THE INTEGRATION OF TABLET COMPUTERS IN PREPARING STUDENTS FOR THE GRADE FOUR LITERACY TEST: PERCEPTION VERSUS REALITY

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ABSTRACT

The goal of this qualitative study was to gain an understanding of the perception that exists for fourteen Jamaican instructional leaders as they integrate Tablet Computers (TCs) into the pedagogical process to prepare grade four students for the Grade Four Literacy Test (G4LT). The research was conducted in four schools; three rural primary schools in the parishes of Trelawny, Manchester and St Elizabeth and an urban primary school in Kingston. The focal group comprised four principals, three vice principals, three grade four coordinators and four grade four teachers from the scope of schools that were piloting the Tablet in School (TIS) initiative. Structured interviews and observation were used as data sources.

Findings from the data revealed that the instructional leaders, while receptive to the initiative of utilizing the TCs in the pedagogical process, were unable to speak to how effective its usage was in preparing students for the G4LT. Furthermore, although the devices were somewhat facilitated in the teaching and learning process, the majority of instructional leaders did not use them to teach the components of the examination. Finally, results suggested that the usage of the TC as an instructional tool had encouraged more favourable responses from students in the classroom learning environment.

As the first study to investigate the integration of TC to teach literacy in the Jamaican Primary Classroom, the current study provided novel insights and a springboard for more qualitative investigations into this particular phenomenon. It is also anticipated that the emerging data will influence and inform decision making within the Ministry of Education (MoE).

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LIST OF ABBREVIATIONS

1. ASTEP- Alternative Secondary Transitional Education Programme
2. CAP- Career Advancement Programme
3. CBTP- Competency Based Transition Policy
4. CEE- Common Entrance Examination
5. ECC- Early Childhood Commission
6. e-LJam- e-Learning Jamaica Company Limited
7. ESTP- Education System Transformation Programme
8. G4LT- Grade Four Literacy Test
9. GOILP- Grade One Reading Inventory
10. GSAT- The Grade Six Achievement Test
11. GTDT- Grade Three Diagnostic Test
12. IDRI- Informal Diagnostic Reading Inventory
13. JFLL- Jamaica Foundation for Lifelong Learning
14. MoE- Ministry of Education
15. MSTEM- Ministry of Science, Technology and Mining
16. NAP- National Assessment Program
17. NEI- National Education Inspectorate
18. NCLP- National Comprehensive Literacy Programme
19. NSR- National Students' Registry
20. PACE- Project of the Advancement of Childhood Education
21. PEIP -Jamaica Primary Education Improvement Project

22. TC- Tablet Computer

23. TIS- Tablet in School

24. USAID- The United States Agency for International Development

CHAPTER 1

INTRODUCTION

Changes in society, particularly those ushered in by the advent of new technologies of the 21st century, challenge us to rethink the meaning of being fully literate. These changes also dictate that we embrace new literacy practices and employ various methodologies and instructional materials in the pedagogical process. Literacy is fundamental in the learning process and its impact on one’s ability to function in society is unparalleled (UNESCO, 2006). Shifts in social contexts have redefined the meaning of literacy, forcing educators to adjust the boundaries on how to effectively teach this lifelong learning skill to children.

The Ministry of Education (MoE), in embracing the new technological age, declared that the organization had a renewed emphasis on using technology to improve pedagogy, especially in the area of literacy (“Technology can Improve Learning,” 2012). According to the Ministry of Education Youth and Culture (MOEYC)[1], (2004), technology, if properly used, can help students acquire the skills they need to survive in this complex and highly technological knowledge-based world. Educators are also cognizant of the importance of using technological gadgets and are prepared to employ these to enhance literacy instruction. Inter alia, technology is used to provide extended access to materials, promote constructivism and active learning, foster creativity (Thompson, 2015), enhance collaborative teaching and learning (Roblyer, 2006), and provide asynchronous and synchronous communication in order to promote and foster lifelong learning.

[1] The Ministry of Education Youth and Culture (MOEYC) was renamed The Ministry of Education (MoE) in 2007 when the Jamaica Labour Party (JLP) assumed governorship of the island.

Tablet computers (TCs) are among the latest technological devices that are being utilized in the pedagogical process (Ciciroa, 2015). Their usage is hypothesized to maximize academic performance in a range of different subject areas (Beschore & Schmidt-Crawford, 2012; Cumming, Strnadová, & Singh, 2014; Flewitt, 2012; Goodwin, 2012; Lin, Wong & Shao, 2012; Riconscente, 2013). The degree to which using the TC can improve literacy outcomes remain an open question. Nevertheless, tablets in schools is a current and relevant issue in the Jamaican Education System. While the initiative to introduce tablets in schools is lauded by many, it is yet to be determined the extent to which instructional leaders; namely principals, vice-principals, grade coordinators and teachers have integrated the technology in preparing students for the Grade Four Literacy Test (G4LT). In addition, the reality of the intricacies that surround its integration need to be examined. Therefore, I propose to study this new phenomenon in a small sample of Primary Schools, in order to generate data that will assist educational leaders and government officials as they continue to make additional informed decisions about the Tablet in School (TIS) Pilot Project.

Statement of the Problem

The vision of obtaining 100% literacy, as measured by the G4LT, has long been the goal of the MoE for grade four students in the Jamaican Primary Schools. However, this outcome has eluded the nation from the inception of the test in 1999. The first administration of the revamped test in 2009 revealed that the national literacy average was 70%. In 2010, the average declined, as attainment stood at 66.9%. In 2011, an incremental improvement of 4.1% was reported and in 2012, the nation saw an additional increase of 3 %. In the year 2013, the national average was 76.3% and 75% in 2014

(Thwaites, 2014). The results of the June 30, 2015 sitting of the G4LT revealed that 86.5% of the country's grade four students are literate (Thompson, 2015). The achievement patterns outlined suggest that there has been modest improvement over the years.

The students' performance has generated much discourse and has met with disdain over the years. Unfortunately, the MoE, parents and other stakeholders have attributed the students' less than satisfactory performance to teacher competence, teaching methods utilized in the pedagogical process, among other factors. Instructional leaders, mandated by the ministry, responded to the issue of teaching methodologies by introducing 21st century approaches in their schools and encouraging educators to utilize these in the teaching and learning process. While the efforts of the leaders in delivering innovative instructional strategies have been commendable, a significant percentage of the students are still performing at the almost mastery and non- mastery level in literacy.

It is hoped that by integrating this technological device in the pedagogical process, teachers will be motivated to teach, and students to learn. Another expectation is that academic output in Language Arts, Mathematics, Science and Social Studies will improve since students will have greater access to information both in and outside of the classroom. The proposed research is designed to fill a gap in the existing body of research by investigating instructional leaders' perceptions as it relates to integrating TC in the pedagogical process to adequately prepare students for the G4LT.

Purpose of the Study

The study is designed to examine instructional leaders' perceptions as it relates to the integration of TCs in preparing students for the G4LT. The grade four primary school students' literacy levels, as measured by the G4LT, is of grave concern to the government and other stakeholders. To the extent that the acquisition of this lifelong skill is critical and forms the basis of lifelong learning, it is imperative that instructional leaders communicate their opinions regarding the impact of using TC in selected schools.

To date, many studies have been conducted in several countries on the use of technology in the teaching and learning process (Angers, 2004; Jacobsen, 1998; Karsenti & Fievez, 2013; Kozma, 2013). In addition, studies have been done about the use of TC to improve academic output (Brunsell & Horesji, 2012; Carter, 2014; Flewitt, 2012; Kerawella et al., 2007). However, insufficient research has been conducted in Jamaica about the use of technology in education. Furthermore, no study has been conducted about the use of TC to drive academic output. Consequently, my research will address this deficiency in the literature by providing rich qualitative data from a purposive sample of fourteen instructional leaders from three rural and one urban primary school in Jamaica with the hope of informing the government on this phenomenon.

Significance of the Study

It is anticipated that findings of this study will benefit the Jamaican society considering that literacy is a fundamental skill that is critical to the growth of a nation. Literacy empowers individuals, families and communities and improves their quality of life. The skill helps eradicate poverty, reduce child mortality, curb population growth, achieve gender equality and ensure sustainable development, peace and democracy

(UNESCO, 2012). A literate society is contingent on the quality education afforded to students in primary schools. Therefore, this study will serve as a basis and theoretical model for future studies that will be conducted on TC and instructional leaders' perceptions on the integration of the technological device to prepare students for the G4LT. It will also provide data that could be used to inform decision-making at the MoE and the Ministry of Science, Technology, Energy and Mining (MSTEM) since the TIS initiative is in its pilot phase. Students, administrators and other stakeholders will benefit from the information gathered as they will be more informed and be provided with better insights as to what is taking place in the education system and the changes that have evolved.

Research Questions

This study was guided by the three major research questions listed below. They provided the framework for the data collection, analysis and reporting of the findings.

1. To what extent do instructional leaders feel that the use of tablet computers are effective in preparing students for the Grade Four Literacy Test?
2. How do instructional leaders facilitate the integration of tablet computers in the pedagogical process?
3. To what extent do instructional leaders consider the tablet computers an instructional tool which has encouraged more favourable responses from students in the classroom learning environment?

Definition of Terms

Given the focus of the study and the attendant variables, the following terms are defined in order to provide clarity.

Definitions of terms that have specific meanings to this study are as follows:

1. Perception**:** “An interpretation or impression based on one’s understanding of something” (The Concise Oxford dictionary, 1995).
2. Tablet Computers: A tablet computer can be defined as a small wireless portable computer that allows input on a screen by means of a finger or stylus rather than an external keyboard. Tablets come with pre-installed applications and a web browser (Atkinson, 2008; Thompson, 2015).
3. Integration: The act or process of combining two or more things inorder to become more effective (Cambridge dictionaries Online, 2015).
4. Literacy: “Literacy refers to a complex set of abilities to understand and use the dominant symbol systems of a culture for individual and community development. It includes critical thinking, problem-solving abilities and oral/aural abilities” (Ministry of Education, Jamaica, 2010).
5. Grade Four Literacy Test: A standardized test administered during the third term of grade four to test students’ competence in Word Recognition, Comprehension and Communication Task. The Grade Four Literacy Test is the national measure of literacy attainment at the primary level (Thwaites, 2014)
6. Reality: The state of things as they actually exist, as opposed to an idealistic or notional idea of them. (Oxford dictionaries, 2015)

Delimitation and Limitations of the Study

As with most studies, delimitations and limitations are inevitable. Price (2004) defined delimitations as systemic biases intentionally introduced into the study design by the researcher. In other words, these are the characteristics that limit the scope and boundaries of the study. Delimitations may include the participants to enrol[2], objectives, research questions, variables, theoretical objectives and philosophical framework. Price further explained that the limitations are the weaknesses that the researcher did not or could not control and which could inappropriately affect the results garnered. Limitations to consider include study design, impact, time, and data. The delimitation and limitation of this study are discussed below.

Delimitations

A purposive sample of 14 instructional leaders was chosen to participate in the research. Ten instructional leaders were from three rural schools and the remaining four from an urban school. This study was undertaken to provide empirical data on the TIS initiative, with the ultimate goal of informing, in order to improve the pedagogical process in Jamaican Primary Schools. The philosophical postures espoused in this study were derived from a constructivist worldview. This ultimately supported the goal of the research; to rely as much as possible on the participants' viewpoints (Creswell, 2014) concerning the TIS initiative. Three major research questions guided the study. From these, open-ended interview items were generated. In addition, an observation schedule was constructed to ascertain data on how students and teachers used the TC during contact period.

Limitations

This study was limited in several respects. To begin with, failure to use a random sampling technique significantly limited the ability to make permissible inferences from the emerging data. Additionally, the institutions were purposively selected since they

[2] Jamaica adopts the British system of spelling for Standard Jamaican English words. Therefore, in this paper, British spelling is used except when quoting information from American literatures.

were among the schools that were on the TIS Pilot Project. Accordingly, the instructional leaders (participants) were a part of a population-specific sample and represented a fraction of the total instructional leader populace. Consequently, generalizations beyond the schools and instructional leaders studied were not intended. Another limitation was the lack of prior research on the topic. Citing prior research studies, forms the basis of my literature review and helped to lay a foundation for understanding the research problem that I was investigating. No known research had been conducted on the TIS Pilot Project in Jamaica, so a world- wide view had to be taken which suggested that further research will have to be conducted about this particular phenomenon in the Jamaican context.

The instructional leaders at one sample school were hesitant to accommodate the process because of misconceptions relating to data collection and the purpose of the study and so they opted not to participate in the research. Therefore, another school had to be chosen by the researcher. Due to the student population of the chosen school, there was no immediate vice principal or grade coordinator employed, consequently, only two instructional leaders were interviewed; the principal and grade four teacher.

Theoretical Framework

Learning Defined

Learning is defined as any relatively permanent change in thought or behaviour that occurs as a result of experience (Sternberg & Williams, 2002). Similarly, Mayer (2003) defined learning as “lasting changes in the learner’s knowledge, where such changes are due to experience” (p. 5). The overarching tenet is that learning is measured by the amount of change that occurs within an individual’s level of knowledge, behaviour or performance and is brought about through experience or interaction via the environment (Mayer, 2003; Ormrod, 2004; Sternberg & Williams, 2002). Learning can occur in various ways. It may come about through direct or vicarious experiences, instructional presentation or a combination of any or all experiences (Newby, Stepich, Lehman & Russell, 2006). The format for learning is contingent on several factors which include: the learner, learning environment and the content to be learned. The phenomenon of how people learn has been studied for hundreds of years and numerous viewpoints exist today (Chowdhury, 2006; Newby et al., 2006). Three pertinent theories in the way learning is conceptualized are the behavioural, information -processing and constructivist theories (Newby et al., 2006; Roblyer, 2006; Samaldino, Lowther & Russel, 2012).

Learning Theories

The stimulus-response (*S*-*R*) or behavioural theory was first introduced by John B. Watson in the early twentieth century. He studied animal's response to conditioning based on the experiments of Ivan Pavlov who developed the animal training model known as stimulus-response or classical conditioning (Watson, 1913). "Classical Conditioning is a process of learning by temporal association in which two events that repeatedly occur close together in time become fused in a person's mind and produce the same response" (Comer, 2004 as cited by Chowdhury, 2006, p.3). This means, learning occurs when a natural reflex responds to stimulus as documented in Pavlov's dog salivation experiment.

In the 1950's renowned psychologist Burrhus Fredrick Skinner, in contrast to Pavlov's classical conditioning, based his research largely on voluntary, deliberate behaviour that made up an individual's behavioural repertoire (Bigge & Shermis, 1999;

Newby et al., 2006). He believed that the best way to understand behaviour was to look at the causes of an action and its consequences. He referred to this approach as operant conditioning (Skinner, 1968). According to Skinner, if a behaviour is rewarded, that behaviour is repeated. He further postulated that voluntary automatic behaviour is either strengthened or weakened by the instant presence of a reward or punishment. Demonstrating with pigeons and equating their behaviour to that of human beings, Skinner found that reinforcement shapes behavioural patterns, which subsequently gave birth to the reinforcement theory (Noll, 1995; Samaldino et al., 2012). According to Skinner, "behaviours are shaped by *contingences of reinforcement* to shape desired responses: positive reinforcement (increases desired behaviour); negative reinforcement (increases desired behaviours by withholding rewards); punishment (decreases behaviours with aversive stimuli)." (Roblyer, 2006, p. 38). Skinner concluded that learning is passive. It is not pre-programmed; therefore, it only occurs in the presence of stimulation.

To explain the behaviourist learning process, the A-B-C model is adapted. The environment presents an antecedent *(A)* which prompts a behaviour *(B)* that is followed by a consequence *(C)* which then determines whether the behaviour will reoccur. Since learning can only be inferred by observing behaviour, an antecedent has to consistently result in a desirable behaviour (Newby, et al, 2006). This framework has implications for the teaching and learning process as it calls for the teacher to arrange external contingencies. The teacher has to clearly state the objectives of his or her lesson, guide students' behaviour with cues and arrange reinforcing consequences to immediately follow their behaviour (Newby et al, 2006). Instruction, therefore, must provide the correct stimuli and reinforcement to achieve desired learning outcomes.

The Cognitive Theory on how people learn emerged out of the advent of computers in the 1950s and more so, the shortcomings of behaviourism. Unlike the behaviourist, who relies solely on observable behaviour to determine if learning has taken place, the cognitive psychologist is concerned with what transpires internally. According to Grider (1993), cognitive theorists believe that learning involves the integration of events into an active storage system comprised of organizational structures termed, schemata. He asserted that the mind uses schemata to selectively organize and process all the information individuals receive from the world. Hence, cognitive theorists believe that behaviour is not only controlled by external prompts but by processes that occur internally in the mind. This school of thought brought behaviourism under scrutiny and the theory was found inadequate to explain complex behaviours and subsequently deemed insufficient to guide the pedagogical process (Smaldino et al., 2012). The information processing theory is one such cognitive approach that explains how the mind transforms information for learning to occur.

According to the information processing theory, learning is encoding information into human memory (Roblyer, 2006). Likening the human mind to that of a computer, the information processing perspective suggests that the mind takes information and retrieves it form memory. Hence, memory is said to be active rather than passive. Atkinson and Shiffrin (1968), proposed a three-step model of memory from which the theory is based: attention, encoding and retrieval. When an individual takes in selected information from the environment via the sense organs it is referred to as attention. Sensory registers receive this information, which is either lost or transferred to the short-term memory (STM) or working memory. The information is processed and translated into a meaningful and memorable form referred to as encoding. The information is then moved to the long-term memory (LTM) where it is held indefinitely. For new information to be transferred to the LTM it must be linked to prior knowledge already stored (Miller, 2011; Newby et al., 2006). Learning occurs when a person encodes information in a way that allows him or her to easily recall said information and effectively use it in a given situation.

Since the emphasis of the information processing perspective is on students' cognitive processes and the critical role memory plays in assisting them to translate new information into a form that they can remember and use, it is imperative that instruction is geared towards fostering and supporting these cognitive processes. Therefore, normative teaching practices should include: organization of new information, linking new knowledge to existing knowledge, utilizing various memory teaching aids including interesting and eye-catching materials and practice exercises to help transfer information from the STM to the LTM (Newby et al., 2006; Roblyer, 2006).

Like the behaviourists, the cognitivists view knowledge as external to the learner. Constructivists, however, believe that learners create knowledge as they attempt to understand their experiences (Driscoll, 2000; Stenbergh & Williams, 2002). Shifting from passive transfer of information to active problem solving and discovery, constructivists emphasize that learners create their own interpretations of the world of information. They construct new understandings using what they already know, and their prior knowledge influences what new or modified knowledge they will construct.

According to Jean Piaget, (one of the first psychologists who documented this theory) children go through stages of cognitive development by interacting with their environment. Piaget and Inhelder (1969) postulated four universal stages of cognitive development. The first is the sensorimotor stage which occurs between birth and two years. During this period, objective permanence (knowing that an object exists after it is removed from sight) is achieved while children explore through their senses and motor activities. Next is the Preoperational Stage which occurs between 2 -7 years. It is during these years partially logical thinking begins to emerge and while children are extremely egocentric, they are able to exercise self-control. The Concrete Operational Stage occurs from around age 7 to 11. The key feature of this stage is conservation (understanding that something is the same in quantity even though its appearance might change). The final stage is The Formal Operational Stage between 12- 15 years. During this stage, children are able to manipulate and organize ideas in their head and show results of abstract thinking. Piaget found that when learners are confronted by the unknown or unfamiliar situations they enter a stage of disequilibrium which they respond to by either the process of assimilation (fitting it into their beliefs) or accommodation (changing their own beliefs). This is known as the adaptation process which enables the transition from one stage to the next.

