PM

Appendix G

Letter of Support



[redacted]

February 12, 2013

Suzette Kelly
Doctoral Candidate
University of South Florida
College of Education
Department of Childhood Education & Literacy Studies
4202 E. Fowler Ave
Tampa, Fl, 33620

Dear Suzette,

On behalf of the [redacted] Board of Management, I would like to indicate our full support of your proposed research project "Perceptions, Beliefs, and Practices about technology among teachers in a Jamaican Infant School". I am aware that this study aims to expand the knowledge base about the integration of technology in Jamaican early childhood classrooms.

We agree that the research has the potential to answer important questions regarding specific aspects of young children's learning with technology in Jamaica. Furthermore, findings from this study will promote more local research and add to the literature on young children's learning with technology in the Jamaican context. The findings should enhance the Jamaican early childhood curriculum being implemented at our school.

As a principal partner, I assure you members of [redacted] School family will assist you in the study activities. We are willing to support you in the selection of participants, securing a private space for interview sessions, access to teachers' lesson plans, and other relevant teaching materials.

We are excited to be a part of this process and wish for you all the best in your studies.

Best regard,

[redacted]

Principal

[redacted]

[redacted]

Appendix H

Member Check Form

September 12, 2013

Dear _____,

Thank you for an interesting and informative interview. To ensure accuracy of the interview please review the attached copy of the verbatim transcript and the relevant information I have included as it pertains to the transcript. Please feel free to contact me at 917-833-9181 or sakelly2@usf.edu should you have any questions. I may also be contacted via Skype; my ID for Skype is suzette.kelly1.

Thank you for your time and cooperation in participating in this study.

Sincerely,

Suzette Kelly

Appendix I

Peer Reviewer Form

I, Patriann Smith, have served as a peer reviewer for "Perceptions, Beliefs, and Practices regarding Technology among teachers in a Jamaican Infant School". In this role I have worked with the researcher throughout the study in the capacity such as reviewing data and assisting with emerging themes.

Signed:

_____

Date: March 31, 2014

Appendix J

Sample Reflective Journal

May 6, 2013

I am finally here in Jamaica to collect data for my dissertation. I thought this day would never come but here I am. I am sitting in the front office waiting to be received by the principal and introduced to the teachers. I was escorted to the principal's office and we did our brief introductions and I gave her an overview of my research focus. She asked a teacher to give me a tour of the facilities and introduced me to the participants.

Although I had emailed the informed consent forms to the teachers, they were not sure about my research and the expectations for their participation. I communicated via email with the principal and this was my first formal contact with the teachers. I was a bit apprehensive because I wondered if all the teachers would be interested and I did not want to have to go find another research site. If it comes down to that I will do what I have to do.

I met with the teachers, I was not feeling their enthusiasm for my research, maybe this was a bad day for them, and maybe they were being pressured with work. The principal was the only one who seemed excited to have the teachers participate in my research study.

The conversations with the teachers went well, four of the five teachers consented to participate in the study. One teacher said this was just not a good time for her. She was overwhelmed with work and could not take this on now.

First Impression of BIS

Welcoming environment, a pleasant and professional front desk attendant, who doubles as principal's secretary. Security check point – ID required entering compound. Teachers and staff in their shirts with school logo.

There seemed to be a friendly rapport between staff members – a collaborative feel to the social climate.

Children wear their uniform to school.

May 12, 2013

Communicating with the participants is going to be a challenge. They are not quick in their response to emails. I have to follow up emails with a phone call for teachers to check their mailbox and respond to emails. This is going to affect turn around for member checks etc. Jamaicans are typically oral communicators so emails might not be their preferred choice to communicate. I have to budget for phone calls.

May 20, 2013

Post Interview

Work as ministry – spiritually called to the profession to teach young children. It is common for Jamaican teachers to view their teaching as a calling.

Children have a voice – How does technology enhance children's voice. She talked a lot about children's output and educational outcome.

Her background in business education comes across in her demeanor and approach to education – output oriented – (Manager).

Issues with MoE expectations – unrealistic for children's culture. Attempting to meet first world guidelines and millennium goals (cultural relevance of expectations). What does Rogoff say about this?

