ABSTRACT

An Investigation into the Use of Technology Enhanced Learning into Curriculum Delivery in the Educational District of Tobago

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This study sought to investigate the Use of Technology Enhanced Learning into Curriculum Delivery in the Educational District of Tobago. It specially sought to investigate the reasons why teachers within the Educational District of Tobago were not integrating technology into the use of curriculum. Data were collected using semi-structured open-ended focus group interviews held with three teachers and the findings of the study revealed that: 1) lack of professional development from the Division of Education 2) teachers' attitudes towards integration of technology 3) lack of resources to integrate technology 4) teachers' workload and 5) the layout of the physical structure of the school.

Keywords –curriculum, curriculum implementation, curriculum development, curriculum design, learning, technology, integration, technology enhance learning.

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Dedication

This study is dedicated to my family, Hilton and Davelle Phillips and all the teachers of the institution understudy.

Table of Contents

Page

An Investigation into the Use of Technology Enhanced Learning into Curriculum Delivery in the Educational District of Tobago

A Case Study

Chapter One

Introduction

We live in a technological world, a world in which people come to expect that good things can come only from the increasing use of technology in our lives. Bill Gates (as cited in Ornstein and Hunkins, 2004, p. 398) states that "Information technology will not only bring mass-produced information to students, but all such information will be customized to their learning styles, their cultural backgrounds, their educational interests and their academic goals."

The twenty-first century requires students to acquire skills necessary to be productive and competitive in higher education and in the workplace. It also demands that they work on their own with little guidance or support from their teachers. However, in order for this to take place, new approaches to curriculum development and delivery may be necessary. Within recent times, some commentators (International Society for Technology in Education (ISTE), Policy Brief (2008) have been arguing that the integration of technology into teaching and learning can have a positive impact on student achievement. Others (Lam and Lawrence, 2002); Gillespie, 2006) in Riasati, Allahyar, and Tan, 2012) believe that through the ongoing use of technology in the schooling process, students are empowered to achieve important technology capabilities.

In spite of what is being argued, there is still no convincing argument which can convince that schooling can dispense with the teacher. Indeed, consensus in the research literature insists that the key individual in helping students develop their potential and 21st century skills is the

classroom teacher. According to ISTE (2000), the teacher is responsible for establishing the classroom environment and preparing the learning opportunities that facilitate students' use of technology to learn, communicate, and develop knowledge products.

Technology is around everything we do, Muir-Herzig (2004). Modern trends in technology suggest that the future will see even more technology employed in our everyday lives. Already the evidence reveals that students now entering schools are already skilled in using technology. As a result educators must constantly ask themselves how to make use of modern technology so that educational ends are addressed. Kerr (as cited in Ornstein and Hunkins, 2004) cautions that, "technology should not be viewed as a quick fix to instructional problems."

Cookson and Schneider (2004) report that children born in the year 1994 will graduate from primary school in the year 2013; that if they have normal longevity, their work lives will last until the middle of the twenty-first century; that the world they will live and work in will be fundamentally different from the world of their parents and teachers.

In keeping with Cookson and Schneider's perspective, Governments world-wide including Trinidad and Tobago have recognized the need to prepare their citizenry for the imperatives of knowledge based societies by investing heavily in the development of appropriate curricula, recognizing the decided advantage that the integration and use of technology can provide in the social and economic development of their populations (Draft Policy for ICT in Education, p. 3).

Background of the Study

It is difficult to deny that the advent of science and technology has dramatically transformed almost every aspect of people's lives. If we are to adjust to the increasing demands

of an unfolding civilization, then as Way and Webb (2007) submit, technology in education has the potential for improving teaching and learning. UNESCO too has jumped in the discussion. This organization's overriding aims are to ensure that all countries, both developed and developing, have access to the best educational facilities necessary to prepare young people to play full roles in modern society and to contribute to a knowledge nation (2002). UNESCO (2002) further proclaims that in order for students and their teachers to keep abreast of this changing world, all nations require a state-of-the-art curriculum and appropriate teacher development.