Besides Jean Piaget, other influential figures associated with constructivism include Jerome Bruner, Lev Vygotsky and John Dewy. According to Sternberg and Williams (2002) and Woolfolk (2008), Jerome Burner’s work is based on discovery learning which is concentrated on students using information supplied to them to construct their own understanding. Lev Vygotsky asserted that learning is shaped by culture and so he proposed the Zone of Proximal Development (the range between a child's level of independent performance and the level a child can reach with guidance) and scaffolding (competent support given to students by adults). John Dewy viewed learning as a social experience; hence, he postulated that growth is fostered by engaging students in hands-on activities connected to real-world issues. The underpinning arguments posed by these pragmatists suggested that students are not empty vessels but come with a wealth of knowledge which can be harnessed in order to make them critical thinkers. Therefore, the role of the instructional expert in constructivism is to create and maintain a learning environment which support collaboration and learning in context (Newby et al. 2006). Instruction should be tailored to each student's needs and preferences. In addition, students should be given opportunities for self- discovery and finally, the teacher should allow students to show competence by using different modalities to assess the same topics.

Learning Theories as Bases for Integration of Tablet Computers in the Pedagogical Process

In every profession, theories inform practice. Learning theories are the foundation of instructional practice and whether they are didactic, heuristic, passive or active in nature, the arguments put forward in each have implications for the teaching and learning process. We live in a technological age and a myriad of technological devices are being employed in the classroom to improve the pedagogical process. The integration of the TC is critical in today's age because of the advantage that can be derived from its usage.

According to Bigge and Shermis (1999) computers, including the TC are the ultimate teaching and learning tools for the behaviourists. Although modern technology advocates may reject the aforementioned characterization by Attwell and Hughes (2010), the device is found to provide consistent, reliable stimuli and reinforcement on an individual basis (Roblyer, 2006). Bigge and Shermis (1999) noted that “Skinner’s Reinforcement Theory is central to computerized learning, especially in drill and practice and tutorial learning” (p. 307). This is so because students’ behaviours are reinforced by their getting the correct answer or being permitted to proceed to the next frame of contingency of reinforcement. Newby et al (2006) cited an excellent example alluding to a mathematical program. They contended that in a math program, the stimuli could be an equation presented, the required behaviour is for the student to identify the correct response from options given with the click of the mouse, and the immediate feedback is given as students are promoted to another frame or level of the activity. Similarly, a literacy program can offer the stimuli and feedback that students need to improve their literacy skills. Therefore, the onus is on the teacher to organize and integrate different materials (text, audio, video and other exercises) into the instructional experience that will allow students to learn independently at their own pace and be engaged in self-regulated learning, enrichment and remediation activities.

From the information processing perspective, one's ability to learn stems from the way one perceives, organizes, stores, and retrieves information (Grider, 1993). The computer is a cognitive or mind tool (Angeli and Valanides, 2002) which is capable of engaging students in meaningful thinking. It affords them the ability to critically analyse, think about the content they are studying and effectively organize and represent prior knowledge. For the cognitivists, the TC has qualities to draw students' attention and more importantly, facilitate the organization, chuncking, linking, assimilation and accommodation of new information with memory, thereby enabling the learning process (Newby, 2006).

The idea that students actively construct knowledge through experience based activities is derived from a combination of concepts in Social Activism, Scaffolding, Piaget's Stages of Development and Multiple Intelligence theories (Roblyer, 2006). The use of technology is supported in all viewpoints as its integration is critical in 21st-century education. According to Roblyer (2006), technology, inclusive of computer, provide opportunities for collaboration and visual presentations; which help students to connect abstract concepts with real life applications. He further explained that technology can support multiple ways of studying the same content and can provide what he described as "visual scaffold" which will assist students in understanding complex concepts. In addition, "technology can make possible a rich array of information and complex environments for students to explore" Roblyer 2006, p. 43). If suitable applications are downloaded to the TC then it could be deemed as one such technological device that supports multiple perspectives or interpretations of reality, knowledge construction, context-rich and experience-based activities. These elements speak directly to the constructivist approach to learning.

Roblyer (2006) contended that integration of technology is necessary for the directed models because it can be used to identify weaknesses or skill deficits, promote skill fluency or automaticity, support efficient, self-paced instruction and support self-paced review of concepts. He further argued that to foster a constructivist approach, technology is employed to promote creative problem solving and metacognition, help build mental models and increase knowledge transfer, foster group cooperation and allow for multiple and distributed intelligences.

While it is maintained that the use of the computer in education has reflected a behaviourist position (Bigge & Shermis, 1999), it can also be argued that the advancement of computer technology calls for individuals to access, analyse and synthesize information. It is not wise therefore to take what Molenda (1991) as cited by Roblyer (2006) described as 'an either or' stance. Rather Roblyer suggested that:

> We must find a way to merge the two approaches in a way that will benefit learners and teachers. A link between the two epistemological plants must be forged so that teachers and students can travel freely from one to the other, depending on the characteristics of the topics at hand and individual learning needs. (Roblyer, 2006, p.46)

Consequently, from the behavioural, information processing and constructivist viewpoint, technology can be used to generate motivation, remove logistical hurdles to learning and develop information and visual literacy skills. Technology makes the teaching and learning process more meaningful and fun.

CHAPTER 2

REVIEW OF LITERATURE

The literature review presented in this section has been organized in accordance with historical perspectives and the main variables, which guide the study. Given the focus of the research topic, it is important that the historical and current perspectives of primary education in Jamaica are discussed. The main variables pertinent to this study are: Technology, Technology in Education, Tablet Computers, and Tablet Computers as an Instructional Tool, the TIS Pilot Project, Literacy, The Grade Four Literacy Test and Students’ Performance on the Grade Four Literacy Test.

Primary Education in Jamaica: Historical and Current Perspectives

The modern Jamaican Educational System has historical roots extending back to 1835 when the country received financial aid under the Negro Education Grant for the education of the ex-slaves populace (Davis, 2004). Within two decades after the initiative, two types of schools emerged: a modest formal education system for whites and publicly financed schools for the working class, which prepared them for artisan and amateur jobs. This dual system evolved and became “entrenched into the social fabric and for more than a century education functioned as the most powerful gatekeeper of the status quo” (Davis, 2004, p. 41). Subsequent to this system, three streams of education surfaced: extremely bright students from the working class moved to the bottom of the developing middle class, resulting in an academic stream for professionals such as lawyers and doctors, a technical stream for maintenance managers of imported equipment and a basic stream for non-skilled workers (Davis, 2004).

In 1953, the MoE was established and about 75% of children were enrolled in primary schools (Miller, 1999). Primary schooling starts at grade one and ends at grade six; the students are between the ages 6 to 11 (Livingston, 2013a, UNESCO, 2011). By 1958, the ministry was given full responsibility for education and with independence in 1962, new policies and programmes were initiated to commence the process of reforming the education system (Davis, 2004).

Miller (1999) noted that:

> The independence reforms sought to achieve universal primary education. Initially, the reforms focused on building more schools, expanding existing schools, training more teachers, and lowering the age of admission from seven to six years. Later they included provisions for children with varying degrees of disability. (p. 205)

Within the first 15 years of independence, there were drastic changes in the system as the government tried to address the issue of unequal access to secondary education by providing free primary education and introducing the Common Entrance Examination (CEE) (Davis, 2004). This examination served as what Davis described as a screening mechanism, explaining that "students who were selected went to traditional high schools, the rest flowed automatically to New Secondary Schools, resulting in an institutionalised two-tiered system – one for the upper and middle class and the other for children of the masses" (p. 42). Evans (2004) substantiated this belief, arguing that Jamaica inherited a dual system of education that was established for two social groups. Despite these arguments, however, UNESCO's 1983 report lauded the Jamaican Education System for being close to universal primary education. UNESCO (1983) noted that just about all primary school leavers received some post-primary/secondary education. Nevertheless, the quality of education offered at the primary level came under great scrutiny as the said report revealed that one of every two students who left the system was deemed illiterate.

Following this derisive report, the government undertook massive investment in education during the 1990's. This included the phasing out of the CEE in 1999 with a curriculum based national assessment as its replacement (Henry, 2012). The National Assessment Programme (NAP) was established as a component of the Jamaican Primary Education Improvement Project (PEIP). Its core function was to assess the academic achievement of Jamaican students at the primary level. However, Andrew Holness[3] in Henry (2011) posited that NAP for primary education could provide "a powerful and comprehensive tool not just for assessing the students, but for assessing schools, school leadership and individual teachers" (p.1).

Under the NAP, four standardized assessments are administered to students at specific times throughout the primary years. The first is the Grade One Readiness Inventory, recently re-named Grade One Individual Learning Profile (GOILP), second, is The Grade Three Diagnostic Test (GTDT), next, The Grade Four Literacy Test (G4LT) and to complete the battery is The Grade Six Achievement Test (GSAT) (Henry, 2011; Henry, 2012). The GOILP and the GTDT were first administered in 2003 and 2008 respectively and The G4LT and GSAT were first administered in 1999 (Lewis, 2010, UNESCO, 2011). For students' success and smooth transition and implementation of the assessments, approximately 2,000 teachers were trained in new methodologies associated with the NAP (UNESCO, 2011).

[3] Honourable Andrew Michael Holness served as the Minister of Education from 2007 to 2011.

Over the past four decades, changes have been made to the way students are assessed, however, the teaching methodologies of most educators have remained constant. The Jamaican Education System continues to be fashioned after the British model, which is teacher-centred (Mayne, 2012) and Direct Instruction is the preferred teaching strategy used in the classroom. This didactic approach to teaching has been employed by the majority, if not all educators in the 595 primary schools (Livingston, 2013b) across the island. Former Jamaica Teachers' Association (J.T.A) president and principal of Jamaica College, Ruel Reid, in Hill (2011) warned that teachers are to be careful of the lecture method as they might lose the interest of the students. In an eye-opening report which covered inspection of schools done within the period September 2012 to March 2013, Maureen Dwyer, Chief Inspector of the National Education Inspectorate (NEI) found that students' performance in 242 or 80% of schools was "unsatisfactory" or needed "immediate support" (p. 1). She further reported that in many of the schools, didactic teacher-centred lessons were very common ("Every Child not Learning," 2013). In this system, the teacher tightly controls the teaching and learning process and relegates the students to responses that come from his or her prompts. The students learn that they must sit quietly, speak only when required to do so, keep hands and feet to themselves and raise their hands if they need to ask or answer questions. This process is seen as pervasive and is often utilized in third world countries or in systems that have less money to spend on educational equipment and staff development.

Freire (1970) described this method of teaching as oppression in the educational system or the 'banking' concept of education. He explained that students in this system are viewed as 'containers' who are to be filled with the content of the teachers' narration, thereby concluding that “education is suffering from narration sickness” (p.71). He further contended that this practice mirrors an oppressive society that only serves the interest of the oppressors who oppose transformation. The banking system of education is greatly flawed simply because knowledge emerges through invention and re-invention and not by simply memorizing or regurgitating information as some educators believe. According to Freire, students should be co-creator of knowledge; creating meaning and using their skills in various everyday life situations. In order to escape a system where students lose critical consciousness, Freire suggested that “mutual humanization” must occur and students, as well as teachers, must become partners in critical thinking and problem solving; instruments for liberation. Hooks (1994) in support of this ideology asserted that education should be a progressive and holistic practice that serves to empower students. Giroux (2011) also in agreement, posited that critical education is a basic element of progressive social change and for the attainment of cultural, and economic equity.

Schug (2003), on the other hand, argued that teacher-centred approach is a valuable and effective method of instruction. Adams and Engelmann (1996) as cited by Schug (2003) explained that a meta-analysis of 34 selected studies was conducted in which Direct Instruction interventions were compared to other teaching strategies. The comparison produced two major results.

> First, 87 percent of posttreatment test score averages favored Direct Instruction, compared to 12 percent favoring other approaches. Second, 64 percent of the statistically significant outcomes favored Direct Instruction compared to only one percent favoring other approaches, and 35 percent favoring neither. (p. 96).

In a subsequent study measuring the relative effectiveness of Discovery Learning and Direct Instruction in Science, Klahr and Nigam (2004) found that more children learned from Direct Instruction than from Discovery Learning and those who were taught using the Direct Instruction were able to make scientific judgements just as well as those taught using the discovery method. Other researchers who have found direct instruction to be effective in the teaching and learning process include: (Borman, Hewes, Overman & Brown, 2013; Carlson & Francis, 2003; Hensen & Pearson, 1983). Regardless of the convincing arguments put forward regarding the effectiveness of Direct Instruction, many educational policyholders and government officials view this strategy as primeval. Consequently, the MoE in embracing this view has seen it fit to train administrators and educators alike in utilizing 21st-century teaching methodologies coupled with the heuristic approach in the teaching and learning process. In addition, educators are given the latitude to infuse direct and explicit methods with the aforementioned approaches as they deem necessary to bring about students' learning.

Substantial financial investment has been channelled into training educators. Nevertheless, the Jamaican education system continues to be dysfunctional. According to Davis (2004), students' attendance and performance continues to be low. Many of the students who exit the primary school attained low mastery in English Language and Communication Tasks. In a renewed effort to affect change, the government launched the Task Force on Educational Reform. The primary aim of the initiative was to hold educators accountable for what goes on in the classrooms and in so doing, improve standards of performance (Mayne, 2012). As a response to the findings of the report penned by Davis (2004), the government launched The Education System

Transformation Programme (ESTP) which is a set of major activities to be implemented to realize improvement in the education system. Primary among these activities is the development and implementation of a National Comprehensive Literacy Programme and professional development for teachers and administrators to increase their capacity. “It is also felt that adopting this route will assist in alleviating illiteracy at the primary school level” (Mayne, 2012, p. 6).

Subsequent to the launch of the Task Force on Education Reform, the government established Vision 2030: National Development Plan (2009). The mandate of this national initiative is to position Jamaica to achieve development status and prosperity by the year 2030, making the country, “the place of choice to live, work, raise families and do business.” The Sector Plan for Education is one of the 31 sector plans derived from the vision and is established to put the country on the global map in terms of excellence in education. According to the Education Sector Plan, the current state of the education system is to pursue seven strategic objectives, which are to:

- devise and support initiatives that are directed towards literacy for all, and in this way, extend personal opportunities and contribute to national development;
- secure teaching and learning opportunities that will optimize access, equity and relevance throughout the education system;
- support student achievement and improve institutional performance in order to ensure that national targets are met;
- maximize opportunities within the Ministry’s purview that promote cultural development, awareness and self-esteem for individuals, communities and the nation as a whole;
- devise and implement systems of accountability and performance management to improve performance and win public confidence and trust;
- optimize the effectiveness and efficiency of staff in all aspects of the service to ensure continuous improvement in performance;
- enhance student learning by increasing the use of information and communication technology in preparation for life in the national and global communities (p. 7).

While all the educational objectives are relevant and important, those that speak to literacy and technology are at the helm of the government's focus as they try to achieve developmental status. Therefore, much effort is channelled into realizing the first and final objectives of the strategic framework for education. To this end, at the beginning of the 2016 school year, 50 high schools are expected to adopt the new Science, Technology, Engineering and Mathematics (STEM) Curriculum (STEM Curriculum, 2015). Furthermore, Thwaites affirmed that the introduction and use of Information and Communications Technology (ICT) in the primary classroom, coupled with traditional ways of imparting knowledge, will only redound to the benefit of the country ("Technology Revolutionising Education," 2015). Accordingly, the 38 schools under the TIS pilot project were equipped with computers, whiteboards/projectors, scanners, printers and the installation of Wi-Fi in addition to the tablets, all in an effort to effectively equip and integrate technology in schools.

Technology Defined

Technology drives our history and our future. As far back as the Stone Age, some form of technology was used. Its importance to human existence today has forced philosophers, anthropologists, sociologists and other scholars alike to aptly define the term. While it is said that a widely accepted definition remains obscure (Hensen and Foelich, 1994), all scholarly attempts made, bring to light some aspects of the meaning of technology. Prior to the seventeenth century, the word technology was non-existent: it was first adapted in the English Language thereafter (Marx, 2010). Derived from the Greek word, *techne* which means an art or craft, with the suffix *ology,* meaning a branch of learning, the word technology was first defined as "a branch of learning, or discourse"

(Marx, 2010, p. 562.) or an organized knowledge for practical purposes (Mesthene, 1979; Herschbach, 1995). Similarly, Social Science scholars defined technology as "the organization of knowledge for the achievement of practical purposes in intellectual and social contexts" (Luppicini, 2005, p.109).

By the late nineteenth century, however, the archaic meanings which solely derived from etymology would not suffice for a comprehensive definition of this complex term. Hence, the word was accorded a greater prominence encapsulating more than just process, but a tool. The Oxford dictionary defined technology as machinery and devices developed from scientific knowledge, a belief held by the prevailing public who equates technology to machinery (Earle, 2002). Bain (1937), however, in a comprehensive definition combining technology as a process and tool stated that "technology includes all tools, machines, utensils, weapons, instruments, housing, clothing, communicating and transporting devices and the skills by which we produce and use them." (p. 860). In its broadest sense, therefore, technology includes all the skills or procedures necessary to make and use tools to achieve a particular objective, and within an even broader framework; machines, computers and devices which can be operated by people who do not necessarily possess knowledge of the mechanisms of such devices.

Technology in Education

Technology, in every sense of the word, has become a vital part of life in today's society. Its evolution within the last few decades has been astounding and its usage has dramatically changed the way we work, learn, interact, and spend our leisure time (Noeth & Valkov, 2014). All spheres of society, including the education sector, have been transformed, owing to the increasing advancement in technology and the benefits that can be derived from its usage. Today, technology has the capacity, if appropriately used, to transform learning thus improving the pedagogical process in schools.

For technology to fulfil the promise of being a powerful contributor to learning, it must be used to maximise children's engagement in a meaningful and intellectually authentic curriculum (Murphy, Depasquale & McNamara, 2003). Technology is a tool and so the onus is on the teacher to get the children working together and motivated. Murphy, Depasquale and McNamara (2003), reiterated this point and further added that, the teachers' selection of a technological device, should be contingent on whether it is the best device to get children to learn. Bernauer (1995) captured a significant insight when he declared that "it is not technology per se that has resulted in improved student outcomes, but rather how the technology was used and integrated into instructional processes" (p. 1). Earle (2002) contended that:

> Integrating technology is not about technology—it is primarily about content and effective instructional practices. Technology involves the tools with which we deliver content and implement practices in improved ways. Its focus must be on curriculum and learning. Integration is defined not by the amount or type of technology used, but by how and why it is used (p. 11).

In many schools today, technology is considered an instructional tool (Angers, 2004; Earle, 2002; Jefferson, Davidson, Richardson & Jones, 2014). Besides the desktop computers, a wide variety of technologies are utilized by teachers. Pertinent among these are: overhead multimedia projectors, laptop, the Internet, interactive whiteboard, the tablet computer and other mobile devices. With these new technologies and pedagogical paradigms, students are afforded opportunities to determine when, where, how, and what they learn. (Blackwell, 2014)

Findings generated from an ethno-case study conducted by Angers (2004), suggested that middle school teachers believe technology is a tool that adds value to lessons and to students' learning and motivation. She also found that technology is used by teachers to create rich learning environments and experiences with project-based learning activities that shift away from the classroom practice of teacher-centred lessons. Bajcsy (2002) deemed technology in teaching and learning as an enabler and suggested that among others things, it can help to: organize and provide structure for material to students, facilitate and assist in the authentication and prioritization of internet materials, simulate, visualize, and interact with scientific structures, processes, and models and serve as an extension and enhancer for handicapped populations. Similarly, Wilson (2002) and Tallerico (2013) envisioned technology as offering endless possibilities to enhance educational experiences, expand academic opportunities, and develop critical employment skills. Mirroring the aforementioned findings, Cisco Systems (2004) reported that technology can improve learning (e.g., higher standardized test scores), increase student engagement in learning, improve the economic viability of students (e.g., increasing students' abilities to succeed in a 21st century work environment through teaming, technology fluency, and high productivity), increase relevance and real-world application of academics, close the digital divide by increasing technology literacy in all students and build 21st Century skills (e.g., critical thinking and sound reasoning, global awareness, communication skills, information and visual literacy, scientific reasoning, productivity, and creativity). Others affirmed the real promise of technology to be its potential to help in re-establishing the role of classroom teachers (Hooper & Rieber,

1995) and to facilitate fundamental, qualitative changes in the nature of the teaching and learning process (Thompson et al., 2000).