June 13, 2013

She talked about her desire to use e-Portfolios for children's assessment. I got excited when I heard this. I started telling her about basic forms of e-portfolios – OneNote, live binder, Mendeley. These are free options she could begin with, especially one note – it is already included in the Microsoft application. E-portfolios imagine that – affordances of technology.

I think the teachers are well aware of some of the affordances of technology, which they articulate well. However, with one computer for 35 or 40 five year olds it is difficult to implement some of these ideas effectively. As a result they often default to the traditional use of the technology to project information for knowledge construction.

July 3, 2013

Intentionality

So today I was thinking a lot about intentional teaching. From my experience in the Jamaican classroom, I am accustomed to seeing a plethora of charts and mobiles to create what we call a 'print rich environment'. Sometimes it is difficult to navigate these classrooms because you might get hit in the head by the mobiles that reinforce letter

knowledge, number knowledge, or non-numerical concepts like color and shape. Teachers often feel proud of their classroom environment because of the evidence of colors and bright images hanging on the walls. I am asking myself now – Is this all necessary? What is the intent and purpose behind the charts and mobiles?

Sometimes they are not necessarily on the children's eye level, so they are often ornaments at best. Why am I thinking about this?

The teachers use technology as a substitute for charts to introduce or reinforce concepts. In order to have them rethink the purpose of teaching aids, then we have to revisit how we teach pre-service teachers. Sometimes pre-service teachers spend hours creating instructional aids because we believe that commercial charts should not fill classroom walls. But why not? If a commercial chart can be used to reinforce or introduce a concept then why not. Does a teacher really need to spend all this time recreating the wheel? What this does is to take time away from intentional practice to ensure children's needs are met.

What is the role of technology in all this? As one participant noted – technology takes the stress out of teaching – in reference to the chart making exercise for instructional aid.

Implication – we need to rethink the strategies for young children in our teacher education program. So what if the student didn't make charts, are there alternatives to the chart? While not attempting to eliminate charts from our early childhood classrooms, we also need to teach pre-service teachers other options to enhance their pedagogical skills. Technology is a learning tool for both teachers and children – it is more than a stress relief from chart making.

It is part of the classroom culture to make charts – a teacher with commercial made charts in her classroom is often not given high ratings.

Lesson Plans

The lessons reflect teacher directed activities. The technology – CD player, PowerPoint, multi-media projector listed as teaching materials. (Knowledge building tool).

Appendix K

Sample Interview Data

Table 5 Sample Codes, Categories and Themes

Initial Codes, emerging categories and themes	**Excerpts from Interview Data**
Decisions about technology, planning for technology	What I try to do is to look at the objective of the lesson to see what is it that I want the students to learn and to see how the use of technology can help to inform whatever information I want them to garner or learn without accessions. The objective of the lesson is crucial in terms of determining how to use the technology as well as creativity. As you know that we are moving away from the chalk and talk methodology of teaching and that has been replaced with whiteboard but it is still a form of standing in front of the students and giving whatever lesson you are doing so it depends on the objective of the lesson and what I want to bring out in it.
Technology and Creativity **Technology to replace charts**	**For me technology I want to bring a sense of creativity to the lesson I don't want to only go out there and do picture discussions which can be used with technology but it is not using the charts, it's not using the usual charts it's not using the usual text books it's not taking them the outside on a field trip it is using technology where they can see the same environment being projected on a screen in a picture format in a different way**

	So I would want to bring creativity in using technology so it's one of the reasons why I try to use technology to bring creativity to learning and teaching. **How the teacher brings out certain lesson or concept in her lesson its other than being creative its adding value to the learning experience it's bringing out creativity.** **Because it's not the everyday thing is not the norm, it's not the chalk and talk Or the book and pencil thing you know they were excited and I think that my objectives were met because there were a able to after the lesson they were able to ask some follow-up questions in that they were able to describe what a cruise ship looks like and they were able to complete sentences as well so it was something new, something different.**
Role of Technology – perceptual skills (literacy), not just entertainment, documenting for parents **Readiness skills**	**I would say that visual perception was highlighted there and then visual perception were simulated all the colors were seen It is not that you asked them to color a picture and they use the wrong crayon the pictures were already there. Visual perception was stimulated and it also led to a discussion from the children some could say I have seen this before some could say I have never seen this before they started to use their imaginations. Based on exposure so visual perceptions were stimulated at this.**