Others agree that technology can assist to a great extent in this regard. For example, Strommen and Lincoln (1992 in Mackinnon, 2002) report that:

> Technology can and does help students develop all kinds of skills – from the basic to the higher-order critical thinking ones. However, for technology to be successful teachers need to make informed choices relating to pedagogical approach, students' needs and learning objectives. Just as important as what technology is used, is how learning can be enhanced through technology,

Technology affects virtually every aspect of our lives, from enabling citizens to perform routine tasks so that they may be able to make responsible, informed decisions that affect individuals, our society, and the environment. Citizens of today must have a basic understanding of how technology affects their world and how they exist both within and around technology (ITEA, 2003). The Dakar Framework for Action (April 2000) identified the use of technologies as one of the main strategies for achieving the world declaration of Education for All (adopted from Jomtein, 1990) and called on all nations to harness these technologies to help achieve these goals.

According to the "National Center for Education Statistics (NCES), (2000) in almost all public schools' in the United States, teachers reported having computers available somewhere in

their schools or their classrooms. The report also stated that there is a rapid increase in the proportion of schools that are connected to the Internet and there are virtually no differences in Internet access between poor schools and wealthier schools any more, as Internet access has steadily been increasing in public schools over time. The International Technology Education Association (ITEA) 2003 in addition states that the "happenstance" approach to technology is no longer effective, schools, in collaboration with the community, must bear the bulk of this effort.

Closer home, the Ministry of Education in Dominica also recognizes its responsibility to utilize technology within the education system. Its philosophy states that, "the integration of ICT in the education system could eventually boost the economic engine of the country, since it provides a leveled "playing field" for the creation and distribution of software, information etc. by its citizens. The philosophy also states that, "ICT must be exploited to allow students greater control over their learning and thus develop skills at their own level and speed.

A report done by Gaible (2008) on Information and Communication Technology (ICT) in Caribbean Schools indicated that some Caribbean countries provide adequate access to computers and the Internet and ensures that all primary school students have ICT skills. The report further states that foundational elements of many ICT implementations in Caribbean school systems amplify the obstacles to technology integration posed by low levels of teacher education and lack of ICT skills.

The Conference of Heads of Government of the Caribbean Community at their 23rd Meeting in July, 2002 in Georgetown Guyana agreed that the formulation of policy in relation to ICT requires attention, direction and promotion at the highest level. They also agreed that the Caribbean Community should adopt a coordinated approach to the conceptualization and

development of Information and Communication Technologies policies (Georgetown Declaration, 2003).

The Ministry of Education eConnect and Learn (eCAL) Programme Policy of Trinidad and Tobago objective is to leverage the potential of ICT to significantly enhance the education system through the provision of laptop computers to Secondary School Student. This initiative has led to an expansion in the distribution of hardware and software of ICT resources in schools. The following gives insight into the thinking behind this initiative:

> The Policy Statement of the eCAL believes that basic education should "evolve and nurture an ICT framework designed to enhance, broaden, strengthen and transform learning to develop the learners into a person who is excellence-driven, global in perspective, innovative, ingenious, creative, and prepared to participate fully in the global economy of the 21st Century programme".

In 2002 the Government of the Republic of Trinidad and Tobago (GoRTT) sought to transform the country to developed country status by 2020. In an attempt to support this initiative, the GoRTT National ICT Philosophy states that, "the use of ICT in education would dynamize the teaching and learning environment, provide equity and access and develop a responsible individual capable of functioning in a technology driven knowledge based society."

In 2008, the Government of the Republic of Trinidad and Tobago in conjunction with Illuminat Trinidad and Tobago Limited conducted a three week training programme in educational technology within the educational district of Tobago. Sixty-eight (68) teachers were selected from the division's thirty-six (36) primary schools. Further to this, in the year 2010, the Division of Education conducted training in computer literacy in conjunction with the National Certificate of Secondary Examination to bring all members of staff on board with using the technology. Although teachers have undergone training conducted by the Division of Education,

schools and by extension teachers have not been able to integrate technology into the teaching and learning environment of Tobago primary schools.

Statement of the Problem

The Division of Education has equipped all schools in the educational district of Tobago with computers and other technological devices in an attempt to ensure that technology is integrated into curriculum delivery. The Division conducted training in 2008 and 2010 to ensure that teachers are equipped with the necessary skills and knowledge to integrate technology into curriculum. The GoRTT has not mandated primary school teachers to integrate technology into curriculum. However, they expect that teachers should prepare students for the world of work. Although the Division made efforts to empower teachers to use technology into curriculum delivery, teachers have not been able to use technology to enhance teaching and learning.