It would appear to be conclusive, therefore, that technology is important to the evolution of education. Its usage in the classroom is manifold and cannot be over emphasized. Technology has been incorporated into the curriculum at all levels (early childhood, elementary/ primary, tertiary) and is perceived major tool to enhance the pedagogical process. Teachers, as well as students, are expected to embrace technological devices (e.g. laptops, smart board and tablet computers) as they are now the gateway to a new frontier in education.

The Tablet Computer

According to Thompson (2015), a TC is “a small, thin computer, with a power source of great autonomy. It is light, able to connect to networks through various protocols and has a touch screen, with fingers functioning as electric activators” (p.5). Atkinson (2008) described a TC as “a form of mobile personal computer with large, touch-sensitive screens operated using a pen, stylus, or finger; and the ability to recognize a user’s handwriting—a process known as “pen computing” (p.3). What is common to all definitions is that the device is hand-held, bigger than a cellular phone but smaller than a laptop and allows input on a screen by means of a finger or stylus rather than an external keyboard.

In 1972, Alan Kay conceptualized, sketched and published the first tablet-Dynabook, as a part of his doctoral dissertation. He envisioned the tool as a toy for children, something to grab their attention and be controlled by them instead of a network (Atkinson, 2008; Tablet, 2015; Thompson, 2015). His plans did not materialize as he later concluded that the idea encouraged passive learning. Four decades after the initial conception, in 2010, the iPad was launched distinguishing itself from other devices created (IBM PC Convertible and ThinkPad) by boasting a touch screen as one of its major features (Thompson, 2015).

Today, TCs have many features. Besides the touch screen interface, one major feature is the high pixel screen density resulting in high resolution. The general size, regardless of the brand, varies from 7 to 12 inches and weighs between 230 to 960 grams (Thompson, 2015). Tablets come with a web browser and a number of applications which are pre-installed. These include everything from games, camera, to specialized word processors, instruments and most importantly educational content (Bacon, 2013) (see Appendix A for table showing TIS pilot project minimum tablet specifications). Students are able to use the device in a variety of ways. The majority will use the pen and its technology to take notes in class, while others will take full advantage of the numerous applications that are installed therein. Additionally, mobility of the TC allows students to take it anywhere in or out of the classroom (see Appendix B for table showing authorization-free internet literacy resource materials and applications for TIS project).

There are several brands and types of tablets, but all are capable of the same functions. The most common type of tablet is the slate style seen on Apple iPad, Surface from Microsoft and Kindle Fire by Amazon. The two most popular operating systems used on the gadgets are Apple IOS, which is used on iPads and Google Android, used on all android tablets including, Samsung and Nexus (Tablets, 2015). However, also available is RIM's BlackBerry Tablet OS, and Microsoft's Windows 8 (Education through Technology Jamaica, 2013).

Tablet Computers as an Instructional Tool to Drive Educational Outcome

Education is currently at a critical juncture in Jamaica and the need for reform assumes a special urgency. Thwaites (as cited by Baker, 2012), warned that stakeholders need to begin to look beyond the traditional methods of teaching to effectively engage students. Baker (2014) maintained that the onus is on school teachers to make the "joy of learning happen" (p.1). She explained that educators and school leaders are powerful people, holding the world in their hands and if these individuals embrace their roles in the education system, then Jamaica would be in a better position. She further explained that although much has changed over the last few decades in terms of technology and learning tools, many teachers are still trapped in the old way of teaching. In an effort to engage students, and make the classroom come to life with more meaningful learning experiences, teachers need to use the wide array of technological gadgets that are available. These she opined, include the computer, laptop and TC. West (2013) found that mobile learning represents an approach to address a number of the educational problems in the United States and the same can be implied for the Jamaican Education System.

In recent times, ongoing endeavours have focused on integrating the TC with the hope of reshaping teachers' pedagogical methodologies. The TC has grown in popularity since its introduction to the populace in 2002, (Atkinson, 2008; Lim, 2011). Although it is more commonly thought of as a device designed for the passive consumption of content, researchers from the University of Illinois found that it can support the learning process when used in an educational setting (Ciciroa, 2015). Chen, Sager, Corbitt and Sandoe (2008) compared the use of the TC with the overhead projector, blackboards and

PowerPoint TM and documented that the device supports instruction and learning by performing three major pedagogical functions; problem-solving, providing visual aids and keeping instructional records. They also concluded that its usage facilitates the different learning styles even more so than the other presentation technologies. Reflecting on the findings of Chen et al (2008), Hocanin and Iscioglu (2014) found that both students and teachers can benefit from using the TC. For students, the TC can improve motivation, collaboration, creativity and information technology skills while for the teacher, if effectively used, can improve classroom management and organization, evaluation of students' and improve the visual quality of materials. In addition, teachers can find more meaningful and engaging materials from which students can benefit.

Hocanin and Iscioglu (2014) purported that:

> learning is no longer just a linear process but one in which all information is connected seamlessly and visually with mobile tablets, they enhance the way of processing and presenting information. In addition, they provide inexpensive opportunities like continuous and situated learning support, potentially a more rewarding learning experience, and improving students' participation (p.14).

Thompson (2015) reported that the TC can support active learning strategies. Citing research conducted by Gerard, Knott and Lederman (2012), Thompson explained that this can be done when using discussion teaching, simulation and small group collaboration strategies. In a study conducted by Neumann and Neumann (2014) on the effect of tablets and apps on emergent literacy, the results revealed that children's early experiences with tablets have the potential to enhance emergent literacy skills such as their knowledge of letters, words, print concepts, and emergent writing. Likewise, Flewitt (2012) found that tablets support literacy learning in the nursery, early years, primary level and in special education. Hutchinson, Beschorne and Schmidt-Crawford (2012) investigated how a fourth-grade teacher integrated the iPad in her literacy instruction and reported that the iPad provided useful opportunities for literacy classrooms through digital, interactive books. They also found that when instruction was designed with the components of the Technology Pedagogical Content Knowledge (TPACK) framework, the iPad " may help teachers meet traditional print-based literacy goals while also providing students with opportunities to learn the new literacies of 21st-century technologies by responding to texts in unique ways" (p. 16). Using these gadgets in the classroom not only allow educators to embrace the new frontiers in technology but to improve static education programs and in so doing, enhance critical thinking and creativity in students Goral (2011) as cited by Mang & Wardey (2013). The TC is also an effective tool to use when teaching students with disorders and disabilities. O'Malley, Lewis and Donehower (2013) investigated the effects of using iPad to teach a set of students with Autism Spectrum Disorder (ASD) and found that the TC was an effective instructional tool in class-wide academic interventions for the students diagnosed with ASD. Results also indicated that teachers found the intervention to be socially valid because of the positive impact it had on student engagement.

Little formal research concerning the use of TC to improve educational outcome in third world and developing countries has been done (Haßler, Major, & Hennessy, 2013). While the effectiveness of using the gadget in the primary classroom has been duly documented in first and second world countries, there are inconclusive investigations of this nature in countries and areas of low economic development and high levels of poverty. Long, Laing and Yu (2013) conducted a survey in developing areas in China to investigate the perspectives of students, teachers and educational administrators relating to TCs and how to apply the technological device in education. Their results revealed that critical stakeholders need to have a deeper understanding of how to practically utilize the gadget in education. Suggesting that the process is not as easy as it appears and many pitfalls might arise, Long, Laing and Yu, (2013) maintained that understanding and application skills are critical not just for stakeholders in the educational eco-system in k-12 schools in China but for those in other developing countries that would like to introduce TC in their education system.

Although the TC is versatile, Bacon (2013) posited that there are several issues in integrating TC into the academic curricula. She explained that budget is always a concern and so there may not be enough money to purchase content and to install applications. In addition, the input of information can be awkward for students as the device is made for receiving and not inputting information. She further argued that students may use class time to visit sites that are not educational and since they are made independent learners, they are more difficult to monitor. The possibility for TC to be a source of distraction has also been noted by (Hocanin & Iscioglu, 2014; Karsenti & Fievez, 2013). O'Malley, Lewis and Donehower (2013) found that staff training and parent involvement were disadvantages in integrating technology; explaining that accessibility to the TC does not equate to high usage by teachers. Ertmer (1999) categorized the barriers to integration into two types: first order and second order or extrinsic and intrinsic elements. The first order or extrinsic factors are those that are related to technical support, adequate training and lack of resources and time. The second order or intrinsic elements are those which include teachers' perception, beliefs and opinion about technology. It stands to reason therefore, that pertinent to this study is the second order or the extrinsic barrier of integrating the TC in the teaching and learning process.

One emerging view in the research available is that the introduction of technology in general and TC specifically, must be supported by a pedagogical vision in order to reach its potential impacts on learning. "Effective technology integration will require continuous collaboration among teachers, administrators, and parents in order to promote student learning" (O'Malley, Lewis & Donehower, 2013 p. 17). A tablet can only be utilized to execute innovative lessons if suitable content and applications are downloaded on them (Ward, 2013). Effective usage is also dependent on its deployment in the classroom. Haßler (2015) cited four ways in which the TC can be deployed in the classroom to improve learning outcome. First is one to one without collaboration, next is one to one with collaboration, many to one collaboration and finally, the gadget is used on an individual basis. Sheppard (2011) suggested that tablets are better suited for individual use, noting technical considerations as they relate to synchronizing of content and charging of batteries.

Tablet in School (TIS) Pilot Project

Thwaites (2015) contended that education is the primary ingredient of economic development and the kernel of the renaissance in our society. His beliefs over the years, have served as an impetus to galvanize renewed thrusts to provide quality education and adequately equip Jamaican students to effectively function in a globalized economy. Accordingly, there has been a quantum shift in the Jamaican Education System and more so in instructional delivery. Many initiatives have been introduced and are being evaluated to ascertain value added to the education system. Inclusive of these are the breakfast and lunch program, The United States Agency for International Development (USAID)/MoE Literacy Project (Thwaites, 2015) and more recently, TIS.

Empowering Jamaican students to achieve their fullest potential through the use of technology is a mandate being carried out by MSTEM, primarily through e-Learning Jamaica Company Limited[4] (e-LJam). E-LJam has collaborated with MoE and the Universal Service Fund (USF), and at the beginning of the 2014-2015 academic year, launched the 1.4 billion TIS Pilot Project. This project was announced by Hon. Phillip Paulwell who heads MSTEM. The preparation work on the TIS began in May 2013 with research on the use of TC in education worldwide. The information garnered, informed the design and implementation strategies employed in the project ("Overview on the tablet in School", 2015). E-LJam contracted four companies to deploy the tablets and provide devices, accessories and device management solutions and services which included tracking and content control. The names of the companies and the quantity of tablets contracted were as follows: Digicel Jamaica (5,500 tablets); Innovative Corporate Solutions (10,500 tablets), Productive Business Solutions (5,500 tablets); and Geotec Enterprise Limited (5,500 tablets) ("Govt. signs $800m deal", 2014).

According to Smith -Edwards (2014), the TIS initiative officially began on July 20, 2014, when the first set of tablets was issued to teachers from seven of the participating schools. This significant gesture marked the beginning of the two months (July- August) training exercise where teachers were taught how to integrate tablets in their instructional delivery. General distribution of the tablets began in September 2014. McIntosh (2014) stated that, with full implementation, 38 educational institutions will see

[4] The e-Learning Jamaica Company Limited (e-LJam) is an agency of the Ministry of Science, Technology, Energy and Mining, responsible for the telecommunication portfolio.

the distribution of tablets benefit approximately 25,000 people. Table 1 below outlines the scope of the TIS Pilot Project in terms of involvement relating to the levels, institutions, students, teachers and tablets issued.

Both urban and rural primary schools across the island have been selected to pilot the TIS project. The parishes from which the schools were selected are as follows: Kingston, St Andrew, St Mary, St Ann, Trelawny, St James, Hanover, Westmoreland, St Elizabeth and Clarendon. Following information ascertained from the pilot, with a view of supplying all institutions across the island, about 600,000 students and teachers stand to benefit from the initiative within 4-5 years ("Overview of the TIS Pilot Project," 2015). Thwaites posited that the tablets will provide an opportunity for creating new material that can enhance and globalise the country's educational offerings (Govt. Signs $800m Deal, 2014). He further contended that such an initiative will afford students the opportunity to maximize their full learning potential.

According to "Overview of Tablets in Schools" (2015), it is expected that the TIS will impact several stakeholders: students, teachers, school administrators and parents. Among the expectations is for the project to overtime change the pedagogical process which will result in students assuming more responsibility for their learning. Teachers will become more comfortable with utilizing and integrating technology into the teaching and learning process and administrators will be encouraged to use technology to carry out

Table 1

Scope of the TIS Pilot Project

Institution Type	Number of Institutions	Number of Students	Number of Teachers	Total Tablets
Pre primary	6	1,255	71	1,326
Primary	13	5,975	236	6,211
All Age and Junior High	5	2,132	112	2,244
High	11	14,043	759	14,802
Special School	1	127	17	144
Teachers College	1	250	50	300
TOTAL	38	23,782	1,245	25,027
CAPS	15		95	
JFLL Centres	14		47	

Note: The Scope of the TIS Pilot Project is from "Overview of Tablets in schools" 2015).

administrative duties. Finally, it is hoped that parents will take a more productive role in their children's education.

The main objectives of the project are to:

- Provide approximately 25,000 tablets to students and teachers island-wide in 38 institutions. These include pre-primary, all age, junior high, a special education institution and one teacher training college.
- Provide children in the selected educational institutions with appropriate tablets based on agreed guidelines for e-learning devices.
- Provide the pre-primary and primary schools with appropriate technology, appropriate e-content and training of teachers in technology integration.
- Assist teachers in all selected schools to acquire an appropriate e-Learning computing device.
- Provide learners at Libraries, CAPs, JFLL, state homes and other learning centres in the neighbourhood of the selected schools with access to relevant e-Learning content.

- Provide ubiquitous internet access to school campuses and access points.
- Equip teachers and persons at neighbouring access points with the required skills to assist and facilitate learners accessing online resources.
- Provide technical and implementation support to the schools and access points.
- Educate the school community in the use and importance of the tablets and other technologies for job creation and economic development.
- Support student and teacher research.
- Increase willingness to read for leisure.
- Build competence in the use of tablets.
- Foster improved parent/guardian – child relationship. (“Overview of Tablets in Schools,” 2015, p. 2)

One year has elapsed since the launch of the initiative and “it is expected that the pilot schools will show marked improvements in their educational outcomes as a result of their use of these devices.” (What is Expected from the Tablet in Schools Initiative? 2014, p.1). In an address made at the University of the West Indies (U.W.I.) Open Campus Fair and Exposition on June 4, 2015, Minister, Hon. Phillip Paulwell stated that “The experiment has been tremendous, so far,…especially at the pre-primary and primary levels. He further informed that “almost overnight, the reading skills have improved, also the level of confidence on the part of the youngsters… and there has also been an increase in the morale of the teachers” (McIntosh 2015, para 2). He reiterated similar sentiments during his address at the Teachers’ Appreciation Luncheon held at the Jamaica Pegasus Hotel on November 19, 2015 adding that a full evaluation repot will be made available to the public in short order (Dennis, 2015). The source from which the minister ascertained his data to articulate such conclusive statements is yet to be determined, however, “School Management is the key” (2015) in agreement, reported that anecdotal evidence reveal that the project has been more successful in the primary schools and infant schools than in the high school. They have concluded that this is so because younger students are able to conform to rules and care the instrument better than the teenagers.

The preliminary finding of an independent audit conducted by professors and senior lecturers at the University of the West Indies found that “the programme resulted in improvements in students’ ability to learn independently; increased their interest in schoolwork; and their reading and writing skills. It also showed improvements in student engagement, enthusiasm by learners and classroom behaviour” (“Tablet in Schools Audit Review” 2015, para. 3).

Defining and Conceptualizing Literacy

Literacy is a complex and dynamic concept that is interpreted in a multiplicity of ways. Historically, the term ‘literate’ meant familiarity with literature. It was subsequently defined as reading, writing and arithmetic- the three R’s (UNESCO, 2003). By the nineteenth century, the definition of literacy and what it meant to be literate evolved to mean the ability to read and write to an appropriate level of fluency (Blake & Hanley, 1995). Cognitive psychologists adopted this perspective as they sought to explain the intricacies of the reading process (Ehri, 1999; Perfetti, 1999). They believed that reading and writing could be taught to any child who possessed the mental capacity, but should be done in a linear series at particular ages (Lambirth, 2001). The late twentieth century brought rise to new ideologies that problematized this skill- based definition (Lewis, 2010), consequently, a more comprehensive definition of the term was coined.

UNESCO (2006) in an effort to combine the work of psychologists, proposed four discrete understandings of literacy. One understanding is literacy as an autonomous set of skills namely: reading, writing and speaking. A second is literacy as applied, practised and situated. The notion that the practice of literacy occurred outside of schools and in social settings was popularized in the work by Barton and Hamilton (1998) who demonstrated how individuals used literacy skills in their everyday lives. The third understanding speaks to literacy as a learning process. Building on the constructivist theories of Piaget and Vygotsky, at the core of this perception, is the view that as individuals learn and construct their own knowledge they become literate (Sternberg & Williams 2002; UNESCO, 2006). Finally, literacy can be looked at as a subject matter hence, the understanding of literacy as text. Freire, as cited by Giroux (2011), however, imagined literacy as critical pedagogy, not only mastering specific skills but also a mode of intervention, a way of learning about and reading the world as a basis of intervening in the world.

Dubin and Kuhlman (1992) discussed the changing definition of literacy, acknowledging that the term means more than reading and writing but competence, knowledge and skills. They cited common expressions such as 'computer literacy,' 'civic literacy,' 'health literacy,' and a score of other usages in which literacy stands for know-how and awareness of the first word in the expression.

Tompkins (2003) defined literacy as the competence to carry out complex tasks using reading and writing related to the world of work and to life outside the school. In defining the concept for the Jamaican context, Bryan and Hall (2000) posited that "literacy is a complex set of abilities to understand and use the dominant symbol systems/language of a culture for individual and community development" (p.56). It includes critical thinking, problem-solving abilities and oral/aural abilities. It holds true then, that literacy is the foundation for success in school, in today's society and for success in life (Bitter, O'Day, Gubbins and Socias, 2009). UNESCO (2009) embracing the relevance of the skill concluded that:

> Literacy is a fundamental human right and the foundation for lifelong learning. It is fully essential to social and human development in its ability to transform lives. For individuals, families, and societies alike, it is an instrument of empowerment to improve one's health, one's income, and one's relationship with the world. (para.1)

Depending on the perspective of literacy that one adopts, there are three vital components of the skill: word recognition, comprehension and writing. Word recognition is "the process by which a reader identifies a string of printed letters as a meaningful unit" (Chikamatsu, 2006, p. 67). The speed and accuracy with which the reader is able to recognize words (automaticity) determine fluency and ultimate comprehension. Comprehension is the ability to use prior knowledge to construct meaning from text. According to Tompkins (2003), the writing process is one in which students use pre-writing, drafting, revising, editing and publishing to develop and refine a composition. The acquisition of these skills is of paramount importance if a child is to be considered literate and succeed in the Jamaican Primary School System.