	Documenting what they say helps them to bring out a part of them that the parents may not have yet identified. It fosters that development it makes them aware of themselves and it also allows the parents to see the a part of their child that they may not even have the time to expose but within itself can be a moment a learning moment for them.
Teacher productivity, learning new information in a different way **Technology to replace charts**	**Technology is learning new information in a different way and it fosters great group discussion other than when they have a text book in front of them.** **If the teacher goes up and projects that big screen then it limits the time that I will have to wait to find the book page all I would have to do is to do a transition song to get them prepared for the lesson and that lesson is projected in one go.** **The lesson that I can think of is one that was entitled the theme was Jamaica land of Beauty and from that lesson I used a multi-media projector to project Jamaica as an island and even though descriptions were given to the children before this lesson, the expression on their faces when it was projected on the screen they were really fascinated seeing a pictorial view and a big pictorial view It wasn't small in the book It wasn't a chart It wasn't a little clip art picture that was pasted in their book.**

Appendix K (Continued)

	It was a big projected screen that showed the beauty of the island so I remember that Jamaica Land of Beauty and they were able to see a picture of the island in a pictorial view. **The multimedia projector and the laptop where they can see persons speaking, singing and the symbols, the representations of those numerals help them to recall and memorize and retain the information for longer periods in their minds.** **Technology makes life easy, it takes the hustle and bustle out of teaching.** **It makes life easier for the teacher. In the Jamaican context our classes are grossly overcrowded.**
Technology Training **Barriers to teaching with**	**I don't think I am adequately trained, may have some basic knowledge in terms of the use of technology and I would use my teacher skills that I have learnt and try to apply my methodology in terms of delivery. I don't think I am adequately trained to teach technology to children in term of a lesson content area.** **I think it was more focused on the knowing how to use technology rather than how to teach, I think so. So we designed PowerPoint presentations but we were never taught how to present the PowerPoint presentations. I think it was what they call a basic introductory aspect of using technology.**

Appendix K (Continued)

	So 'how to' was not really reinforced, it was basically giving us an introduction as to what technology really was and what it was about. I think I need more training, **The whole aspect of actually getting training in technology is good just to bring in all different aspects all different, everything it is a case that I want to make personally I would be want one how to use a tablet because I don't have one and you know I would have to go and play with it to know certain things so it would be a lot easier if they could have a course how to use a specific tablet or so and I would learn because I have the interest so I would learn.** **I think I would need some more training concerning how to use the tablets; the dos and don'ts. In order to help me to be better able to assist my students who will have their tablets and maybe one or two students might have a tablet at home that they actually know how to use. I need training in that area.**
Tablet Concerns	**It's frightening its exciting but it's something that we all really, really, really, really want to be a part of and also I think it is going to be a challenging too because the expectation would be more and it also means that you will have to align your curriculum to foster this within your one to one section thought out the day and for the**

	children to not to be addicted to it that they will not want to go back to other modes of learning but you have to use it in such a way that to create balance in their sphere of leaning so the tablet doesn't become so hooked. They are so hooked on the tablet that if you should introduce a lesson another way they don't want to, those are my thoughts. **It's not like you can run around with the tablet as you feel; like you can go outside and whatever. There should be certain rules concerning the use of my tablet! Safety rules, how to care for my tablet: what if I'm drinking my juice; should I have my tablet next to my juice? What will happen to my tablet if the juice spill on it? So you need to take those things into consideration. If you know a child is destructive you need to monitor that child carefully with the tablet. Because sooner or later it will be of no use and the child will not even learn from it. So I think it is the way the teacher structures herself and plans for her lessons concerning the use of the tablets.** **I'm hoping that these tablets will help to boost/increase the literacy and numeracy rate in the institutions. We will have more students who are doing well in the areas of Reading, Math, Problem Solving, Critical Thinking Skills etc. The Minister for Education said that in the schools it seems like the higher order thinking is thrown outside the window, because the kinds of questions and the strategies being used are focused only on the lower order**