The Purpose of the Study

The purpose of this descriptive case study is to explore the views of teachers in the schools under study to ascertain their perceptions on integrating technology into the curriculum and also their insights into the use of technology for enhanced learning into curriculum delivery.

Research Questions

The research questions that were used to conduct this study are:

Overarching Question:

To what extent have schools in the Tobago Division of Education been able to integrate technology into curriculum development, implementation, and delivery?

In order to narrow the focus on the qualitative study, four sub-questions were applied to the central question.

1) What mindset do teachers in the Tobago Division of Education display towards the use of technology in schools?
2) What support systems are available for the maintenance and upgrade of technological equipment and materials in Tobago schools?
3) What facilitating conditions prevail to help promote the introduction of technology into Tobago primary schools?
4) What are the main challenges to the introduction of technology into Tobago primary schools?

Research Sub-questions four was selected for operationalization.

Expected Outcomes

It is anticipated that teachers in Tobago primary schools would change their attitudes towards the integration of technology enhanced learning into curriculum delivery. It is also expected that administrators and teachers will develop visions that directly speak to equipping students with the knowledge and skills necessary to cope with the challenges of this technological age.

Finally, it is hoped that the findings of the study would help: 1. schools and teachers to integrate technology into the teaching and learning environment; 2. the Division of Education put measures in place so technical support would be more easily available to schools and teachers.

Significance of the Study

The results of this study will have implications for determining whether the educators at this institution will be sensitized to the needs to change their teaching strategies and their attitudes towards how children learn so that they will be prepared for this technological era. The findings will provide insights for educators for future activities that lend themselves for professional development. It would deepen teachers' understanding of the requirement of technology enhanced learning into curriculum. Finally, this research should add new knowledge to the body of research findings that exists on the study at hand, as well as to how the teaching and learning environment can be improved.

Definitions of Key Terms

The following terms were defined to better inform the readers of their intended purpose and meaning within the study.

Technology Enhanced Learning – is using technology to support the teaching process

Barrier – is defined as, "any condition that makes it difficult to make progress or to achieve an object," (Word Net, 1997 in Bingimlas, 2009).

Learning – is defined as "a persisting change in capability resulting from the learner's experience and interaction with the world" (Driscoll, 2000 in Smaldino, Lowther and Russell, 2007).

Curriculum – is an organised set of formal education and/or training intentions, Pratt (1980) in Ornstein and Hunkins, 2004, p.10.

Curriculum Design – refers to the way we conceptualize the curriculum and arrange its major components (subject matter or content, instructional methods and materials, learner experiences or activities) to provide direction and guidance as we develop the curriculum, Ornstein and Hunkins, (2004, p.18).

Curriculum Development – consists of various processes (technical, humanistic, and artistic) that allow schools and school people to realize certain educational goals, Ornstein and Hunkins, (2004, p. 195).

Curriculum Implementation – is a process of getting educators to shift from the current programme to the mew programme. It is an interaction process between those who have created the programme and those who are charged with delivering it, (Ornstein and Hunkins, 2004, p.299).

Integration – is the process of using technology in the classroom to introduce, reinforce, extend, enrich, assess, and remediate student mastery of curricular targets. (Hamilton, 2007)

Technology is a "body of knowledge and systematic application of resources to produce outcomes in response to human needs and wants," Savage and Sterry (1990 cited in Sanders, 1992).

Organisation of the paper

The following is a brief outline of how the subsequent chapters of the paper are organized. Chapter two begins with an introduction to the literature review and a synopsis of what is technology integration, the benefits of technology integration, the available support

system for the integration of technology and the barriers that prevent this integration into educational practices along with a theoretical framework.

Chapter three presents an overview of the methodology section. It discusses the rationale for qualitative design, the sampling procedure, the profiles of the participants and the justification; the data collection instrument, the research questions, the ethical safeguards and consideration and the justification. This chapter also describes the methods of data analysis and the delimitation and limitation. Chapter four presents the analysis and presentation of the findings and chapter five presents the discussion in light of the literature and recommendations that are linked to each finding.