Background of the Grade Four Literacy Test

The G4LT was developed in 1999 by the Student Assessment Unit (SAU) within the Jamaica Ministry of Education as part of the NAP (Lewis, 2010). Its main purpose was to determine the literacy levels of students completing grade four and to encourage educators to provide appropriate remediation when deficits in ability are determined (Williams & Staulters, 2010; Davis, 2004). In 2008, the Competence Based Transition Policy (CBTP) modified the test from a classroom-based evaluation to a nationally assessed test with the objective of making it a critical part of primary education in

Jamaica (Lewis, 2010). The test is now used as a standardized measure of literacy and is seen as “a barometer for literacy achievement” (Williams & Staulters, 2010 p. 98). It assesses students’ ability to recognize words, read and comprehend simple stories, factual text, directions list and tables. It also verifies their ability to write simple, reports and letters (MOEYC, 2004).

The G4LT has three sections and measures three sub-skills – Word Recognition, Reading Comprehension and Communication Task (Writing). Section one comprises 40 word recognition tasks, which the students complete in 10 minutes. The students have another 40 minutes to complete the reading and comprehension section which comprises of 30 questions and 40 minutes to complete two writing tasks in the communication segment. The writing task segment comprises of two papers: paper one tests their ability to complete a simple information sheet and paper two verifies the students’ ability to write simple letters. The maximum score that can be attained in this section is 8 points. Table 2 shows the grading scheme for the G4LT:

Table 2

Scoring of the G4LT

Literacy Skills	Mastery	Near Mastery	Non-Mastery
Word Recognition	31-40	26-30	0-25
Comprehension	12-30	8-11	0-7
Writing	5/8-8/8	3/8-4/8	0/8-2/8

Note: The values represent scores allotted under each segment of G4LT. All values represent raw scores.

Students who pass all three sub-sections of the test are considered as achieving mastery and are deemed literate. Students who fail either one or two sections are deemed as achieving near mastery status and those who fail all three areas are classified as being in the non- mastery category. Under the CBTP, the students who fail have three opportunities to re-take the test (Bromfield, 2013). The first two opportunities are presented in grade five, term one (December) and three (June) respectively and the final during the first term of grade six. If the grade six students fail to achieve mastery after the three attempts they will not be eligible to sit the GSAT and will subsequently be placed in the Alternative Secondary Transitional Education Programme (ASTEP).

Students' Performance on the Grade Four Literacy Test

The students' performance and the results of the G4LT have been treated with much disdain since its inception in 1999 (Bryan, 2004). Table 3 below provides summative data about public schools students' performance on the G4LT since 1999-2015.

Data ascertained regarding the re-sitting of the examination reveal that 55% of the 20,235 students who were given a second and fourth opportunity to re-sit the test in December of 2011 failed to achieve mastery. In 2012 of the 20,000-strong cohort, 7,471 of the students were re-sitting the examination for the fourth time while the remaining 12,529 were getting a second chance at achieving mastery. Of the 7,471 of the grade six students who re-sat the test, 58% were given the grade of non-mastery (Reid, 2012). These results were very disappointing for the ministry and other stakeholders and so efforts were doubled to achieve the ministry's target of 85% literacy by 2015.

Table 3

Students' Performance on the G4LT in Public Schools from 1999-2015

Year	Percentage Mastery at 1st Administration	Percentage mastery at 2nd Administration
1999	52	57
2000	47	58
2001	43.3	60
2002	53.3	58
2003	58	71
2004	57	63
2005	64	74
2006	64	75
2007	64	79
2008	71.8	81
2009	70.1	80
2010	67	81
2011	71	83.7
2012	72	86
2013	76.3	84.2
2014	75	*
2015	86.5	*

Note: Table outlining students' performance was adopted form (Thwaites, 2014).
*No examination was administered because of the change in policy i.e. reduction of four sitting to two.

Rationale for Students' Poor Performance

Grace McLean, Chief Education Officer in the Education Ministry, based on information garnered through the Child- find Programme has concluded that a minimum of 28% of our students are suffering from mild learning disabilities (Reid, 2012) and will never be able to gain mastery in the test. Parents, on the other hand, reject this view stating that their children are being set-up and the test is a scam for providing a basis on which to push them through the educational system at any cost, Lodge (as cited in Wright, 2002). She further argued that a test which places more than half of its emphasis on labeling- the ability to match pictures to corresponding words could be considered unbalanced. Henry (2005) in his analysis of the examination postulated that the test exposes the weaknesses of the country's education system. Bryan (2004) however put forward that the test is not flawed, but the difficulty is trying to acquire literacy in a language which is not students' mother tongue. The students are exposed to a different language at home and in their communities (Jamaican Creole) from that of what they hear in the school room (Standard Jamaican English) (Williams & Staulters, 2010). This aural clash she contends needs to be recognized and compensated for in the education programme. This compensation would mean that the students are not failing, but the system has failed (Denovish, 2011).

Another problem that contributes to the low literacy scores is that of emergent literacy (Bryan, 2004). She argued that a lack of positive start, a sense that reading is meaningful, explains the dire results on the comprehension section of the test. Bryan and Hall (2000) affirmed this argument, alluding to the fact that development begins long before the child reaches school and even through the school plays an integral part in literacy development, family, community and culture.

The issue of teacher competence has also been brought into question. The administration of schools has been criticized for deploying teachers with greater skill set in grades one to three with not much thought given to those placed in the upper grades. While the rationale for these decisions are understandable, Bryan (2004) maintained that teachers of the greatest expertise: with a flexible mindset equipped with a range of different strategies; language aware enough to cope with children's varying linguistic demands; and a belief in the children's innate ability should be placed at grade four. Williams and Staulters (2010) found that teacher-pupil ratio is also a deterrent in the process as high teacher-pupil ratio prevents educators from employing student-centred activities in the classroom. It can also be argued that the students are not motivated to learn and teachers' pedagogical skills are somewhat stagnant. Thwaites (2014) noted that absenteeism and lack of parental involvement could be direct factors that contribute to low literacy levels.

Education is evolving and the changes are a direct result of the integration of technology in the process. Students are the main beneficiaries that are affected by the change and educators should be resolved in their efforts to expose students to 21^{st}-century methodologies that will improve literacy attainment.

Initiatives to Improve Literacy

In recent years, the Jamaican government has initiated many programs to boost the literacy levels of the primary school students. These include the National Students'

Registry (NSR), the National Comprehensive Literacy Programme (NCLP), CBTP and ASTEP (Allen, 2011). Recent initiatives cited by Thwaites (2014) are as follows:

- Ongoing development of teachers through teacher training programs
- Increased collaboration with both private and public sector organizations. Namely: Jamaica Foundation for Lifelong Learning (JFLLL), Early Childhood Commission(ECC) and Project for the Advancement of Childhood Education (PACE)
- Publication and distribution of the Literacy standards and benchmarks for primary schools, Informal Diagnostic Reading Inventory (IDRI), Handbook of Literacy Instruction, The Literacy 4-5-6 Curriculum Guide and the Handbook of the NCLP.
- Greater collaboration and partnership with private sector to provide student resources.

In addition, the National Steering Committee (NSC) was established in April 2014 to be responsible for providing advisory, technical and professional support in the area of literacy and language education at both the national and regional levels. After considerable research, ministry officials and other relevant stakeholders have suggested the inclusion of technology, hence, the TIS initiative.

Tablet computers are relatively unexplored as tools for literacy learning (Beschorne & Schmidt-Crawford, 2012). The advantages and disadvantages of using TC to enhance the pedagogical process and improve students' academic outcome in primary schools across the globe have been duly documented and substantiated (Brunsell & Horesji, 2012; Carter, 2014; Kerawella et al., 2007). It is yet to be examined, however, in the Jamaican context, the extent to which integration of TC can improve academic performance. Furthermore, it is critical that data are collected on the perception of Jamaican instructional leaders as they relate to the integration of these gadgets. The research will also examine the reality that exists as they seek to integrate the gadget in the teaching of literacy skills. Therefore, this research will fill a significant gap in this area especially in the Jamaican context.

CHAPTER 3

METHODOLOGY AND PROCEDURE

Rationale for a Qualitative Design

The fundamental purpose of educational research is the attainment of new knowledge (Borg & Gall, 1989). Three major approaches dominate educational research: quantitative, qualitative and mixed methods. Creswell (2014) defined quantitative research as an approach for testing objective theories by examining the relationship among variables which can be measured in order that numerical data can be obtained. In contrast, qualitative research is defined as “an umbrella concept covering several forms of inquiry that help us understand and explain the meaning of social phenomena with as little disruption of the natural setting as possible” (Merriam, 1998, p. 5), extensive narrative data are yielded from this method of research. Mixed methods research has been duly defined as the collection of both quantitative and qualitative data, interpreting the two forms of data by using distinct designs that may involve philosophical assumptions and theoretical frameworks (Creswell, 2014).

In order to develop an initial understanding of the issue, a qualitative design was adopted for this study. Comprehensive description and interpretation had to be documented about the TIS Pilot Project. The variables introduced in this research were complex, interwoven and difficult to measure. In addition, multiple meanings were derived from instructional leaders’ viewpoints and so data were based on an emic perspective (Mertler & Charles, 2008). In considering those critical factors, a qualitative approach provided a more accurate perspective and account of the data. Creswell, (2014) identified five viable ways to conduct qualitative research: narrative, phenomenological, grounded theory, ethnography and case study research. A narrative research project is one in which the researcher studies and asks individuals to provide stories about their lives. In other words, a narrative research focuses on the life history of an individual. Mertler and Charles (2008) described phenomenological research as an inquiry whose goal is to "describe and interpret the experiences or reactions of participants to a particular phenomenon from their individual perspective" (p. 365). They further argued that grounded theory research is used to discover an existing theory or generate a new theory that results directly from the data gathered. "Ethnography is a design of inquiry coming from anthropology and sociology in which the researcher studies the shared patterns of behaviours, language and actions of an intact cultural group in a natural setting over a prolonged period of time." (Creswell, 2014, p.14). Mertler and Charles (2008) provided a more succinct definition explaining that the research process is used to study human interactions in social settings. A Case study is a detailed investigation centred on a single participant (Mertler & Charles, 2008).

Having examined the literature on qualitative methods, the tradition of inquiry that was most fitting to be utilized in this study was phenomenological research. "A phenomenological study describes the meaning for several individuals of their lived experiences of a concept or a phenomenon" (Creswell, 2007, p. 57). The word phenomenology derived from the Greek words *phainómena* which means "appearance" and *lógos* meaning "reason or word." Considering the word's etymology, Stewart and Mickunas (1990) defined the concept of phenomenology as a reasoned inquiry which discovers the inherent essences of appearances: an appearance is anything of which one is conscious. According to Greonewald (2004), Edmund Husserl, German philosopher and father of phenomenology redefined the term for the twentieth century, theorizing that people could be certain about how things appear in, or present themselves to, their consciousness. Greonewald further explained that anything outside of one's immediate experience must be ignored, and in so doing, the external world is reduced to the contents of personal consciousness. Realities are therefore treated as pure 'phenomena' and the only absolute data from where to begin. To this end, Giorgi (2009) and Moustakas (1994) as cited by Creswell (2014) offered a comprehensive definition of the term citing that phenomenological research:

> is a design of inquiry coming from philosophy and psychology in which the researcher describes the lived experiences of individuals about a phenomenon as described by participants. This description culminates in the essence of the experiences for several individuals who have all experienced the phenomenon. This design has strong philosophical underpinnings and typically involves conducting interviews (p. 14).

Assumption of Qualitative Research

Every qualitative research methodology labours under certain assumptions. Explained herein, is a synthesis of the characteristics, methodological and philosophical assumptions of this research. Creswell (2012) described four philosophical assumptions relating to qualitative research.

- Ontological- This relates to the nature of reality and its characteristics. It is the belief that the real world exists independently of our perceptions and theories (Maxwell, 2013).
- Epistemological - Researchers try to construct understanding from the world. Subjective rather than objective evidence is assembled based on individual views from research conducted.

- Axiological - Researchers make their values known in the study and actively reports these values, biases and the value-laden nature of information gathered from the field.
- Methodological - The approaches used in the process of research: inductive, emerging and shaped by the researcher's experience in collecting and analysing the data.

Husserl's (1962) statement "we can only know what we experience" forms the basic philosophical assumption which underlined this inquiry. As such, the aim of this research was to get close to the instructional leaders to gather subjective evidence on their views as they experience the TIS pilot program. According to Creswell (2014), this is one of the best ways of acquiring knowledge, through the subjective experience of people. This can be accomplished by applying a naturalistic approach. Therefore, data were collected from instructional leaders in their natural setting (Creswell, 2014), that is four schools where the TIS Pilot Project was piloted. Hence, this research was conducted from an epistemological perspective.

There is a descriptive narration of the information ascertained: the data, as well as the results of the analyses of these data, took the form of words rather than numbers (Mertler & Charles, 2008). An inductive approach was used in the collection of data for which I was the primary agent. In addition to the wealth of information that was gathered through the use of structured interviews and observation, a qualitative design was preferred because of its ability to garner in-depth information about this phenomenon, about which, very little is known, especially in the Jamaican context.

Role of the Researcher

Having worked as an instructional leader at a rural primary school for twelve years, I am cognizant of the need for teachers to be more au fait with pioneering research that informs practice in the Primary Education System. During my tenure at the primary level, I worked in the capacity of a literacy co-ordinator, the Grade Four Coordinator and the class teacher of at-risk students who were sitting the G4LT. My job description included preparing the students for all school-based and national examinations, supervising the grade four teachers, and planning literacy activities designed to improve these skills in the entire student population. After leaving that substantive post, I gained employment at Church Teachers' College where I now work in the capacity of lecturer in the School of General Education and Professional Studies.

The college believes that research is one of the key areas in which it can distinguish itself from its competitors. With this resolve, administrators are committed to fostering a culture of research by encouraging faculty-led, graduates and student research. It is critical that I begin to embrace research, and more so in the field of literacy and the TIS initiative, as I believe greater knowledge of this topic will better prepare me for future prospects in education.

Population and Sampling

The research was conducted in four schools; three rural primary schools in the parishes of Trelawny, Manchester and St Elizabeth and an urban primary school in Kingston. The participants under study were four principals, three vice principals, three grade four coordinators and four grade four teachers from the scope of schools that were piloting the TIS initiative. Participants for this study were selected using the purposive sampling method known as homogeneous sampling. This method was chosen because it is considered to be the most important kind of non-probability sampling to identify primary participants (Welman & Kruger 1999). The sample was selected based on my judgement and the purpose of the research (Babbie, 1995; Greig & Taylor, 1999; Schwandt, 1997). In addition, the sample size selected allowed for saturation or redundancy to take place (Creswell, 2014) as both schools and instructional leaders represent at least 30% of the primary schools and instructional leaders that were a part the TIS Pilot Project.

Timeline of Activities

During the month of December 2015 and January 2016, contact was made with the MOE and administration of the school sites to request permission to conduct the research at their institutions. Subsequent to that, interviews were conducted July 2016 and October 2016. Observations were done in the said months. All data were collected by the first week in November of 2016. Transcriptions of data were done immediately following each interview and data analysis took place in the months of December 2016 and January of 2017.

Data Collection

Data for this study were collected through the use of formal interviews conducted with instructional leaders, namely; principals, vice principals, grade four coordinators/ supervisors and grade four teachers. Two interview schedules were generated: one for principals and vice principals and another for grade coordinators and classroom teachers. The principals' and vice principals' schedule comprised 17 items (See Appendix C), while the grade coordinators' and classroom teachers' schedule comprised 22 items (See

Appendix D). It was from these schedules that data were generated to answer the pertinent research questions. Individual interviews was conducted in a safe, quiet and private area on each site. The verbatim responses of the respondents were recorded and transcribed (see Appendix H for document related to permission to audiotape interviews).

Data were acquired through the use of observations. These were open-ended in nature and provided first-hand experience of how the instructional gadgets were utilized in the pedagogical process. Information was recorded at the research sites in an unstructured way using an observational protocol (See Appendix E). A Stimulated Recall Interview was conducted (with the classroom teachers) using the Observational Protocol as a stimulus.

All paper documents were kept in a securely locked file cabinet in the investigator's home. Electronic files were kept on a password- protected computer. Participants were given a pseudonym upon entrance in the study.

Pilot Testing of Data Collection Instruments

Prior to preparation of the final version of the interview schedule, the items on the instruments were subjected to a pilot run. This involved a pre-testing of the items on a small group of instructional leaders comparable to those selected as the focal group for this proposed study. The results identified misunderstandings and ambiguities in a few items on the original draft of the instruments. Consequently, these items were restated and one was added to each schedule.

Table 4 below illustrates the items on the interview schedules and the purpose for which they were designed.

In order to allow for meaningful analysis, discussion and findings of the data generated from the participants, specific interview items were designed to generate data in support of each of the three major research questions. Table 5 illustrates the relationship of the alignment of sets of interview items to their corresponding research question.

Data Analysis

Interviews

The focus of this study lies in the description of what the instructional leaders' experienced. The goal was to find commonalities in the experiences rather than imposing my or other person's interpretations. Therefore, as the researcher, the first step in analysing the data was to rescind all preconceived ideas of the subject explored to understand the participants' experiences. Additionally, I renounced presuppositions in order to identify the data in pure form, uncontaminated by extraneous intrusions (Patton, 1990).

This research followed Creswell's (2014) six steps during the data analysis but does not by any means suggests a linear, hierarchical approach but more interactive in practice as the various stages were interrelated.

Step 1. Organizing and preparing data for analysis.

The data were collected, transcribed then sorted and arranged based on categories of instructional leaders.

Step 2. Reading through all data.

Data were then read to provide a general sense of the information and to reflect on its overall meaning.

Table 4

Interview Items and their Purpose in Data Collection

Interview Schedule Items P, VP	GC and CT	Purpose
1, 2, 3, 4	1, 2, 3,4	Collect demographic data relating to age, gender, professional experience, qualification and position held by participants at the school
5, 6, 7,8	5, 6, 7, 8	Designed to ascertain information about the Grade Four Literacy Test and remedial initiatives for students who are underperforming in literacy.
9, 10, 11, 12	9, 11, 12, 13,14	Will provide information on how tablet computers are integrated into the pedagogical process.
16,17	10, 21, 22	Designed to ascertain data on instructional leaders' perspective on the contribution of the tablet computers in preparing students for the Grade Four Literacy Test.
13, 14,15	15, 16, 17, 18,19,20	Designed to capture information about students' response to the integration of tablet computers in the teaching and learning process.

Note: Instructional leaders: P= Principal; VP = Vice- Principal; GC = Grade Coordinator; CT= Classroom Teacher

Table 5

Alignment of Interview Items with Research Questions

Research Questions	P and VP	GC and CT
1. To what extent do instructional leaders feel that the use of tablet computers are effective in preparing students for the Grade Four Literacy Test?	5, 6, 7, 8, 16,17	5, 6, 7, 8, 21, 22
2. How do instructional leaders facilitate the integration of tablet computers in the pedagogical process?	9, 10, 11,12	11, 12, 13, 14
3. To what extent do instructional leaders consider the tablet computers an instructional tool which has encouraged more favourable responses from students in the classroom learning environment?	13,14,15	9, 10, 15, 16, 17, 18, 19, 20

Note: Instructional leaders: P= Principal; VP= Vice- Principal; GC=Grade Coordinator; CT= Classroom Teacher

Step 3. Coding the data.

Data were then analysed using the open coding process. To commence the coding process, information ascertained was divided into segments. Decision rules that were used for segmentation included: expected responses based on literature and common sense, emerging patterns (information repeated several times during the interviews), diverging views, unanticipated responses, information that interviewees explicitly stated was important and responses that spoke to a theory or concept specific to the study.

Step 4. Using the coding process to generate a description of the themes for analysis.