Appendix K (Continued)

	thinking. **Because I have never owned one. I don't have anyone around me that has one. So that excites me to know that it is finally there, and I am going to get this to see what it is about. How is it going to enhance the students' learning? Is it that I am going to be on the same network with all of them and I can say 'press this or press that's. You know, so I am just, it's just an open mind, just pure excitement. So I am just happy.**
Technology Integration **Readiness skills**	**Technology integration what it means to me is using more than one technology in bringing out a lesson so I could collaborate a video presentation with an over screen projector or I could also use a audio CD player if I want to bring out listening or auditory discrimination I could integrate both so I could use auditory with a CD player use a projection screen to bring out other elements that the audio CD may not be able to do so that's what integration use of technology means to me.** **I'm hoping that these tablets will help to boost/increase the literacy and numeracy rate in the institutions.**

Appendix K (Continued)

Challenges for child as agent **Limited technology**	**I don't have the technology that they can manipulate in the sense of a smart board the computer is limited so I don't have a computer where each child I don't have computers where each child can manipulate so to say to bring out skills areas I would say that it is limited because I don't have enough of the PCs for the children to use.** **I use technology in my class but not as it should, mainly because of the classroom size. We don't have enough for each student to really manipulate over time. Two students are allowed on the computer for a day. Students will not be using the computer all day because they have other things doing. So maybe if we had more computers more students will be able to manipulate the computer on a daily basis.** **If I had more than like 3 or so computer in the class that would even better, so each child could go to 1 computer but I don't reach that level as yet but that could be good at least you could have like a little mini computer lab in the class and they have an idea what they are doing, so you have those games that what you should have on a tablet could be on that computer and they could use interactive games once it incorporate the lesson.**

Appendix K (Continued)

Teaching practices – children use search engine for images **Affordances of technology**	**Some of the methods that I use storytelling, dramatization, and puppetry- when they see the puppets they're excited and they come alive because they're seeing something different. They wonder 'how comes the puppet is talking?' So we use those strategies. These can also be used concerning technology because you can make up a puppet show or find one on the internet and actually watch and learn from it too.**
Affordances of technology	**Some of my strategies are cooperative learning, group work and role play, dramatization, games, aesthetics, songs and music. With technology, I remember I went to this technology seminar/workshop and I was introduced to a music mat- which is attached I think to the interactive whiteboard (and I hope I can get one in the near future) It is a padded mat that they can step on and it makes a sound and they can also see what is happening on the screen. They also instead of going to the board and touching they actually can remain on the mat and move on the mat and you see the response on the screen.** **You bring your pictures, your aids and I use my laptop when I use that too. Because I use like the songs, you have this song particular 'Sweet, Sweet Jamaica' by Vegas and that is a very good song to teach when you are talking about like tourist. You have a section that deal with tourist coming to Jamaica and I use as an introduction, and it was very good, very, very good.**

Appendix K (Continued)

	Right we were looking at the cruise ship. So, for that you know that the child entered the word cruise ship and we went on images and when it popped, they gave their experiences, how they felt when they saw they saw this big thing one said "Miss this look like a house". You know they were really excited, I you know I felt good knowing that I could bring something to them that they would like and enhance their learning. **I'm always going on YouTube to find those nice children's songs or even if I want to play a DVD because I have that DVD section. I could play it and it's always just fun activities.** **On Fridays even though it is school hours and we do teach concepts, its more relaxing so I will allow them to take a video but they are also taught in terms of using or playing or selecting the DVD's videos**

Appendix L.

Sample Lesson Plans

Lesson Plan

Theme:	Jamaica Land We Love
Subtheme:	The Beauty of our Land
Date:	Monday April 15, 2013
Age:	5-6 year olds

CIRCLE TIME

Activity Title:	Jamaica is a beautiful country
Objectives:	Children should be able to: •Locate Jamaica on the world map •Tell why Jamaica is an island • To say why Jamaica is considered to be beautiful • Take turns to speak
Concept/Content	Jamaica is an Island. It is surrounded by a body of water called the Caribbean Sea. Jamaica is a beautiful country the weather is hot because of its location.
Materials	Lap top, overhead projector, powerpoint pictures
Introduction	Teacher will introduce the song "Oh Island in the sun"