Chapter Two

Literature Review

Introduction

This study explored the use of technology enhanced learning into curriculum delivery in the educational district of Tobago. As part of this effort, the review of literature focused on the history and trends of technology integration, the benefits of integrating technology into curriculum for both students and teachers; the challenges that impeded the integrating of technology into instructional practices; the impact of professional development on teachers' use of technology in schools; and teachers' perceptions on the use of technology integration and the pros and cons of the support systems with respect to technology integration.

Technology and Technology Integration

Noeth and Volkov (2004) purport technology to a wide range of computer based teaching and learning materials and tools, including all elements of computer use, Internet resources, various electronic communications, and distance education. Thompson, Schmidt, Walker, O'Connell, Bergland, Bengfort, and Linduska (2000, in Noeth and Volkov) on the other hand notes that technology is an integral part of education systems, and it is a daunting task to separate the effects of technology from the effects of other factors that influence teaching and learning. Technology is an integral part of education systems argued Thompson et al (2000) supported by The National Research Council (NRC 1995 as cited in Noeth and Volkov), who affirmed that technology offered new ways of teaching and learning, and provided new ways for all involved in education to be openly accountable to parents, communities, and students.

Bajcsy (2002 in Noeth and Volkov, 2004) conceptualized technology in teaching and learning as an enabler and suggested that technology can work to: help organize and provide structure for material to students; simulate, visualize, and interact with scientific structures, processes, and models; serve as an extension and enhancer for handicapped populations; and provide automated translators for multilingual populations. Wright, Israel, and Lauda (1993 in Yu, Kuo, Yang, Hu and Yang, 2012) consider technology to be "a body of knowledge and actions, used by people, to extend the human potential for controlling and modifying the natural and human-made (modified) environments"

Integration, on the other hand, is when classroom teachers use technology to introduce, reinforce, extend, enrich, assess, and remediate student mastery of curricular targets, Hamilton (2007). The National Educational Technology Standards for Students (NETS-S) and ISTE (2002 in Harris, 2005) declared that, "effective integration of technology is achieve when students are able to select technology tools to help them obtain information in a timely manner, analyzed and synthesized the information, and present it professionally." Sun (2000 in Wetzel, Zambo and Ryan, 2007) posit that….."Integration is the use of technology by students and teachers to enhance teaching and learning and to support existing curricular."

Pierson (1999) conceptualized technology integration as teachers utilizing content and technological and pedagogical expertise effectively for the benefit of students' learning, Woodbridge (2004). Hew and Brush (2007 as cited in President, 2012) postulated that, "technology integration is the use of computing devices such as desktop computers, laptops, handheld computers, software or Internet in K-12 schools for instructional purposes. Hew and Brush (2007) too jumped in support of Sheingold (1990) who postulated that integrating

technology in the classroom is…….about helping teachers to use technology as a tool for learning, Gorder (2008).

The National Center of Education Statistics (NCES) (2002) posited that "technology integration is the incorporation of technology resources and technology-based practices into the daily routines, work, and management of schools." The article further stated that "technology resources are computers and specialized software, network-based communication systems, and other equipment and infrastructure. Practices include collaborative work and communication, Internet-based research, remote access to instrumentation, network-based transmission and retrieval of data, and other methods." According to ISTE (2002 in Harris, 2005), curriculum integration with the use of technology involves the infusion of technology as a tool to enhance the learning in a content area or multidisciplinary setting.

For the purpose of this paper, technology refers to using computers and other technological devices available at the school for enhanced student learning and as an aid to teaching in the classroom.

History and Trends of Technology Integration

Historically, educational technology ……. can be traced back to the time when trial priests systematized bodies of knowledge, and early cultures invented pictographs or sign writing to record and transmit information Saettler (1990 as cited in Sandoval, 2011.)

The ancient Greece, the Elder Sophist used the term "techne" to refer to the process of applying knowledge systematically to practical art of instruction. During the Middle Aged Advent of Scholastic Philosophy, Pierre Abelard introduced a technology of

instruction which was really a new method of structuring and presenting materials that helped set the style of scholastic education.

Comenius, Pestalozzi, Froebel, Herbart and Montessorri contributed their own concepts on educational technology improving on the educative process. Johnann Amos Comenius, the earliest and most renowned champion of what we would today call visual literacy and visual education. Edward Thorndike and John Dewey formulated the scientific theory of learning and the scientific method respectively. In 1926 and 1927 respectively, educational films were used as instructional and Pressey wrote on programmed learning through a machine which tested and confirmed a learning task. In 1932, the first instructional television programme was aired at the State University of Iowa.