The commonalities and differences from the coding process were subsequently categorized as themes or what Moustakas (1994) described as cluster of meaning. The themes were used to write textural and structural descriptions which explained what the participants experienced and the context of setting that influenced their experiences of the phenomenon.

Step 5: Advanced how the description and themes will be presented in the qualitative narrative.

An extensive narrative discussion under each research question was chosen as the main way to present the findings of the analysis of the data. The narrative displayed multiple perspectives and was supported by different quotations articulated by the respondents. In addition, the major themes that emerged from the data were summarized.

Step 6: Interpreting the meaning of themes/ descriptions

According to Creswell, this step can take different forms based on the design of the study but should include the lessons learnt. The lesson could be derived from the researchers' personal interpretations and experiences, meanings resulting from the comparison of the findings or information gleaned from the literature. With this in mind, I opted to interpret the finding of the results in chapter five of the study.

Observational Protocol

Although interviews were the primary method of data collection, I also conducted observational sessions. Data from the observational protocols were read, analyzed and coded. Similarities and differences based on the three main observation sessions were summarized.

Methods of Verification

In an effort to minimize validity threats, five of the eight strategies posited by Maxwell (2013) were utilized. They were as follows: Intensive, Long Term Involvement, 'Rich' Data, Peer Debriefing and Searching for Discrepant Evidence and Negative Cases and Comparison. In addition, Member Checks or Respondent Validation was applied as a strategy to rule out validity threats.

Extended periods were spent with participants at each school prior to and after data collection so that I could have a more intimate knowledge of the TIS Pilot Project. Prolonged time spent at the sites also allowed for intensive, long term involvement. Information about the setting was recorded in order to provide 'rich' data. I also sought to document the way in which the tablet was utilized in the teaching process, and in particular in the teaching of Literacy/ Reading. Much attention was paid to the methodology and pedagogical strategies employed when preparing the students for the Grade Four Literacy Test.

It is not uncommon for information ascertained during the investigation process to be 'far-fetched' and sometimes have no relation to the topic being studied. Therefore, in an effort to strive for validity, I analysed and reported all unusual or contradictory data and negative cases (outliers). Readers will be afforded the chance to evaluate the finding and draw their own conclusions.

Peer debriefing was used to enhance the accuracy of the explanations and interpretations given. Experts in the field of education and literacy were consulted for advice and information pertinent to the study. These individuals included, Education Officers at the Ministry of Education Region Five, lecturers of literacy and selected teachers and principals who were knowledgeable about the skill. In addition, I had dialogue with individuals from STEM to ascertain additional information on the topic. The involvement of the aforementioned individuals added validity to the account.

During the data collection process, I conducted in-depth formal interviews and made thorough records during the observational exercises. Transcriptions of data were done verbatim to capture a detailed representation of what transpired during the data collection process. After transcribing interviews, all vague statements were clarified by consulting with the respondents with whom the interviews were conducted. This lessened or illuminated misinterpretation of data within the study.

Ethical Considerations

There is always potential for ethical issues to arise when a research involves human subjects. Therefore, it was important that ethical considerations were woven in the study as soon as it started. As such, informed consent of participants was obtained (including assurance that participation is voluntary, with the opportunity to withdraw from the research at any time). I had an obligation to respect the rights, values, needs, desires and opinions of the participants in the study. Therefore, their privacy and anonymity were protected. Full confidentiality of information was maintained and data collected was interpreted honesty (See Appendix G).

Due to the nature of the study, permission to carry out the study was obtained from the Ministry of Education, Jamaica (see Appendix F for letter requesting permission to conduct research from the Ministry of Education, Jamaica). In addition, permission was sought from the Institutional Review Board (IRB) at Temple University (See Appendix I).

Conclusion

The future of utilizing the TC in primary schools is promising. As we embrace the future, the onus is on instructional leaders to create 21 century classrooms by integrating these technological devices in the teaching of different subject areas or disciplines. Literacy is one such area in which the TC is used as an instructional tool. The acquisition of this skill is of paramount importance if a developing country is to elevate its status. In recognition of the need to improve literacy levels in the country, the Jamaican Government has deemed it necessary to pilot the use of the TC in schools.

This study provide an opportunity for government officials to make informed decisions about the TIS Pilot Project and the usage of the device in Jamaican Primary Schools. It is anticipated that the findings of this research will unravel some of the challenges involved in integrating the technological device as an instructional tool to teach grade four students as they prepare to sit the Grade Four Literacy Examination.

CHAPTER 4

FINDINGS

Introduction

The acquisition of 100% literacy for the nation's grade four students has long been the goal of the MoE. Although several programmes and sustained initiatives have been implemented so that this vision can come to fruition, this milestone is yet to be realized. One of the most recent projects of the ministry was the launch of the TIS Pilot Project. It was hoped that by integrating technology, and in particular the TC, in the pedagogical process, students' literacy skills would improve thereby improving their scores on the G4LT.

This qualitative research study was designed to examine instructional leaders' perceptions as it relates to the integration of TC in preparing students for the G4LT. This research was conducted from an epistemological perspective. A purposive sample of 14 instructional leaders comprised the focal group. These individuals were chosen because they were employed at four of the primary schools in which the TIS initiative was implemented.

Data for this study were collected through the use of structured interviews. Two interview schedules were designed: one for principals and vice principals and another for grade coordinators and classroom teachers. The principals' and vice principals' schedule comprised 17 items (See Appendix C), while the grade coordinators' and classroom teachers' schedule comprised 22 items (See Appendix D). Data were also acquired through the use of observations. These were open-ended in nature and provided first-hand experience of how the instructional device was utilized in the pedagogical process.

The data were collected, transcribed verbatim, then sorted and arranged based on category of instructional leaders. Subsequently, they were analyzed using the open coded process. Instructional leaders' responses to each item were then categorized and further analyzed for emerging themes. In the reporting process, I self-consciously worked with frequencies, numbers, and percentages for three main reasons. First, was to organize the large batch of data generated from the participants in the four selected schools. The second reason was to keep myself analytically honest and third, to guard against bias.

The research findings that this chapter reports are based on the analyses of structured interviews and observation sessions conducted. Results garnered from the observational schedule were woven into the discussion of the data which were organized in accordance with the three research questions that guided the study, namely:

1. To what extent do instructional leaders feel that the use of tablet computers are effective in preparing students for the Grade Four Literacy Test?
2. How do instructional leaders facilitate the integration of' tablet computers in the pedagogical process?
3. To what extent do instructional leaders consider the tablet computers an instructional tool which has encouraged more favourable responses from students in the classroom learning environment?

Table 5 illustrates the alignment of these major research questions with the interview items designed to generate narrative verbatim data.

The second part of the findings dealt with themes and sub-themes that emerged from the data collected.

Results from Interviews and Observations

Demographic Data

Four principals, three vice principals, three grade coordinators and four classroom teachers participated in the study. Of the group, 78% were females and 22% males. Seven percent of the respondents were in the 20-30 years category, 21% were in the 31-40 years age category, 36% fell in the 41-50 and 51-60 age group respectively. Seventy two percentage of the respondents were above 41 years and constituted the bulk of the sample. Further perusal of the data revealed that 93% of the respondents had a first degree and the remaining 7% had a Master's degree. Their years of service in the teaching profession ranged from 7 to 33 years. Furthermore, the data revealed that all respondents had been working in their post, at the time of the research, between 1 and 15 years. Seventy one percent were working in their post for less than five years. Table 6 summarizes the demographic composition of the sample according to variables relating to: gender, age, position held, qualifications, years working in current position and years of service as an educator.

Item 4 on the principals' and vice principals' interview schedule was designed to ascertain data about the instructional leaders' role in preparing students for the G4LT. These instructional leaders reported that their role in preparing students for the G4LT was manifold and included: facilitating teachers in the preparation process, providing resources and ensuring that correct methodologies are employed in the teaching and learning process. Respondent 1 (R1) noted that a part of his role was to "provide motivation for the teachers to perform well and also for students," encourage parents to play an active role in their children's development and "ensure that the assessment

Table 6.

Summary of Demographic Data of Participants

Respondent	Gender	Age	Position	Qualification	Years in Current Position	Years in Education
1	M	37	P	BA Management	4	17
2	F	54	VP	BA Education	3	29
3	F	53	GC	BA Education	6	29
4	F	43	CT	BA Education	2	19
5	M	46	P	BA Education	8	16
6	F	57	VP	BA Education	4	23
7	F	37	GC	BSc Education	3	9
8	F	28	CT	BA Management	7	7
9	F	41	P	MSc Curriculum	3	19
10	F	52	VP	BA Education	15	30
11	F	57	GC	BA Guidance	1	33
12	F	39	CT	BSc Biology	1	16
13	M	48	P	BA Technology	4	22
14	F	47	CT	BSc Education	3	25

Note. F= Female; M=Male; P= Principal; VP= Vice Principal; GC= Grade Coordinator; CT= Classroom Teacher policies and programmes for the school are adhere to." He further explained that another of his role was to make teachers cognizant of their responsibilities and the expected standards set out by MoE and the Board of Management. This view was also substantiated by Respondent 9 (R9), who further observed that working with teachers and other stake holders to create literacy based programmes to assist students was critical to the job. Monitoring staff competences to deliver the grade four curriculum was considered equally significant and was also reported by Respondent 13 (R13). Motivating students, providing free intervention classes and extending school hours for grade four students emerged from the data collected as roles of these instructional leaders.

Item 4 on the schedule for the grade coordinators and classroom teachers was designed to gather data on the instructional leaders' experiences in the area of literacy. All respondents reported that they were not literacy specialists. Six further explained that the most experience they have had in the area is completing related courses while writing for their various degrees, conducting individual research and attending workshops organized by MoE while teaching the grade. Respondent 11(R11), however, based on her years of service had acquired much experience in the field. She had been a Language Arts Resource Teacher since 1994 and had worked with MoE on several of their projects. Notably among these was *The New Horizon Project.* She also trained classroom teachers during the ministry's workshops and had presented at many of these.

Research Question 1

To what extent do instructional leaders feel that the use of tablet computers are effective in preparing students for the Grade Four Literacy Test?

Principals and Vice Principals

R1 explained that The G4LT has three main components. One is word recognition. Word recognition comes in two main parts, matching pictures with words or matching words with pictures. There are 40 items in this section. The child has to score 38 out of the 40 items correct to master. The second is comprehension, which is where most of our children experience challenges. It tests them on a wide array of reading materials which include passages, poems, graphs or a pie charts and advertisement. This section is comprised of 30 questions. For the students to master, they have to correctly answer 12 of the 30. The final section is the writing task section where the students are given a prompt or cue. They are to read it or look at it and then compose a letter, then complete a form.

While all seven respondents were cognizant of the three sections of the G4LT, only 15% were able to give a detailed breakdown of its components. The remaining 85% gave an overview similar to the response of R9 who stated that, "The Grade Four Literacy Test has three sections; there is a writing aspect, there is the word recognition and then there is the comprehension."

The percentage of students who did not master the G4LT for the academic year 2015-2016 were as follows: School A 13%, School B 28%, School C 29% and School D, 15%. The principal at School D (R13) rationalized the performance of the students at his institution when he articulated that:

> The last round, we were at 85% so I would say 15% which is just about the norm for any society. They claim that 15% of a population is not… I wouldn't use the word educable but aaahm they tend to find out that they would not probably master the literacy. That's why the government had celebrated the country, had celebrated the 85% as full mastery because

> based on what the studies have shown that if 85% mastered then that's the norm that's the max.

Data collected related to how TC helped in remedial programmes implemented to improve students' literacy skills varied. Two respondents spoke about students' natural gravitation towards the device: one reported that it was an 'instant hit.' Three of the seven respondents stated that students used the device for research purposes. Two informed that it was used for reading applications, independent reading and to complete reading exercises. R1 stated that TC motivated the students. They also helped to generate high interest level in learning and increased students' participation and enjoyment. He further explained that it was used in pull out programmes, provided additional literacy practice and like a teacher, assisted students in processing their answers. Continuous usage he said, helped to improve students' scores on the Literacy Mock Examinations. Due to the fact that the usage of the tablets drastically decreased the printing of teaching and learning materials and activities, he concluded that using the device was cost effective and encouraged efficiency among his grade four teachers.

According to Respondent 5 (R5), completing writing and communication tasks and preparing projects were three ways in which the TC helped. Respondent 6 (R6) used it for applications that catered to the different needs of the students. R9 stated that it was utilized for literacy games and explained that:

> There is some form of autonomy when it comes on to the types of games that we want them to select and to use that will build their literacy. Basically it's really not just for a formal instruction in the classroom to take place but also that it helps the students in their play time to really to interact with these games which we hope build their skills overt time.

In contrast, R13 did not elaborate on how the device was utilized. He only alluded to the availability of applications that could have been downloaded from Google Play Store.

Five of the seven principals and vice principals interviewed reported that the effectiveness of the device in the remedial programmes was unknown. R13 admitted that there wasn't a 'remedial programme' at his school to speak to, while R1 articulated that his programme was extremely, extremely effective. He proceeded to answer the question by citing examples of how the device was used. He purported that the tablet provided teachers with a wide array of applications for the remedial programmes, created a learning platform for the school, provided opportunities for teachers to share best practices, provided instant gratification and feedback for the students and encouraged individual work. R6 reported that the effectiveness was largely based on teachers' control. Both R13 and R6 answers failed to capture an adequate response to the question posed. Numerical data or other documentation to determine effectiveness were not available for perusal at any of the schools. Consequently, the claims could not be substantiated or refuted.

Four of seven respondents clearly indicated that the TIS initiative can make a difference in the teaching of literacy in Jamaican schools. Two respondents said this was contingent on the programme being smoothly implemented and properly managed. Another was concerned about the teachers' expertise and stated that they should be trained to use and monitor the device. R9 was more so concerned about changing teachers' negative mind-set and getting them to appreciate the device. In a verbatim response she articulated that:

> If it is, you can get them to see it as not a burden but something that really adds value to teaching and learning and of course you know exposing the children to all they can yuh nuh from the internet then I think it will really auger well for literacy.

Students' perceptions of the device was also an issue for a few participants. Three of the seven respondents maintained that students should be made to see the device as an instructional/ educational tool rather than a toy. Control of the tablet is critical if using the device is to make a difference in the future. One way of maintaining control according to R6 is to omit individual ownership and have students work in pairs. Reliability and quality of the devices came into question by R13. He argued that the TCs had a lot of faults and with 'hardier' devices, there will be future for the usage of the devices in schools.

Also emerging from the data was the technological age in which we live and the innovativeness that tablets added in the way students learn. According to R1 and R13, students are able to work at their own pace as the device promoted discovery and independent learning. Moreover, it afforded quick access to materials and alleviated teachers stress in preparing these, hence, scope for making notable differences in the Jamaican Educational System.

The majority of the participants felt that using the TCs to prepare students for the G4LT was a good one. However, while they were receptive of the idea, R9 maintained that the onus is on the educators to effectively use the device. Some also identified several challenges with the use of the tablets. These included:

- Organization of the implementation of the project
- Lack of installation of critical security features that would have prevented students from accessing adult content
- Programming of the device and

- Lack of school based, cluster or regional technicians to speedily repair the gadgets.

In an optimistic response, R5 mentioned that all the challenges encountered can be rectified. Some believed that continuous use of the tablets should be encouraged at the grade as it can boost students' confidence and so, sustainability of the initiative was mentioned. On the contrary, one respondent indicated that she preferred the traditional teaching methodologies and materials and as such, expressed the following view:

> Probably it's because I am from the old school. First of all, the negatives I saw and heard of, I must say… that took away from the actual learning that for me, back to the book and the things when they use to settle in their book and classwork and that's you know, use to be focused on doing your work. Then came the tablets with distraction.

Grade Coordinators and Classroom Teachers

Dictionary use and research were two ways in which the tablets were employed in remedial programmes. Two of the seven participants reported that the tablets were used to teach word recognition. Another two used it to give worksheets and other activities. Primarily, Respondent 7 (R7) and Respondent 14 (R14) used the device to download reading applications and hands on activities from Google Store while Respondent twelve (R12) utilized Leap Frog for games. Respondent 4 (R4) explained that the remedial students were technologically savvy and were able to manipulate the device and so she used it to increase attentiveness, excitement and reinforcement of concepts taught. Two respondents mentioned that there was not much usage of the device due to physical damage. Poor internet access and availability of the gadgets (because they were being utilized by other family members) were also deterrents to its usage in the remedial classroom. Interestingly, R11 experienced these difficulties during the execution of a comprehension lesson. It was observed that only 4 of the 25 students in the class had tablets, two of which were dysfunctional. The deployment of the TC was many to one with collaboration. To be more specific, one tablet was used in each of the four groups and so two groups were without functional gadgets. The teacher commenced the lesson by asking the students to use the Dictionary Application or Google Search on the tablets to find the meaning of the word "friendship." Those with dysfunctional gadgets were instructed to use their hand-held dictionaries. The internet connection was extremely slow and the students seemed frustrated because of the extended time it took them to get online. When they were finally on the internet and had found the meaning of the word, the teacher asked them to read the definitions out loud. The TC was used for about five minutes during the teaching and learning exercise. When asked why she did not utilize the gadget in the latter part of the lesson, in a candid response she stated:

> I am familiar with these applications because I use them often and the tablet is not designed to teach everything. Based on how I planned the lesson, aah, it would almost be impossible to use it again. Furthermore, I told all the students to carry their tablets to school today, and see most of them did not. I think the lesson would have been better if everyone had their tablets.

R14 experienced a similar fate during the execution of a Language Arts lesson. During the teaching and learning process, no applications were utilized. Instead, students were asked to download pictures of water bodies or the beach prior to class and save them on their tablets. The rationale given for not utilizing appropriate applications was that majority of them were not in working order. She later articulated that the lesson did not lend itself to the use of other applications. The final question posed was directed to get a response for item 4 on the Stimulated Recall Interviewee Schedule and so, the teacher was asked why she chose not to use the tablet when she attempted to teach vocabulary building in the latter part of the lesson. In a verbatim response, she briefly stated, “as I said before, a lot of the applications are not working, the internet connection is slow and many students do not have their tablets.”

An overwhelming majority of the respondents indicated that the extent to which the tablet was effective in the remedial programmes was unknown. This was due to the ongoing complications experienced with the device. While two respondents alluded to fun and engaging reading activities in which students were made to participate, numerical data concerning the effectiveness of same was not forthcoming.

An analysis of the data revealed that each of the four schools was well equipped with additional technological devices that were sometimes utilized in the teaching of literacy and other subject areas. These included: multimedia projectors, laptops, Mimio Teach Interactive White Board, Smart boards and board games. One respondent confessed that she was incompetent in using some of the devices and further admitted that she solicited the assistance of students when it was necessary to do so.

The extent to which these additional technological devices have been effective in the remedial programmes was reported on by the participants in terms of the value they added to students’ learning experiences and the teaching process. Interestingly, however, one participant opined that while there were success stories, the remedial students were in need of additional intervention strategies since they would have suffered from numerous psychological issues.

Respondents further reported that using these devices increased students’ attentiveness, interest, involvement, increased excitement and also their willingness to learn. In addition, students made a concerted effort to increase their work output. As it relates to the teaching process it was revealed that videos for reinforcement of concepts previously taught were easily accessible. Observation of a Language Arts lesson taught by R4 showed her utilizing the multimedia projector and laptop to project a video titled, “Where is it ?” to introduce the concept of *Preposition* to her class. Students were immediately excited about the video shown and seemed engrossed in the introductory activity, substantiating the claim of increased interest, involvement and excitement. According to R4 “…the other devices are helpful and they really bring flavour to the lesson.” She further confessed that one to one tablet usage was more fulfilling for the students. This resolve caused her to deploy the tablets as one to one without collaboration in the lesson observed. It should be noted however, that most of the tablets did not belong to the grade four students but were an assortment of tablets from the other grades. Consequently, when the students were asked to access the Grammar Application to complete an exercise on preposition, it was observed that the items differed according to grade levels. In addition, many of the students did not complete the task because of malfunctioning issues; the device would not accept the answers that were inputted. A problem that did not come as a surprise to the teacher as she agreed that the application was not the most suitable to use in the lesson. When prompted to hear the rationale she noted, “Some of the applications are malfunctioning and I am not surprised that Grammar is one of them.”