- Development
  - Teacher will ask the children to listen to the song again as she sings it
  - Teacher will ask the children to say what words do they hear in the song
  - Teacher will ask what do they think the words mean
  - The teacher will ask the students what is an island

Appendix L (Continued)

Teacher will ask the students if they have ever seen an Island

- Teacher will ask the students if they knew that Jamaica is an island
- Teacher will explain to children that she will be using the laptop and projector to show the picture of Jamaica as an island
  Teacher will show pictures of Jamaica as an island surrounded by the Caribbean Sea
  Teacher will ask the children what do they think of the pictures?
  Teacher will name at least two other islands and ask if they have ever heard of any before

Assessment: What body of water is Jamaica surrounded by?

GUIDED LEARNING

Group 1-4	Children will colour the map of Jamaica and the Caribbean Sea
Objectives	Children should be able to complete activity

OUTDOOR PLAY

Objective: Children should be able to use pickup and drop an object in a basket. Children will be paired for the activity.

STORY TIME
Tina Visits Jamaica

CREATIVE ACTIVITY

Activity
Objective (s) Ryhmes and Jingles

Appendix L (Continued)

Lesson Plan

Theme:	Transportation
Subtheme:	Getting Ready for a Flight
Date:	Wednesday January 30, 2013
Age:	5-6 year olds

CIRCLE TIME

Activity Title: Travelling by an air craft

Objectives: Children should be able to:

- Identify why people travel by plane
- Identify when do people travel by plane
- Identify the months that people like to travel and why
- Identify the countries that people travel to

Concept/Content Taking a trip by plane can be exciting: People travel by plane for many reasons. Summer and Christmas holidays are when family members take a trip on a plane to see their families: some families travel together

Materials Pictures of people travelling, suitcase, plane

Introduction Pictures will be displayed for students to see and they should create a story

Development Teacher will ask:

1. Why do we need a suitcase and a plane?
2. Why do you think these persons are travelling?
3. Will they be taking the bus with all these suitcases?
4. Will they be taking the bus with the suitcases somewhere?

Appendix L (Continued)

Assessment: Students will role-play: Planning a trip

GUIDED LEARNING

Groups 1-4	Children paste picture of a family travelling and write simple sentences
Objectives	Children should be able to read the simple sentence

OUTDOOR PLAY

Objective: Children should be able to use the hands to create small and big body movements. Children will use high and lower body levels to demonstrate actions.

STORY TIME

Elijah and the Raven

CREATIVE ACTIVITY

Activity	Draw the raven that helped Elijah and label it
Objective (s)	Children should be able to follow instructions and label the parts of a plane

Appendix L (Continued)

Lesson Plan

Date: February 1, 2011

Theme: Transportation

Sub- Theme: Types of Air Transportation

Age Group: 5 year olds

SECTION 1 –CIRCLE TIME

Time: 9:05-9:30am **Duration:** 25 minutes

Objectives: By the end of this lesson children should be able to:

1. tell what it feels like to travel on a plane.
2. ask at least (5) questions about travelling on a plane.
3. identify the initial /d/ sound in words.
4. count out nine objects.
5. identify the facial expression that depicts how you would feel or feel travelling on a plane.

Materials:
My Feelings chart, dress up clothes, suitcase with a doll, donut, picture of Dora, Diego, door, dog, donkey, duck and a doctor, hand bag, passport, worksheets to draw a line from all the pictures that begin with the /d / sound to the suitcase.
Content/Concepts:

Taking a trip by plane can be exciting; we go to an airport to take a trip or meet people who come to visit us. People travel by plane for many reasons; summer and Christmas holidays are when many family members take a trip on a plane to see their families; some families travel together.

Learning Activities:

1. **Introduction**

Teacher will dress up looking like she just came off the plane. She will have her hand bag, suitcase and her passport in her hand. She will enter the class saying "what a flight, wow, America is so big I almost got lost but I am glad to be back in Jamaica." "I have a show right now let me get on it." Teacher will let children know that they will be watching a television show where children who have travelled to other countries will be interviewed. Children will be encouraged to ask questions. Children will sing "This is the Land of my Birth."