Seymour Papert, a professor at the Massachusetts Institute of Technology, was among the first to recognize the potential of technology to fundamentally change the learning enterprise. During the 1960s, after collaborating with renowned Swiss psychologist Jean Piaget, Papert developed the Logo programming language and began introducing it to children. Since Papert's groundbreaking work, the tools available for learning have become increasingly powerful and widespread (Boss, 2011). By the late 1980s, the prevalence of computers in school gave rise to technology standards for teachers. In the 1990s, the Internet was introduced and access to vast amounts of information was readily accessible. According to Roblyer and Edward (2000), teachers by 1997, with the introduction of the microcomputer gained greater control over the use of classroom

technology. In Nigeria, educational technology started during the colonial era 1926-1940 and before the post independence era, (as cited in Lucido and Borabo, 1997).

Benefits of Technology Integration for Students and Teachers

The literature has persistently argued that successful integration of technology in education can lead to a number of benefits. Some of these benefits have been explored below.

The use of technology into the learning environment has become an unstoppable force in recent years (Cohen, Manion, and Morrison, 2004). Dede (1998) postulated that technology has the potential to enhance student achievement and teachers' learning (cited in Keengwe, Onchwari and Wachira, 2008). Indeed, in a study to establish the relationship between computer technology and student achievement in mathematics, Wenglinsky (1998) reported a positive correlation between computer proficiency skills and academic achievement. Students who used computers and incorporated constructive strategies reported significantly higher scores than students who relied only on computer-based drill-and-practice programmes to learn mathematics.

On review studies related to technology and student achievement, Sivin-Kachala and Bialo (2000) reported positive and significant gains for students who were engaged in technology-rich environments. Those students showed significant gains and achievement in all subjects, increased achievement and improved attitudes toward their own learning, and increased self-esteem (cited in Keengwe et al., 2008).

The Milken Exchange on Education Technology used a meta-analysis of research studies to examine the impact of technology on student achievement and found that there were measurable increases in achievement in classrooms where technology is embedded and properly utilized (Schacter, 1999 in Education Alliance, 2005).

Some researchers maintain that the application of technology can help to increase student motivation and engages students in the learning environment (Dunken, 1990; Lee, 2000 in Riasati, Allahyar and Tan, 2012). This perspective is supported by the Department of Education and Early Childhood Development (DEECD, 2010). The department found that learner's experience of technologies in the classroom can enhance learners' engagement and motivation in fulfilling task (Riasati, Allahyar and Tan, 2012).

The integration of technology into curriculum delivery has accelerated the shift from teacher-centred approaches to student-centred approaches by guiding and supporting students in their learning rather than the traditional bench-bound instructors (DEECD, 2010 in Riasati, Allahyar and Tan, 2012). As a result, it is now accepted that to effectively teach with technology, teachers must shift their instructional practices from a teacher-centered lecture approach to a more student-centered learning or constructivist approach (Jonassen, 2000, cited in Keengwe et al, 2008). With the teacher as facilitator of learning, students will be engaged in self evaluation and peer evaluation; they also will become aware of the quality of their work and will accept feedback more willingly (Riasati, Allahyar and Tan, 2012).

Research, which examines constructivist teaching and learning models, indicates that technology brings complexity to the tasks that students perform and raises student motivation (Baker, Gearhert and Herman, 1994; Dwyers, Ringstaff and Sandholtz, 1990). Brooks and Brooks (2001) conclude that technology changes the roles of teachers and students; that the traditional role of the teacher as dispenser of information is challenged; and that the teacher's new role is that of guide—to challenge students' thinking and encourage reflection in the learning process (Keengwe, Onchwari and Onchwari, 2009).

Reeves (1998as cited in Keengwe et al., 2008) submits that learning with technology, incorporates the use of computers to help students develop higher order thinking, creativity and research skills. Barron and Orwig echo the same sentiment, when they postulated that integration of appropriate technology into classroom practices can positively impact important dimensions of learning such as active learning, critical thinking, cooperative learning, communication skills, instructional effectiveness, multisensory delivery, motivation and multicultural education (Keengwe et al, 2008). Novak (1998), goes further by asserting that these higher order skills are pivotal in helping learners become skilled at thinking purposefully and connecting life experiences to academic learning which might translate to meaningful learning (Keengwe et al., 2009).