The grade coordinators and teachers unanimously believed that the TIS can make a positive difference in the teaching of literacy if deliberate and purposeful actions were taken to improve the initiative. Three of seven respondents would like to see improvement in the proper maintenance and physical care of the devices. Four individuals were concerned about the poor security features and called for improvement of same, along with the management tool for teachers. R11 would like to see more pre-installed programmes for non-readers and provision of better internet connection. Respondent 12 (R12) felt that one to one tablet usage can be effective and hoped that the initiative will be adopted and sustained island wide. In addition, she believed that additional treatment for psychologically challenged students would be beneficial since this would help the school and the country to realize their literacy targets. Teachers' competence in using the device came into question when Respondent 3 (R3) reported that:

> It can make a lot of difference but first we have to engage the teachers. Engage the teachers, make sure teachers are comfortable because it doesn't make sense you say alright, put tablets in schools and you still have teachers from the old school who are actually afraid of the technology.

She further argued that, "You have to get the teachers first on board, you have to get them comfortable ...If you don't get the teachers comfortable there is going to be a lot of issues."

Finally, these instructional leaders were receptive of the idea of utilizing the TC to prepare students for the G4LT. Articulating similar comments as those of the principals and vice-principals, they felt that the initiative had the potential to assist students in their preparation for the national examination if parents were more involved, students stayed on task, applications were always in working order, refurbished tablets were redistributed on time and tablets were revamped and improvements were made to management applications. It was suggested that utilizing the device improved the teaching and learning experience for students. However, one respondent postulated that based on the structure of the G4LT,the tablets would not adequately prepare students and so pull out programmes and extra lessons have to be a part of the preparation process. All agreed that a lot of 'ground work' was needed for smooth implementation of the initiative and several maintained that the project is an improvement in the Jamaican Education System.

Research Question 2

How do instructional leaders facilitate the integration of tablet computers in the pedagogical process?

Principals and Vice Principals

Respondents were asked to explain the policy of their schools as it relates to the integration of tablet computers in the different disciplines. Analysis of the results showed that each respondent had a different reply, most of which was confined to policy to mean frequency in which the device was used. R1 explained that the school did not have a written policy as they were awaiting such a document form MoE. He hastened to state however, that during said time, the school produced their policy which stated that the devise was to be used in one lesson on a daily basis. R13 articulated that at his institution, the policy was that the tablets were to be utilized at least three times a day in a lesson and for R6 it was two times a week in the teaching and learning process. R9 and Respondent ten (R10) in their responses did not speak to the policy of the school in this matters but in a general comment, stated that teachers were encouraged to use the device to enhance their lesson.

In a more detailed response to the question, R5 claimed that the policy of his school included:

- The responsibility of parents in ensuring that the students utilize the tablets for what it was intended for at home.
- Teachers utilizing the tablets for various lessons within the class not just for Language or Mathematics but also for other subjects, even Physical Education.
- Students to become responsible for their own learning and to see themselves as persons who got something that is expected to take them from point A to point B where learning is concerned.
- Persons within the school and wider community to realize that the students got a device that is to improve their learning and performance and they are to ensure that they help to guide and protect them on the road to home and to school.
- Whatever damage is done to the device proper investigation is to done before casting a blame. Likewise the company that dispatch the tablets to us must stand the responsibility where necessary.

All participants stated that measures taken to ensure the device was utilized in the teaching and learning process were: vetting of lesson plans, classroom walk-throughs and providing registers for teachers to record usage. R1 in addition to the aforementioned, stated that workshops were conducted for teachers to gain additional knowledge on how to integrate the device in the teaching and learning process. The same measures were taken by R13 to ensure integration of the device, he was however concerned about the frequency of its usage, or more so, the lack thereof and complained that teachers' attitude towards using the device was quite unfavourable.

When asked about the frequency in which the tablet was integrated into the teaching of Literacy or Reading lessons, R1 and Respondent 2 (R2) responded it was used once a day, R3 specified three times a week, R13 was unable to speak to the frequency with which the device was used, R9 replied daily or at least four times for the week and R10 said usage was based on the discretion and initiative of the classroom teacher. R6 reported that usage was inconsistent due to complications, damage to the devices and confiscation by parents. During the Simulated Recall Interview following the observation of R14's Language Arts lesson, she was asked to discuss why the tablet was employed in her lesson. The rationale given was that the teachers were mandated to use the device at least three times a day in their lessons.

Five of the seven respondents reported that a pre-installed management software was used to manage students and their devices during the teaching and learning process. In addition to this software, R1 spoke of pre-installed applications that prevented students from accessing blocked sites. R5 argued that these applications and software were ineffective as students were able to outsmart the teachers by manipulating the tablets in order to access these blocked sites. Two respondents, revealed that the tablets given to their students and teachers were not equipped with such a software and explained that provision of management tool was dependent on who the tablet provider was. One management technique used by this respondent was confiscation of the devices if the students did not stay on task or was disruptive. The other respondent did not mention management during the teaching and learning process but did say she took the tablets from the students during the day and store them in her cupboard.

Grade Coordinators and Classroom Teachers

Three of the seven participants used the tablets daily in the teaching of literacy. One participant declared that she had hoped to use it daily but her plans did not come to fruition. Two used it three times for the week and one stated that she used it as much as possible. When prompted to quantify the amount of times it was utilized, she stated two times for the week.

Similar data emerged when participants were asked to explain how they used the tablets to assist students in picture word association and word recognition. Two participants had not used the tablet to teach word recognition or picture word association. Three participants said they used the picture word association application which was set up like a game. It allowed students to identify common items in the home. The remaining two participants, being keen not to mention how they had used the tablets in the teaching of word recognition and picture word association, confessed that there were bright, vivid pictures and applications that could be utilized.

The data collected showed that only one participant used the tablet to teach sequencing as one of the comprehension skills. One respondent used it for picture reading in order to improve students' vocabulary and uploaded applications and used them when necessary. The data showed that five of the seven respondents did not use the tablets to teach comprehension. This accounted for approximately 71% of the focal group.

The respondents were asked to explain how they used the tablet to teach Communication Task. Four of the seven did not use the gadget to teach this component of the G4LT. One participant explained that students used it to type their letters and then final drafts are printed for display. Conflicting views were divulged by another participant who stated that the students were made to copy forms from the tablets into their note books because their typing skills were extremely poor. In a verbatim response she stated:

> …they would write it in their books but not on the tablet. I cannot remember filling out a form on the tablet. I think it would have been too complex for them to type because their typing skills are not really aahm they would take all day to type but to write it is different.

One respondent mentioned that she used it to reinforce concepts that are found on forms examples such as the meaning of the term nationality and country of residence.

Research Question 3

To what extent do instructional leaders consider the tablet computers an instructional tool which has encouraged more favourable responses from students in the classroom learning environment?

Principals and Vice-principals

The principal and vice-principals reported both positive and negative observable differences in students' participation and responses in the pedagogical process since the integration of tablet computers. Five of the seven explicitly stated that participation had improved. R10 described it as "maximum participation," while R13 noted that teachers would receive full participation and responses if games were included in the lesson. Two participants noted that students' oral language had improved. Two reported that it fostered group work. R1 noted that it increased engagement for slow learners and provided a sense of self gratification. He also believed that it fostered independent research and gave students opportunities to challenge the teachers' viewpoints. R5 spoke about the acquisition of phonemic awareness. R13 purported that it generated great excitement and lessons were more enjoyable as they were excited to play games. R9 claimed that it improved leadership qualities and peer relationships. She explained that:

> there are some students who you would never imagine would speak up and because of their love for technology they have become the frontrunners in the classroom. They are the ones who have taken over so they become

> more outspoken, they have taken unto to themselves a kind of leadership responsibility where other students can look up to say, hey this is happening with my tablet can you help me to solve it.

R6 and R2 alluded to the heightened interest of the students. While the majority agreed that there were positive students' participation and responses, a few outlined negatives. It was stated that malfunctioning tablets and lack of internet access caused a lull in the execution of lessons. Furthermore, three participants reported that the students were technologically savvy and so were able to skilfully manipulate the device, reconfigure the setting and break through security setting which indirectly devalued the pedagogical process since they were otherwise engaged.

Six of the seven participants believed that students were more interested in the device and not learning. According to the respondents, some students were more interested in playing the games and there was an obvious lack of focus on educational tasks. Despite this finding, one individual was convinced that the device can be used as a stimuli to get students to learn. An opposing view came from R1 who believed that students were more interested in learning. He expounded on his viewpoint stating that their interest had heightened, lessons were less monotonous and traditional, entertainment value was added and the novelty of having/ owning a tablet was important to children.

Several advantages and disadvantages of utilizing the tablet computers were stated by the respondents. The advantages were categorized as: cognitive, affective, behavioural and social. Cognitive advantages included: promoting learning, broadening students' access to data and how information can be acquired and encouraging self and heuristic approach to learning. The data revealed some affective advantages as developing individual competencies, building confidence, lifting the morale of the learner and increasing participation, motivation and excitement. Improved attendance, improved students' behaviour, fostered communication were identified as behavioural advantages. Finally, the social advantages that emerged were engendered collaboration among teachers and encouraged parent involvement.

Five of the seven respondents complained about parents and other siblings' inappropriate use of the device. Four cited lack of continuous reliable internet access and students downloading of inappropriate materials including pornographic content as major disadvantages. Three respondents spoke about teachers' inability to maintain control of the students while they were on the internet; R6 specifically mentioned students diverting from given tasks and R10 alluded to the playing of unrelated games during the teaching and learning process. She further concretized her point buy sharing an example of an exceptional student whose grades deteriorated because of lack of focus. The tablet was labelled as a distraction and blamed for students' lack of interest in traditional games and entertainment. Poor security features and the general quality of the tablets also came into question. R13 claimed that using the tablets caused students to be anti-social and R6 explained that because of the love for the device and the perception that is a toy many students displayed inappropriate behaviours when the gadget was taken away from them as a form of punishment.

Grade Coordinators and Classroom Teachers

When asked about the programmes that were installed on the tablets to facilitate literacy, the responses were limited. For the most part, respondents downloaded and used applications from Google Play Store and other sites geared towards literacy. Two spoke about the preinstalled dictionary, others, a few e- books installed on the redistributed tablets. One respondent mentioned simple passages and picture word association applications and two, Edufocal (a social learning website for Grade Six Achievement Test (GSAT). According to R4, there is the Grammar, text books from the Ministry of Education, Kindle with stories to read and a book titled "Marcus Garvey" which was written at the students' grade level. There were dictionaries and other games such as Chicktionary installed on them which were kids friendly. One respondent however, had no knowledge of the programmes that were installed on the tablets to facilitate literacy.

The extent to which the tablet computers have contributed to the improvement of students' literacy skills was explored by five respondents. Three of whom acknowledged that its usage had widen students' vocabulary, improved their oral communication skills, gave additional practice in using Standard Jamaican English (SJE), assisted in research, improved concentration and built determination. The tablet was described as a catalyst for students to learn to read as it encouraged students to conduct research and do independent work. Respondent 4 reported 90% effectiveness but like a few others, hastened to state that lack of Wi-Fi, frustration caused by malfunctioning applications, lack of security features and downloading of games hampered success. Most interestingly however, was the accusation of political interference that would have hindered success when she revealed that:

> I personally believe that there are some politics involved that affected us moving forward. Because we were in limbo…with the usage of it because we did not know what the next party was going to say what their take would be on the tablet. Was it going to be withdrawn? Or the programme would continue so for this year we were in limbo. But for last year it was very effective.

Increased engagement and interest, willingness to learn alertness, attentiveness, improved behaviour and improved peer relationship were some of the positive changes observed in students' responses in the pedagogical process since the integration of the tablet computers. Five respondents said tablets were a distraction and one said that the students needed constant monitoring due to the downloading of games. In a candid answer, R11 responded, "honestly I am just being frank here I, really don't see it being so impactful, I really don't, to that great extent. I am not saying maybe, for a small minority, but certainly not for the majority."

According to five respondents, the tablets affected students' engagement on academic tasks in that, while they were receptive, they were also distracted. They explained that the students' interests do not lie in academics but using the device. One respondent had mixed views stating that several students worked productively while others might not have stayed on task.

Four participants reported that females preferred tablets as an instructional tool while the remaining three were convinced that males favoured the device. Three respondents reported increased participation in the teaching and learning process, but the onus was on teachers to adequately monitor and stream line activities. One participant mentioned that the use of tablets was more suited for introverts while others agreed that students on a whole showed more enthusiasm when the tablets were utilized in the teaching and learning process. Again, the issue of dysfunctional tablets and students' inability to read were mentioned as deterrents to maximum participation.

Similarly to the principals and vice-principals, the grade coordinators and classroom teachers cited several advantages and disadvantages of utilizing the TCs in the Jamaican Classroom. Primarily, the advantages were subsumed under three major categories: students' engagement in instructional pursuits, contribution to specific literacy skills and affective instructional disposition. The instructional leaders stated that the TC enhanced and assisted in the teaching and learning process, increased student engagement, heightened students' interest level in learning and school work and provided information and reinforcement activities. It was also mentioned that it improved vocabulary, word recognition and reading skills, encouraged independent reading, research and work. Many felt that the device encouraged discovery learning, improved students' self-confidence and fostered a sense of helpfulness. In addition, it assisted in classroom management and lend itself to gender connotation as it was duly noted that boys were more actively engaged in lessons. Finally, it was said that the device had the potential to eliminate primitive teaching methodologies.

Common among the responses as a disadvantage was students' access to pornographic and other inappropriate content. Teachers' inability to control students while using the tablets, lack of parental supervision at home and the inappropriate usage of tablets by parents and siblings were also cited. Furthermore, some respondents were concerned that the tablet was a major distraction, students spent too much time playing games and neglected their other responsibilities. One respondent did not appreciate the fact that using the tablets lessened play time and accounted for students' inactivity and laziness. Other disadvantages were: lack of internet connectivity, poor quality tablets and dysfunctional features on the devices. Finally, it was noted that students were targeted by unlawful civilians who wanted to steal the devices and this was a grave concern for one respondent.

Emerging Themes from Interviews and Observations

The summary of the findings in this section reports on the emerging themes from the combined interviews conducted with the 14 participants and data ascertained from the observational schedules.

Three overarching themes and eight sub- themes were identified from the data. The overarching themes are:

1. Instructional leaders' perception on the effectiveness of using tablet computers to prepare students for the G4LT.
2. Use of tablets in teaching the different components of the G4LT.
3. Instructional leaders perception of the tablet computers as an instructional tool that has encouraged more favourable responses and participation in the classroom learning environment

Theme 1: Instructional leaders' perception on the effectiveness of using tablet computers to prepare students for the G4LT.

This theme is presented in four parts:

a. Effectiveness of tablet computers in remedial literacy programmes
b. Teachers competencies and attitude towards using tablet computers in the pedagogical process
c. Quality of tablet computers distributed in schools
d. Internet connectivity

Effectiveness of tablet computers in remedial literacy programmes

Responses generated from items 7 and 8 on the principals' and vice principals' observational schedule and items 5 and 6 on the grade coordinators' and classroom teachers' schedule revealed that 9 of the 14 respondents were unsure of the effectiveness of the TCs in the remedial programmes at their institution. This accounted for 64% of the total participants.

Teachers' competencies and attitude towards using the tablet computers in the pedagogical process.

Neither of the interview schedules had an item that spoke directly to teacher competency. However, this issue became an emerging pattern when several respondents on several occasions while answering other interview items spoke to teachers' inability to effectively utilize the TCs or their attitude towards using the device in the teaching and learning process. This issue was raised by 43% of the participants. Although this did not account for a significant number of the focal group, the matter was mentioned ten times.

Quality of tablet computers distributed in schools

Again, the interview schedules did not have an item that spoke directly to the quality TCs that were distributed in school but an over whelming number of participants mentioned the issue in several responses. The quality of tablets in this case speaks to the physical features, applications installed and internal security features of the devices. Ten of the fourteen respondent or 71% complained about the durability of the tablets and the inferior quality of the device reporting how susceptible they were to physical damage. The same percentage spoke about the inability to adequately utilize the device in the teaching and learning process because of the malfunctioning applications that were installed on the gadgets. This problem was mentioned a total of 17 times during the interviews and observed during two of the three teaching episodes.

The matter of security was spoken of by 64% of the respondents when answering interview items. The students' ability to successfully manipulate the tablets to reconfigure preinstalled security settings in order to access inappropriate and pornographic materials was an area of concern as it was alluded to at least 12 times.

Internet connectivity

If instructional leaders and students were to benefit from maximum usage of the TCs, they would have needed reliable Wi Fi and internet services. As reported 10 times by 50% of the respondents during the interviews and also observed during the teaching episodes, lack of internet and Wi Fi services was a deterrent, as such, several activities in which the instructional leaders wanted to engage the students did not materialize.

Theme 2: Use of tablets in teaching the different components of the G4LT.

This theme is presented in two parts:

a. Using the tablet computer to teach word recognition, comprehension and communication tasks
b. Tablets as a distraction

Using the tablet computer to teach word recognition, comprehension and communication task

Items 12 to 14 on the grade coordinators' and classroom teachers' schedule were designed to yield data on how these instructional leaders used the device in the teaching of word recognition, comprehension and communication task; the three components of the G4LT. The data revealed that only 14% of the participants used the tablet to teach all three components of the G4LT. Table 7 shows the respondents use of the TCs to teach the components of literacy test.

Table 7

Use of Tablet Computers to Teach the Different Components of the G4LT

Respondents	Word Recognition	Comprehension	Communication Task
3	Unsure	Yes	No
4	Unsure	No	No
7	Yes	Yes	Yes
8	Yes	No	Yes
11	No	No	Yes
12	No	No	No
14	Yes	No	No

Tablets as a Distraction

Item 13 on the first interview schedule and item 16 on the second were intended to generate responses related to the differences and negative changes instructional leaders observed in students' responses and participation in the teaching and learning process while utilizing the TCs. For the aforementioned items, 50% of the instructional leaders reported that the TCs were a distraction. However, further perusal of the data revealed that 71% of the instructional leaders overall thought the tablet was a distraction in the teaching and learning process. This data was ascertained from responses given to other interview items, namely items 15, 17, 20 and 21 on the grade coordinators' and classroom teachers' schedule and item 14 and 15 on the principals' and vice principals' schedule .

Theme 3: Instructional leaders' perception of the tablet computers as an instructional tool that has encouraged more favourable responses and participation in the classroom learning environment.

This theme is presented in two parts:

a. Monitoring students' usage of the device in the classroom
b. Advantages and disadvantages of utilizing TCs in the Jamaican classroom

Monitoring students usage of the device in the classroom

An obvious theme that emerged from the data was monitoring the students' use of the device in the classroom. The issue was mentioned 15 times by 50% of the respondents. Effective monitoring allows students to stay on task and in so doing, be able to respond and participate positively in the classroom. Furthermore, since majority (86%) of the principals and vice principals believed that the students were more interested in the device than in learning, it is even more critical that they are properly monitored.

Advantages and disadvantages of utilizing tablet computers in the Jamaican classroom

The instructional leaders unanimously agreed that there were several advantages and disadvantages of utilizing the tablet computers in the Jamaican Primary Schools. The advantages far outweighed the disadvantages and perusal of the listing suggested that both sets of leaders had similar understandings related to the issue. While items 15 and 20 on the each schedule were created to generate responses concerning the disadvantages and advantages of utilizing the tablets, the data showed that many of the respondents answered other items citing advantages and disadvantages of using the gadget. What is critical however, is that 100% of the leaders believed that using the devise could improve several principles of the pedagogical process.