Development

2. Teacher will ask four children who have travelled to other countries to sit on the chairs facing the class .They will be interviewed.

Possible Questions:

a. Which country/countries have you travelled to?
b. How did you feel when you were on the plane? (Children will answer verbally as well as identify how they felt on the "My Feeling" chart).
c. Who did you travel with?

3. Children will pretend to call in on telephone and ask the children being interviewed questions.
4. Teacher will thank the persons who were interviewed, the callers and the viewers.
5. Children will be asked to guess what is in her suitcase.
6. Teacher will place the suitcase on a table in front of the class and open it. Individual children will be invited to take one object from the suitcase, say its name and tell the beginning sound.
7. Children will count the number of things that teacher carried from America in her suitcase. The objects will be placed in the area in front of the white board for one child to touch and the other children count.

Assessment:

Children will be given worksheets to draw a line from all the pictures that begin with the /d / sound to the suitcase.

Appendix L (Continued)

SECTION 2- GUIDED LEARNING-SMALL GROUPS
NB: These activities will be rotated. Activities one and two will be done by the children, with little supervision from the teacher. The teacher directed activity is the activity where the teacher will sit with the group and teach the lesson. All the groups will experience each activity.

Time: 9:35 – 9:55 am **Duration:** 20 minutes

Activity 1: Children will be drawing nine people with happy faces on a plane.

Objectives: Children should be able to:

1. draw nine people on a plane.

Materials: Plane cut outs for children to draw nine people on.

Activity 2: Children will be colouring pictures that begin with the /d/ sound.

Objectives: Children should be able to:

1. colour pictures whose names begin with the /d/ sound.
2. say words that begin with the /d/ sound.

Materials:

Phonics workbook page 28.

Teacher Directed Activity

Activity 3: Children will be counting out nine counters

Appendix L (Continued)

Objectives: Children should be able to:

1. count objects up to nine.
2. prove that the last number counted represents the number of objects in a set.
3. stop at nine when counting out counters.

Materials: counters, basket with blocks, containers, cut outs of miniature donuts

Learning Activities:

Steps

1. **Introduction**

Children will count from 1-9. They take turns taking nine blocks from the basket.

Development

2. Children will be questioned based on what they did.

Possible Questions:

How many times did you clap? (9 times)
How many blocks did you take up? (9 blocks)
How many things did teacher take in her suitcase from America? (9)
3. Each child will count out nine counters and tell how many counters they have. They will be reminded to stop at nine when they are counting.

Assessment:

Children will take a container, count out nine donuts and place them into the container.

Lesson Plan

Date: September 17, 2012

Theme: Our Country Jamaica-Our People

Sub- Theme: Out of Many One People

Age Group: 5 year olds

SECTION 1 –CIRCLE TIME

Time: 9:05-9:30am **Duration:** 25 minutes

Objectives: By the end of this lesson children should be able to:

1. say a sentence using SJE.
2. name at least one the people who came to Jamaica brought with them.
3. describe the individual races language, dress, music and dance.

Materials:

Map of Jamaica, Africa, India, China, Middle East and Europe, flash cards with the name of each country, pictures of people from these countries, Youtube video showing African, Chinese, Indian, European dance and music

Content/Concepts:

A long time ago people came from different countries to live here in Jamaica; they came from countries in Africa, from India, China, Spain, England, the Middle East and other countries.

Appendix L (Continued)

Learning Activities: Steps

1. **Introduction**

Children will sing "The People Came to Jamaica" song to the tune of "Hill an Gully Ride".

Development

2. Children will answer questions based on the song. A discussion will continue based on the students' responses.
3. Children will view pictures of maps and people. They associate the people with their country.
4. Children will play the "I Spy" game to name and identify different countries.

Assessment:

Children will be given a worksheet to colour maps of different countries. They will draw a line from each country to Jamaica showing that people came from those countries to Jamaica.