Summary

The findings of Chapter Four were primarily based on analysis of 14 interview transcripts and supported by three observations conducted. Presentations of the findings were organized by the three major research questions which guided the study. Major themes that emerged were summarized using narrative verbatim responses, a table and quantitative measures. The observations which also served as data source were scrutinized and each compared for similarities and differences in order to clarify or substantiate participants' statements.

Three major themes and eight sub-themes were uncovered. The overarching themes were as follows:

1. Instructional leaders' perception on the effectiveness of using tablet computers to prepare students for the G4LT.
2. Use of tablets in teaching the different components of the G4LT.
3. Instructional leaders perception of the tablet computers as an instructional tool that has encouraged more favourable responses and participation in the classroom learning environment

The fist sub-theme suggested that majority of the participants did not know the effectiveness of using the TCs in the remedial programmes they would have implemented at their schools. Sub- themes uncovered from emerging patterns included: Teachers' incompetence and attitude towards using the TCs in the pedagogical process, Quality of

TCs distributed in schools and Internet connectivity, issues that were substantiated by the observational exercises.

Theme 2 unravelled the issue of instructional leaders' usage of TCs to teach Word Recognition, Comprehension and Communication Task and the tablet as a distraction for students. Finally, Theme 3 focused on monitoring students' usage of the device and the advantages and disadvantages of utilizing TCs in the Jamaican classroom.

The TIS Project has been lauded as a good initiative that has the potential to improve the teaching and learning experience for both teacher and students. To this end, Chapter 5 will discuss the findings and results of this study and make recommendations for future research and practice.

CHAPTER 5

DISCUSSION, RECOMMENDATION AND CONCLUSION

Introduction

The purpose of this qualitative study was to examine instructional leaders' perceptions as it relates to the integration of TCs in preparing students for the G4LT. The following research questions informed the study:

1. To what extent do instructional leaders feel that the use of tablet computers are effective in preparing students for the Grade Four Literacy Test?
2. How do instructional leaders facilitate the integration of tablet computers in the pedagogical process?
3. To what extent do instructional leaders consider the tablet computers an instructional tool which has encouraged more favourable responses from students in the classroom learning environment?

Learning as purported by (Mayer, 2003; Sternberg and Williams, 2002) is a permanent change in behaviour and knowledge that results from experiences. Learning can be conceptualized in three theories: behavioural, information processing and constructivist (Newby et al., 2006; Roblyer, 2006; Samalina, Lowther & Russel, 2012). Based on the arguments put forward by each principle, technology, including the TC, if effectively used, can improve the teaching and learning process. Hence, these theories have come to inform the Jamaican government's stance and instructional leaders' practice in the education arena.

The literature review in this study, explored the historical and current perspectives of Primary Education in Jamaica and the main variables pertinent to this study, which are: Technology, Technology in Education, Tablet Computers, Tablet Computers as an

Instructional Tool, the TIS Pilot Project, Literacy, The Grade Four Literacy Test and Students' Performance on the Grade Four Literacy Test.

In order to answer the three fundamental questions which framed this research, investigation was conducted through structured face to face interviews with 14 instructional leaders and observations conducted in three schools. This chapter reviews, analyzes and discusses the findings of the study in light of the literature presented. It also outlines recommendations for future research and practice as it relates to the TIS pilot project in Jamaican Primary Schools.

Discussion

The findings of the research were organized within the framework of the major research questions and these were answered by emerging themes from the data presented. An interesting conclusion by Chen et al (2008) as reported by Hocanin and Iscioglu (2014) can provide support for the findings of this study as the participants agreed that while there were challenges, using the TCs in the teaching and learning process can be beneficial to both teachers and students. In light of this discovery, the findings will be discussed herein.

Theme 1: Instructional leaders' perception on the effectiveness of using tablet computers to prepare students for the G4LT.

The essence of this theme related to the perceptions of instructional leaders on the effectiveness of using the TCs to prepare students for the G4LT. During the third term of grade four, all students, regardless of their academic performance are required to write the G4LT. This examination has been described as a measure of their literacy achievement (Williams & Staulters, 2010) and in order for them to do well, they have to be adequately prepared. Many instructional leaders have implemented different strategies and programmes to help their remedial students. Among these, as articulated by participants in this study are; providing free intervention classes and extending the school day for grade four students. Remedial programmes have been the preferred strategy used by many to improve under preforming/ remedial students' literacy skills prior to the examination.

According to majority of the respondents in this study, the effectiveness of using the TCs in the remedial programmes was unknown. This may have been attributable to the fact that adequate data were not collected prior to, and after, the introduction of the TIS pilot project to unequivocally speak to efficacy. As asserted by Murphy, Depasquade and McNamara (2003), if technology is to contribute meaningfully to learning it must be used in an authentic curriculum and in these schools the remedial programmes (if the institution had one) lacked structure and authenticity.

Technology, including the TC is viewed as an instructional tool (Angers, 2004; Earle (2002; Jefferson, Davidson, Richardson & Jones, 2014). However, critical to the device being effective, is stakeholders understanding of how to utilize it in the classroom (Long, Laing & Yu, 2013). This study found teachers competence and attitude towards using the TC in the teaching process to be aligned to the literature on the topic. Competence and teachers attitude are two factors Ertmer (1999) referred to as first order or extrinsic elements and are viewed as barriers to the integration of the device in the classroom.

The participants in this study, although trained for approximately two months prior to the rollout of the TC, did not possess adequate knowledge of how to use the device meaningfully for learning to take place. This realization was highlighted in the data from the interviews (as some responses suggested a resistance to change) and more importantly was concretized during the observation process. It was concluded from the observation that the instructional leaders utilized the applications that were more familiar to them and were not enthused about finding more suitable applications to execute the lessons taught. There was minimal usage of the device for the duration of the lessons observed. This finding is consistent with that of (O'Malley, Lewis and Donehower, 2003) who established that accessibility to the gadget does not equate to high usage by teachers. Another matter that demonstrated the lack of instructional leaders' knowledge and capacity to effectively use the device in the classroom was noted in the deployment of the tablets during the pedagogical process. During two lessons observed, the deployment of the TC was many to one with collaboration, a practice that Sheppard (2011) rejected citing that tablets are suited for individual use a belief that a few of the participants also shared.

In general, the quality of the TCs was of grave concern to the participants. As was previously mentioned, the issue was raised by them in three parts: physical features, applications and security. None of the literature reviewed identified physical features as it relates to durability as an issue. However, the findings of this study, concerning applications, were mirrored by Ward (2013) who observed that the TC can only be utilized to execute innovative lessons if suitable content and applications were downloaded on them.

The TC raised various concerns in terms of inaccessibility of various applications when there is poor internet/ Wi Fi connectivity. This was of concern to the participants, especially those in the rural schools where poor internet access was most noticeable. As was previously noted, during the observations at the different schools, the students were unable to access the internet services and in one case, the speed at which the Wi Fi was operating proved to be unbeneficial. In addition, some of the applications were malfunctioning, causing both teachers and students to become frustrated. This inadvertently hindered the frequency and time spent using the device in the teaching and learning process.

Theme 2: Use of tablets in teaching the different components of the G4LT.

The essence of this theme was to find out how the instructional leaders facilitate the integration of the TC when teaching the different components of the G4LT and to determine how the students responded to its usage in the literacy classroom. Researchers such as (Flewitt; 2012 Hutchinson, Beschorne and Schmidt-Crawford, 2012; Neumann and Neumann; 2014) opined that the tablet can help in literacy education. With this well-known knowledge, instructional leaders professed to use the device to teach and develop students' literacy skills. Contrary to this declaration, however, was the findings, which revealed that the majority did not use the gadget to teach all three components of the G4LT. Of course, this has negatively affected the advantage of its use in the literacy classroom.

The claim of this research parallel those of (Bacon, 2013; Hocanin & Iscioglu, 2014; Karsenti & Fievez, 2013) who found that the tablet is a source of distraction. The participants in the study felt strongly about this issue and verbalized it while they answered interview items that were not intended to generate such a response. According to most participants, students were distracted by mostly games and other inappropriate materials that they or their siblings downloaded onto the device and so monitoring their usage of the device was critical.

Theme 3: Instructional leaders' perception of the tablet computers as an instructional tool that has encouraged more favourable responses and participation in the classroom learning environment.

At the core of this theme was the need to ascertain data regarding instructional leaders' perception of the TCs as an instructional tool that has encouraged more favourable responses and participation from students in the classroom. Monitoring students' usage of the device during the classroom was a major finding of this research and stems from the tablet being considered a major distraction. Participants believed that students had to be closely monitored for them to stay on task and follow the teachers' instructions. In addition, they were concerned about other non-educational activities in which students would have been engaged during the teaching and learning process. These findings reflected those of Bacon (2013) who contended that when students use the tablets, they become independent learners and while it is difficult, it is absolutely necessary to monitor them because of the aforementioned reasons.

The prospects of integrating the TC into the learning experience was deemed a novel initiative to shape teachers' pedagogical methodologies and in so doing, help to upgrade Jamaican classrooms into 21st century environments. On the one hand, the introduction of tablet is celebrated because of the many advantages that can be derived from its usage. On the other hand, there are several critical issues that must be taken into consideration before and after its introduction into the school system. Research has found that the TC can improve motivation, collaboration and improve classroom management

(Hocanin & Iscioglu, 2014). These findings were similar to those revealed in this study. Several participants stated that the TC encouraged participation and excitement and encouraged self and heuristic approach to learning. Unexpected findings as advantages of using of TC were its ability to improve school attendance, build confidence and lift students' morale. The disadvantages of using the tablet computers in the classroom mirrored some of the finding of Bacon (2013). Other disadvantages which were previously stated included; lack of reliable internet service, downloading pornographic content and malfunctioning applications. Interestingly, a disadvantage that emerged from the data was parents' and siblings' inappropriate use of the device when the tablets were kept at home. Several instructional leaders revealed that students sometimes did not take their devices to school because family members took them for personal use. An issue that manifested and was blatant during the execution of lessons observed. This action did not align with the collaboration to which (O'Mally, Lewis & Donehower, 2013) alluded to and that is needed among parents and other stakeholders to promote student learning. Participants agreed, however, that the advantages of using the tablets far outweighed the disadvantages.

The results of this study did not find any significant information to report as it relates to the variables specific to the participants. The exceptions was that participants who were over the age of 50 generated more negative feedback about the use of the technology in the teaching process. One participant explicitly stated that she preferred the old teaching methodologies while others in the said age group thought that the students really did not benefit from the integration of the device in the teaching and learning process.

Recommendations for Future Research

This study offered preliminary review into instructional leaders perceptions as it relates to the integration of TC in preparing grade four students for the G4LT. This is the first research of its kind to be conducted in the Jamaican Primary Schools. While this study focused on the experiences of 14 instructional leaders in rural and urban schools, other aspects of TC usage in the Jamaican classroom have not been explored. This study could have been extended by using a larger sample of instructional leaders from across the island. The focal group which comprised mainly instructional leaders from rural Jamaica lacked adequate representation from urban schools and so limited how well the findings apply to the group of primary schools that were on the TIS project.

An area of interest that I would have liked to explore during the investigation was the sustainability of the device in the Jamaican School System. This issue was obviously outside of the scope of the study but was relevant. Jamaica is a third world country and while the government's interest in improving the education system is commendable, very pertinent questions need to be asked. Among these are: Does the government have the financial resources to purchase content and repair and update the devices when necessary? Most importantly, how feasible is the TIS initiative in this current economic climate?

The findings of this study offer a foundation from which future investigations could be conducted about the TC in the Jamaican classroom. Five areas I suggest for future research consideration are:

1. The use of TC as an instructional tool to improve students literacy skills
2. Integration of TC as an instructional tool in the remedial classroom

3. The effectiveness of using TC in the Jamaican primary school
4. The employment of TC in teaching different disciplines
5. Students' perceptions of utilizing the TC in the classroom

In depth explanation of how the use of TC benefit the Jamaican Education System and more importantly, our students need to be examined. Since literacy is a critical skill to acquire, it stands to reason that investigation be conducted in this area and be extended to its usage in other disciplines. Furthermore, I believe that it would also be helpful to capture quantitatively the experiences and perspectives of students who use the tablets as an instructional tool as the perspectives of instructional leaders may significantly differ from those of the students.

Recommendations for Future Practice

The findings of this study are critical to the field of education and more so to all stakeholders, including the government and policy makers. It contributes to studies undertaken about pedagogical practices in Jamaica and in particular, a phenomenon that has never been researched that is instructional leaders' perceptions of the integration of the TC in the instructional system of a curriculum. Based on the findings of this study, the following are recommended:

1. Teachers be adequately and robustly trained in order to have a more in-depth understanding of how to effectively use technology in education. Meaningful change and fostering a positive attitude of integrating any technological device to develop 21st century skills in students will only come from long term professional development and not a few months of workshop as was indicated by some

participants of the study. Older teachers should be given additional support and time to adapt to these technologies.

2. Rich numerical and narrative data should be collected prior to and after any new initiative is introduced in a school. This practise will serve as a means of evaluating the outcome and effectiveness of same. Furthermore, if this measure is not taken then school administrators' and government officials' capacity to answer questions about the initiative will be hampered and policy decisions will be compromised.
3. The tablets, like text books, are instructional tools. The difference between the tablets and text books is that tablets can be very expensive to maintain. In light of this, I recommend that the students do not own the devices or be made to take them home. Instead, the tablets should be treated like every other government-owned instructional tool and be kept at school in a secure room where they are accessible to teachers. After use in a session the tablets should be returned to where they are housed for future use. This will decrease damage to the devices, parents usage and students ability to download inappropriate content.
4. The tablets should be used to teach literacy skills. Instructional leaders should be made to use the tablets to teach the different components of literacy and in particular the components of the G4LT. Participants expressed that the TC's usage was evidenced in school logs and lesson plans however the findings suggested otherwise and showed that its usage was not fully facilitated in the teaching of comprehension, word recognition and writing.

5. Suitable applications and security features must be installed on TCs prior to roll out. In addition, all the tablets utilized in the pilot schools should be equipped with the same or similar resources to ensure parity.

Conclusion

Chapter Five concludes this research study. The findings produced three overarching themes and eight sub-themes. These revealed: instructional leaders' perceptions of integrating TC in preparing students for the G4LT; how they facilitated the integration of TC in the pedagogical process and their perceptions of the TC as an instructional that has encouraged more favourable responses in the classroom environment. The findings revealed both extrinsic and intrinsic barriers to the integration of the technology. Extrinsic factors included the lack of adequate training for instructional leaders, lack of preinstalled resources/ applications and technical support which in this case, reliable internet access. Intrinsic factors were the perceptions and negative attitude of some instructional leaders about the device.

Recommendations for future research suggest more methodological work be done in order to robustly capture the impact and outcome of using the TC in literacy, other disciplines and the Jamaican Education System as a whole. Recommendations for future practice included: a) adequate and robust training for teachers who utilize the technology in their classrooms, b) rich numerical and narrative data be collected prior to and after introducing any new initiative, project or programme in all schools so that usage can be evaluated and effectiveness determined. In the case of the TC, c) the school should own and manage the devices and they be treated like any other instructional tool where students utilize them then they are returned to the teacher for future use. Finally, teachers should facilitate the integration of TCs in the teaching of literacy skills.

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APPENDIX A

TABLET IN SCHOOLS (TIS) PILOT PROJECT MINIMUM TABLET SPECIFICATIONS

Tablet in Schools (TIS) Pilot Project Minimum Tablet Specifications

Category – Hardware	**Minimum Specifications**
Screen Size	9 ins
Screen Type	LCD, Crack Resistant
Screen Resolution	Hi-Definition
Type Touch	Multi-Touch, Capacitive
Visible angle	170 Degrees
Processor	1.3GHz Dual Core, Separate GPU
ROM	1.5Gb DDR3
Flash Memory	16Gb
Camera	2 Mega Pixel Front, 5Mega Pixel Rear or Single Swivel 5 Mega Pixel
Sensors	Gyroscope, Accelerometer, Ambient Light Sensor and Compass
Battery	6 Hours Per Charge
Network	Wi-Fi 802.11 b/g/n, Bluetooth Support for External 3G Dongle
External ports	MicroSD, USB, 3.5mm Headphone
Category – Software	**Minimum Specifications**
OS	Broad Based Usage OS with Minimum 3 Years Support e.g. Android 4.1 (Jellybean), Apple IOS 6, Windows 8.X etc.
App Market	Access to One of the Major App Markets e.g. Google Play certified, Apple App store, Microsoft Store
Default Apps	General- File Manager, Word Processing, Presentation, Spread Sheet, Task Manager, Browser, Gallery, Clock, Calculator, Calendar, e-Book-Reader, e-mail
Music Files support	MP3/WMA/WAV/APE/AAC/FLAC/OGG
Video Files support	AVI/MOV/1080p MP4 /RMVB/FLV/MKV
Picture Files support	JPG, BMP, PNG, GIF
Document files support	Word Processor, Electronic Spread Sheet, Electronic Presentation
EBook files support	UMD, TXT, PDF, HTML, RTF, FB2, e-PUB
Special App	Parental Control App Filtering Browser Filtering App Usage Tracking and Reporting
Category – Security	**Minimum Specifications**
Physical Tablet	Custom Colour Branding Protective Case Security Label

	Rugged Exterior Crack Resistant Glass
Application	Authentication and Bricking Tracking (Wi-Fi and GPS) Pass Worded Profiles
Category – Services	**Minimum Specifications**
Distribution	Island wide Capacity for Issuing and Providing Warranty Repairs
Warranty re-replacements	1 Year Through Island wide Centres (2 Business Day Replacement Strategy) User Should not be Without the Device for More than 2 Business Days. Option for Extended Warranty (include cost) Option Screen Protection Insurance (include cost) Option Other Accident Insurance (include cost) Spares
OS	OTA Upgrades of OS, Refresh of Device
Accessories	Cases (Rubber) Rugged Folder Type Case with Keyboard Stylus Adaptor cables 3g Dongles Chargers

Note: The specification for the tablets issued by the e-learning was retrieved from (Mclean, 2014)

APPENDIX B

AUTHORIZATION-FREE INTERNET LITERACY RESOURCE MATERIALS FOR TABLET IN SCHOOLS PROJECT

Authorization-Free Internet Literacy Resource Materials for Tablet in Schools Project

Title	Description	Curriculum Focus
First Words Nimble Minds	Word learning and reading game	Language Development and Literacy social skills
Assistive Technology		
Sono Flex	Allows for vocabulary skills	Language/ Literacy
Audio Recording		
Take and Talk	Creation of audio contents and presentations	Content creation, ICT integration
50 Languages	Creation of audio contents and presentation	Content creation, ICT integration
Wave Recorder	Creation of audio contents and presentations	Content creation, ICT integration
Audio Boo	Creation of audio contents and presentations	Content creation, ICT integration
Online Productivity tools: General Resources		
Drop Box	Online storage	Personalize and storage resources
Sync Space	Online storage	Personalize and storage resources
Google drive	Online storage	Personalize and storage resources
Google Docs	Online storage	Personalize and online resources
Open Office for Android	Online productivity software	Use of appropriate software app for learning
Online Resources		
MoE/ e Jam/ School library	Online resources -Local	Topics in multiple subjects

Apps 4 kids	Online resources - international (all subjects)	Topics in multiple subjects
Edu Port	Online resources- international educational portal which allows users to browse through, view and save their favorite lectures and talks offered by some of the most popular YouTube channels.	Topics in multiple subjects
Skype	Allows teacher and students to create platform learning engagement	
Facebook	Allows teacher and students to create platform learning engagement	
You Tube/ teacher tube	Allows teacher and students to create platform learning engagement	
Photo editing		
Cupslice	All for creative content and class participation	Innovation and creativity
Photo Edition Pro	Allow for creative content and class participation	Innovation and creativity
Aviary	Allow for creative content and class participation	Innovation and creativity

Teacher

Evernote	https://play.google.com/store/apps/details?id=com.evernote
SKitch	https://play.google.com/store/apps/details?id=com.evernote.skitch
Animoto	https://play.google.com/store/apps/details?id=com.animoto.android.videoslideshow
Color Note	https://play.google.com/store/apps/details?id=com.nimblesoft.notes
Bluefire Reader	https://play.google.com/store/apps/details?id=com.bluefirereader
IPublish Central Reader	https://play.google.com/store/apps/details?id=com.impelsys.ioffline
Copia	https://play.google.com/store/apps/details?id=com.adobe.rmsdk.rmapijni&hl=en

APPENDIX C

INTERVIEW PROTOCOL FOR PRINCIPALS AND VICE PRINCIPALS

Interview Protocol for Principals and Vice Principals

Research Questions:

1. To what extent do instructional leaders feel that the use of tablet computers are effective in preparing students for the Grade Four Literacy Test?
2. How do instructional leaders facilitate the integration of tablet computers in the pedagogical process?
3. To what extent do instructional leaders consider the tablet computers an instructional tool which has encouraged more favourable responses from students in the classroom learning environment?

Subjects:

Principals and Vice principals of selected primary schools

Location:

The respondent's office on the school grounds

Introduction:

This is a study about the perception that exists for Jamaican instructional leaders as they integrate Tablet Computers (TCs) into the pedagogical process to prepare grade four students for the Grade Four Literacy Test (G4LT).

I have chosen to speak to you today because your school is among the scope of institutions that is on the pilot programme. In addition, you have been identified as someone who has a good insight on the topic. I would like to audio tape our conversations today. Please be advised that your information will not be released to anyone who is not directly associated with this study. In addition, you must sign the devised document which meets our human subject requirements. This document affirms that all information will be held confidential and your participation will be voluntary. I appreciate your willingness to participate.

Demographic Questions:

I think that your age, gender, educational background and employment history would be very important to my study so it would be helpful if you could start by answering these questions to satisfy the demographic aspect of the interview

1. How old are you?
2. It would be very helpful if you could tell me about your education and career path so far.
3. How long have you been working in the capacity of a principal/ vice-/ principal at this institution?
4. What is your role as principal/ vice principal as it relates to preparing students for the Grade Four Literacy Test?

I just want to make sure that we have covered the relevant questions related to demographics, educational background, work history and experience:

- Your age
- Your educational background
- Jobs to which you were employed
- Role in preparing students for the Grade Four Literacy Test

Knowledge Questions:

I would now like to discuss the Grade Four Literacy Examination and the students' performance on the test.

5. Can you give an overview of the components of the Grade Four Literacy Test?

6. What percentage of the students at this school did not master the examination last school year?
7. Briefly, explain how the tablet computers help in any remedial programs that have been implemented to improve the students' literacy skills?
8. To what extent do you think the tablet computers have been effective in these remedial programs?

I would now like to discuss the Tablet in Schools (TIS) Pilot Project and Grade Four Students responses to the program

9. Explain the policy of the school as it relates to the integration of tablet computers in the teaching of different disciplines.
10. What measures have you taken to ensure that the tablets are integrated in the teaching of literacy skills?
11. How often are the tablet computers integrated into Literacy /Reading lessons?
12. Explain how the device is managed by the teacher in the teaching and learning process?
13. What are some of the differences you have observed as it relates to students' participation and responses in the pedagogical process since the integration of the tablet computers?
14. Do you believe that students are more interested in learning since the tablets have been integrated as an instructional tool?
15. Can you identify the main advantages and disadvantages of utilizing the TC in the Jamaican Primary Classroom?

16. As we look towards the future, how do you see the TIS making a difference in the pedagogical process specifically in literacy in Jamaican Schools?

Affective Questions*:*

I would like to proceed now by exploring how you feel about the effectiveness of integrating tablet computers in the pedagogical process.

17. Could you describe your feelings about the use of tablet computers in preparing students for the Grade Four Literacy Test skills?

Summary:

The TIS Pilot Project is a relevant topic in the Jamaican Education System today. The Ministry of Education in an effort to improve the education process and to move away from the didactic teaching methods have seen it pertinent to integrate the gadget in the pedagogical process. Its usage is hypothesised to improve the students' literacy skills and in so doing, improve the students' performance on the Grade Four Literacy Test.

Is there any other information you wish to divulge that you think would be pertinent to this topic? Is there anything else that I should have asked that you would like to tell me about now?

APPENDIX D

INTERVIEW PROTOCOL FOR GRADE COORDINATORS AND CLASSROOM TEACHERS

Interview Protocol for Grade Coordinators and Classroom Teachers

Research Questions:

1. To what extent do instructional leaders feel that the use of tablet computers are effective in preparing students for the Grade Four Literacy Test?
2. How do instructional leaders facilitate the integration of computer tablets in the pedagogical process?
3. To what extent do instructional leaders consider the tablet computers an instructional tool which has encouraged more favourable responses from students in the classroom learning environment?

Subjects:

Grade Four Coordinators and Classroom Teachers

Location:

Quiet place/ office on school grounds

Introduction:

This is a study about the perception that exists for Jamaican instructional leaders as they integrate Tablet Computers (TCs) into the pedagogical process to prepare grade four students for the Grade Four Literacy Test (G4LT).

I have chosen to speak to you today because your school is among the scope of institutions that is on the pilot programme. In addition, you have been identified as someone who has a good insight on the topic and is integrally involved in students' preparation of the test. I would like to audio tape our conversations today. Please be advised that your information will not be released to anyone who is not directly associated with this study. In addition, you must sign the devised document which meets our human subject requirements. This document affirms that all information will be held confidential and your participation will be voluntary.

I appreciate your willingness to participate.

Demographic Questions:

I think that your age, gender, educational background and employment history would be very important to my study so it would be helpful if you could start by answering these questions to satisfy the demographic aspect of the interview

1. How old are you?

2. It would be helpful if you could tell me about your education and career path so far.

3. How long have you been working in the capacity of a grade four coordinator/teacher in this institution?

4. Briefly, describe any experience that you might have had in the area of literacy.

I just want to make sure that we have covered everything that is important:

- Your age
- Educational background
- Previously held jobs
- Experience with the Grade Four Literacy Test

Knowledge Questions:

I would now like to discuss the Grade Four Literacy Examination and the students' performance on the test.

5. Briefly, explain how the tablet computers help in any remedial programs that have been implemented to improve the students' literacy skills.

6. To what extent do you think the tablet computers have been effective in these remedial programs?
7. Give an overview of the other available resources that are utilized in the teaching of literacy to bring about desired outcomes?
8. To what extent do you think these resources have been effective in these remedial programs?

I would now like to speak to you about the Tablet in School (TIS) Pilot Project.

9. Describe the programmes that are installed on the tablet to facilitate literacy.
10. To what extent do you believe that the use of tablet computers have contributed to the improvement of students' literacy skills?
11. How often do you integrate the tablet computers into Reading or Literacy lessons?
12. In what ways have you used the tablet computers to assist students in picture word association and word recognition?
13. In literacy, different comprehension skills need to be taught. Can you briefly explain how you have used the tablet computers to teach different comprehension skills?
14. Explain how you have used the tablet computers in the teaching of communication task.
15. What positive changes have you observed in students' responses to the use of tablet computers in the pedagogical process?
16. What negative changes have you observed in students' responses to the use of tablet computers in the pedagogical process?
17. How have the tablets affected students' engagement on academic tasks?

18. Which gender do you think has a preference for the use of the tablet as an instructional tool?
19. What are some of the differences you have observed in students' participation in the pedagogical process since the integration of the tablet computers
20. Can you identify the main advantages and disadvantages of utilizing the TC in the Jamaican Primary Classroom?
21. As we look towards the future, how do you see the TIS making a difference in the pedagogical process specifically in literacy in Jamaican Schools?

Affective Questions:

I would like to proceed now by exploring how you feel about the effectiveness of integrating Tablet computers.

22. Could you describe your feelings about the use of tablet computers in preparing students for the Grade Four Literacy Test?

Based on responses given, probing questions will be asked for respondent to elaborate.

Summary:

The TIS Pilot Project is a relevant topic in the Jamaican Education System today. The Ministry of Education in an effort to improve the education process and to move away from the didactic teaching methods have seen it pertinent to integrate the gadget in the pedagogical process. Its usage is hypothesised to improve the students' literacy skills and in so doing, improve the students' performance on the Grade Four Literacy Test.

Is there any other information you wish to divulge that you think would be pertinent to this topic? Is there anything else that I should have asked that you would like to tell me about now?

APPENDIX E

OBSERVATIONAL PROTOCOL

BACKGROUND INFORMATION

Observational Protocol

Background Information

Observer: Tracy-Ann McGhie-Sinclair

Date of Observation____

Time of Observation____

Total number of students in class ____

Number of Boys_____________________ Number of Girls _______________________

Duration of the Observation:

________ 1 hour ________2 hours

________ half day ________ whole day

Other, please specify

____

____

This section provides an overview of how the tablets were used in the teaching and learning process.

Activity Context

Description of the seating arrangement in the classroom.

____

____

____

____

Number of tablets available for usage in the lesson.

____

____

____

____

How were the tablets deployed in the classroom during instruction?

_____One to one without collaboration

_____One to one with collaboration

_____Many to one with collaboration

_____ Individual basis

Additional information on tablet deployment

____

____

____

____

How many times were the tablets used in the execution of the lesson?

____

____

____

____

____

Which applications were used during the execution of the lesson?

Intended purpose(s) of the applications used during instruction based on information provided by the instructional leader (Classroom teacher).

Additional information to capture the activity or context of the lesson observed.

Simulated Recall Interview.

Using the information garnered from the Observational Protocol, a Stimulated Recall Interview will be conducted (with the classroom teacher) immediately following the lesson observation to find out why he or she utilized the strategies, applications and techniques or lack thereof in the execution of the lesson.

Questions may include but will not be limited to the following:

1. Briefly discuss why the tablet was/ was not employed in the lesson.
2. What was the intended purpose of the applications used during the lesson?
3. Do you believe that this application was the most suitable to be used to effectively teach the concept?
4. When you taught _____ but didn't use the tablet, why did you choose not to use it?

APPENDIX F

LETTER REQUESTING PERMISSION TO CONDUCT RESEARCH

FROM THE MINISTRY OF EDUCATION, JAMAICA

Letter Requesting Permission to Conduct Research from the Ministry of Education, Jamaica

February 12, 2016

The Chief Education Officer
Ministry of Education
2 National Heroes Circle
Kingston 4
Jamaica

Dear Dr Grace McLean:

Re: Permission to Conduct Research in Public Schools

I recently sent a correspondence requesting permission to conduct research in two primary schools, namely: XXXXXXX Primary and XXXXXXX. However, during a recent discourse with the Chair of my dissertation committee, Dr Samuel Myers, he impressed upon me the need to extend the sample of schools and participants in the study. Therefore, I am hereby asking that the initial request be amended and permission be granted to conduct the said research in two additional schools: XXXXXXX in Manchester and XXXXXXX in Kingston.

If you require any further information, please do not hesitate to contact me at 291-7270 or tracyannmcghie@yahoo.com. You may also contact Dr Samuel Myers at 434-4657. His email address is drsammyers@yahoo.com or samuel.myers@ctc.edu.jm. Thank you for your time and consideration in this matter.

Yours sincerely,

Tracy-Ann McGhie-Sinclair (Mrs)

Temple University
Doctoral Student

APPENDIX G

INFORMED CONSENT

Informed Consent

Title of research: The Integration of Tablet Computers in Preparing Students for the Grade Four Literacy Test: Perception versus Reality

Investigator and Department: *Principal Investigator:* Dr. Samuel Myers**,** College of Education; *Student Investigator:* Tracy-Ann McGhie-Sinclair, Doctoral Student, Department of Policy, Organizational and Leadership Studies (POLS) Educational Leadership Program

Why am I being invited to take part in this research?

We invite you to take part in a research study because you are an instructional leader who works in one of the schools that is a part of the Tablet in School (TIS) Pilot Project.

What should I know about this research?

Someone will explain this research to you.
Whether or not you take part is up to you.
You can choose not to take part.
You can agree to take part and later change your mind.
Your decision will not be held against you.
You can ask all the questions you want before you decide.

Who can I talk to about this research?

If you have questions, concerns, or complaints, or think the research has hurt you, contact the research team by calling Tracy-Ann at (876) 291-7270 or email the primary investigator at Samuel.myers@ctc.edu.jm . You can also send mail to Church Teachers' College, 40 Manchester Road, Mandeville, Manchester, Jamaica West Indies or make contact by calling (876) 434-4657 or (876) 962-2662.

This research has been reviewed and approved by an Institutional Review Board. You may talk to them at (215) 707-3390 or e-mail them at: irb@temple.edu for any of the following:

Your questions, concerns, or complaints are not being answered by the research team.
You cannot reach the research team.
You want to talk to someone besides the research team.
You have questions about your rights as a research subject.
You want to get information or provide input about this research.

Why is this research being done?

The purpose of the present study is to examine instructional leaders' perception relating to the integration of tablet computers (TC) in preparing students for the Grade Four Literacy Test (G4LT). The Grade Four Primary School students' literacy levels, as measured by the G4LT, is of dire concern to the government and other stakeholders. The acquisition of this lifelong skill is critical and forms the basis of lifelong learning As such, the government of Jamaica has launched the Tablet in School (TIS) Pilot Project to enhance literacy instruction and in so doing improve students' performance on the G4LT.

It is therefore imperative that instructional leaders communicate their opinions regarding the integration of the TC since it is in the pilot stage. Data generated form this research will assist educational leaders and government officials as they continue to make additional informed decisions about the TIS Pilot Project.

How long will I be in this research?

We expect that you will be engaged in this research for about 60 minutes: the demographic questions will take about 20 minutes and the remainder of the interview will take an additional 40 minutes. The study will conclude once interviews have been conducted with all sixteen participants and observations are completed.

How many people will be studied?

We expect about sixteen subjects will comprise the focal group for this research.

What happens if I agree to be in this research?

If you agree to participate in this research study, data will be collected from you through the use of a formal in person interview. The duration of the interview will be 60 minutes. Your interview will be audio recorded and transcribed verbatim. The interview will be conducted at your school or off site at a location and time based on your availability. This research will be done between April – June, 2016. Observation of students at the school site will begin in June of 2016. The estimated completion of primary analyses of this study is August 2016.

What happens if I agree to be in this research, but I change my mind later?

If you decide to leave this research, there will be no negative consequences and it will not affect your status. Your choice to participate or withdraw is confidential and will not be shared with other participants.

If you decide to leave this research, contact the research team so that the investigator can remove your data from consideration in the study.

Is there any way being in this research could be bad for me?

There are no foreseeable risks associated with this research. As with any other study, your participation may involve unforeseen psychological risks; which may include you being uneasy during the interview as you try to give an adequate response to satisfy the questions posed.

What happens to the information collected for this research?

To the extent allowed by law, we limit the viewing of your personal information to people who have to review it. We cannot promise complete secrecy. The IRB, Temple University and other representatives of these organizations may inspect and copy your information. In addition, the Ministry of Education, Jamaica may inspect the findings of the research.

All paper documents collected will be kept in a securely locked file cabinet in the investigator's home. Electronic files will be kept on a password- protected computer. To protect your identity, you will be given a pseudonym upon entrance in the study. Your choice to participate in the study will remain confidential and your real identity will not be shared with other participants or be published in the final report.

Can I be removed from this research without my OK?

The person in charge of this research or the sponsor can remove you from this research without your approval. Possible reasons for removal include: failure to make yourself available to be interviewed during the interview timeline. I will make a concerted effort to follow up with you during the study in order to allow you to communicate any emergencies or personal issues that may arise that would cause you to miss a scheduled interview. Opportunities will be given to reschedule your interview so you can remain in the study.

What else do I need to know about this research?

If you are interested in the results of this study, you may contact the student researcher via email at tracyannmcghie@yahoo.com for information in autumn 2016 once the study has been concluded and the report is completed.

Signature Block for Adult Subject Capable of Consent

Your signature documents your permission to take part in this research.

Signature of subject	Date
Printed name of subject	
Signature of person obtaining consent	Date
Printed name of person obtaining consent	

APPENDIX H

PERMISSION TO AUDIOTAPE

Permission to Audiotape

Investigator's Name: Tracy-Ann McGhie-Sinclair

Department: Department of Policy, Organizational and Leadership Studies (POLS)
Educational Leadership Program, Temple University

Project Title: The Integration of Tablet Computers in Preparing Students for the Grade Four Literacy Test: Perception versus Reality

Subject: ______________________________ Date: _______________________

I give ______________________________ permission to audiotape me. This audiotape will be used only for the following purpose (s):

(Choose one)

___ CLINICAL

This audiotape will be used as part of my treatment. It will not be shown to anyone but my treatment team, my family, and myself.

___ EDUCATION

This audiotape may be shown to education professionals outside of
for educational purposes. At no time will my name be used.

___ RESEARCH

This audiotape will be used as a part of a research project at ____________________. I have already given written consent for my participation in this research project. At no time will my name be used.

___ MARKETING/PUBLIC INFORMATION

This audiotape will be used to promote _________________________ to educational or health professionals, referral sources, and/or the general public. At no time will my name be used.

___ OTHER

Description:
____
____
____
____
____
____

<u>WHEN WILL I BE AUDIOTAPED?</u>

I agree to be audiotaped during the time period: __________________ to __________________.

<u>HOW LONG WILL THE TAPES BE USED?</u>

I give my permission for these tapes to be used from: ________________ to _________________.

I agree to the proposal that the data be stored for one year after completion of the study.

<u>WHAT IF I CHANGE MY MIND?</u>

I understand that I can withdraw my permission at any time. Upon my request, the audiotape(s) will no longer be used. This will not affect my care or relationship with ________________ in any way.

<u>OTHER</u>

I understand that I will not be paid for being audiotaped or for the use of the audiotapes.

<u>FOR FURTHER INFORMATION</u>

If I want more information about the audiotape(s), or if I have questions or concerns at any time, I can contact:

Investigator's Name: Tracy-Ann McGhie-Sinclair

Department: Department of Policy, Organizational and Leadership Studies (POLS) Educational Leadership Program

Institution: Temple University / Church Teachers' College

Street Address: 40 Manchester Road, Mandeville, Manchester Jamaica West Indies

Phone: Office: 962-2662 Home: 291-7270

This form will be placed in my records and a copy will be kept by the person(s) named above. A copy will be given to me.

Investigator's Signature: ________________________

Instructional Leader's Signature: _________________________

APPENDIX I

APPROVAL LETTER FROM TEMPLE UNIVERSITY INSTITUTIONAL REVIEW BOARD

Approval Letter from Temple University Institutional Review Board

TEMPLE UNIVERSITY
Research Administration

Research Integrity & Compliance
Student Faculty Center
3340 N. Broad Street, Suite 304
Philadelphia PA 19140

Institutional Review Board
Phone: (215) 707-3390
Fax: (215) 707-9100
e-mail: irb@temple.edu

Date: 15-Mar-20

PI:	Myers, Samuel
Committee:	A2
Protocol Number:	23638
Project Title:	The Integration of Tablet Computers in Preparing Students for the Grade Four Literacy Test: Perception versus Reality

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The above new study was administratively closed because the IRB determined that the proposed activity is not human subjects research as defined by DHHS or FDA regulations. Consequently, Temple IRB approval is not applicable and the study was given the status of "closed/never opened." You are welcome to pursue the activity, obtaining any applicable administrative or departmental (non-IRB) approvals.

Please contact the IRB at (215) 707-3390 if you have any questions.