Appendix L (Continued)

STORY TIME

Discussion on Bob Marley and his importance to the world

CREATIVE ACTIVITY

Activity	Discussion: Bob Marley as a reggae singer
Objective	Children should be able to paste a picture and write a simple sentence
Materials	Paste, book, picture, pencil, music with Bob Marley, CD player

Appendix M

Country Information

Map of Jamaica

Central America and Caribbean

Appendix M (Continued)

Location

Caribbean, Island in the Caribbean Sea, South of Cuba

Introduction

Jamaica was colonized by England in 1655. The British established a plantation economy based on sugar, cocoa, and coffee. The abolition of slavery in 1834 freed quarter million slaves, many of whom became small farmers. Jamaica gradually increased its independence from Britain. Since independence from Britain in 1962, power in Jamaica has alternated between the social-democratic People's National Party and the conservative Jamaica Labor Party.

Jamaica is known for its strong sense of self identity expressed through its music, food and rich cultural mix; Jamaica's influence extends far beyond its shores. With luminaries such as the Black Nationalist Marcus Garvey and musician Bob Marley, Jamaicans are proud of their cultural and religious heritage.

Population

2, 930,050

Languages

English, English Patois

Birth Rate

18.41 births/1000 population

Death Rate

6.67 deaths/1,000 population

Internet Users

1.581 million

Economy

Jamaica is one of the world's most indebted nations; bauxite and alumina production and tourism are key sectors

Politics

Prime Minister Portia Simpson-Miller (first female Prime Minister) from the People's National Party won a closely fought election in late 2011

Appendix M (Continued)

Natural Hazards

Hurricanes (especially July to November)

Source

Central Intelligence Agency Fact Book

https://www.cia.gov/library/publications/the-world-factbook/geos/jm.html

BBC Country Information

http://www.bbc.com/news/world-latin-america-18784061

Appendix N

Dub Poem: Tablet Nuff

By Suzette Kelly (inspired by Louise Bennett's 'Dutty Tough')

Tablet nuff but life still rough;
Di pickney dem a swipe;
And caan read from lef to right.

Di minister sey - dem must problem solve;
Higher order tinking skills;
Prepare dem fi di global village.
Teacha mus do less telling;
An do more guiding.
No more chalk and talk!
So di teacha dem a bawl;
Lawd help wi,
Teach Jamaican pickney

No teacha no cry, No teacha no cry,
Everytings is gonna be alright! (sung to the tune of Bob Marley's 'No woman no cry')

More tablets a come;
Might as well unnu seckle dung.
Tablets inna school;
Teacha an pickney haffi learn how fi use di tool;
Dem no waan look like fool;
Some a dem only a play it cool.
Hear dem – "What a pretty shiny sinting, it mek wi all a bling. Like people from farrin"
Tablet nuff and lickle learning can gwaan.
Tablet nuff but life still rough!

English Translation

Many tablets in schools,
But teachers still have challenges.
The children can swipe but they can't read from left to right.

The Minister says "Children need to problem solve,"
"They need higher order thinking skills,"
"Teachers should not transmit knowledge but guide learning."

“No more chalk and talk!”

The teachers are concerned.
They are asking for help.

More tablets will be coming,
So might as well teachers accept it.
Tablets in the schools,
Teachers and children need to learn how to use them as learning tools.
The tablets are pretty and we like the accessories,
We have devices like developed societies.
Many tablets to enhance learning,
Many tablets but teachers still have challenges.

About The Author

Suzette A. Kelly was born in Saint Ann, Jamaica and earned a Bachelors Degree in Early Childhood Education from the University of the West Indies, Jamaica. She loves to write and recite poetry, especially from the dub poetry genre common in Jamaica. She earned a Master of Arts Degree in Early Childhood Education from the University of South Florida in collaboration with Shortwood Teachers College, Jamaica. She was a classroom teacher at Bamboo Primary and Junior High School from 1997 to 2003. She was administrator of a Jamaican Basic School from 2003 to 2006. She has been a faculty member in the Department of Early Childhood Education at Shortwood Teachers College since 2006. She was awarded a Fulbright scholarship in 2009 to pursue doctoral studies at the University of South Florida. She served as a graduate assistant for the Department of Childhood Education and Literacy Studies from 2009 to 2014. Her responsibilities as graduate assistant included teaching undergraduate courses for elementary and early childhood majors. She also supervised early childhood pre-service teachers during their field placement in Hillsborough county schools.