Research has shown that many students benefit from the use of technology integration into the teaching environment (Schacter, 2001). Kulik (1994 as cited in Schacter, 1999) conducted a meta-analysis technique to aggregate the findings from more than 500 individual research studies of computer-based instruction. The findings revealed that students using computers learn more in less time, like classes more, and have more positive attitudes towards computers in classes that utilized computers for instructional purposes.

Schacter (1999) compiled and analyzed five large-scale studies of education technology for the Milken Exchange on educational technology. The findings revealed that in over 700 empirical research studies, in the study of the entire state of West Virginia, in a national sample of fourth- and eighth-grade students, and in an analysis of newer educational technologies that students with access to computer assisted instruction, or integrated learning systems technology, or simulations and software that teaches higher order thinking, or collaborative networked technologies, or design and programming technologies, show positive gains in achievement.

Challenges of Technology Integration into Curriculum

The Impact of Professional Development on Teacher Use of Technology in Schools

Researchers now accept that the teaching process has fundamentally changed, because professional development has taken teachers from learning how computers work to using technology to change how they teach (CDW-G, 2006 in Ertmer and Ottenbreit-Leftwich, 2009). Technology training is a major factor that has helped teachers develop positive attitudes towards technology and integrating technology into curriculum (Benson, 1996; Reynolds and Morgan, 2001 in Zhao and Bryant, 2005). Against this background, Darling-Hammond (2008) reminds us that schools cannot be improved without improving the skills and abilities of teachers and principals who work in them. Baylor and Ritchie (2002) state that "regardless of the amount of technology and its sophistication, technology will not be used unless faculty members have the skills, knowledge and attitudes necessary to infuse it into curriculum," (cited in Albirini, 2004). Teachers are the ones who ultimately will implement change. Therefore, professional development processes must address their needs and concerns (Darling-Hammond, 2010a and 2010b in Lunenburg 2011).

Clearly, professional development is critical to ensuring that teachers keep up with changes in statewide student performance standards; become familiar with new methods of teaching in content areas; learn how to make the most effective instructional use of new technologies for teaching and learning (Lawless and Pellegrino, 2007). The content of pre-service education to technologies is "fundamental to computer operation rather than preparation on how to use technology as a teaching tool and how to integrate it across the curriculum" (Sandholtz, 200 in Ringstaff and Kelly, 2002).

Kassen and Higgins (1997, in Arkin, 2003) state that, technology training is most effective when it:

(1) offers teachers ample time to practice and experiment with technology and to share ideas;

(2) provides sustained support rather than a one-shot training session; and

(3) receives institutional commitment, this clearly demonstrating to teachers that technology is not just another bandwagon.

Nierderhauser and Perkmen (2008 cited in Walker and Shepard, 2011) concluded that even if all barriers to technological integration were removed for teachers and students, that it would not be a natural process for teachers to use technology authentically for learning without training. The findings from a follow-up study six years after the initial study found that participants had the same level of excitement toward technology integration and usage as they had in the earlier study. The researchers attributed this finding on the ongoing professional development teachers encountered as they engaged in the integration of technology into their classroom (Nierderhauser and Perkmen, 2008). Khoehler and Mishra (2008) identified content knowledge, pedagogical knowledge, technological knowledge and combinations of these three as necessary for effective teaching with technology.

Matzen and Edmund (2007); Bauer and Kenton (2008); Ertmer, Conklin, Lewandowski, Osika, Selo, and Wignall (2003 cited in Gorder, 2008), on the other hand, explained that, "an inherent flaw on professional development was not in instructional practices, but rather on when teachers were taught mainly technical skills, they may fall back on technology because they had

not been provided with an alternative vision for the use of technology (Minor, Losike-Sedimo, Reglin, and Royster, 2013). The researchers, however, believed when the right professional development was presented within concepts geared towards student-centred instructional practices, teachers were more likely to integrate technology into their classrooms thus changing their attitudes toward technology (Minor et al., 2013).

The Office of Technology Assessment (1995) found that limited professional development was one of the predominant strategies that affect the integration of technology. Research conducted by the NCES (2005) found that teachers' opportunities to learn about technology for educational purposed during traditional professional development activities are often lacking. A recent study by the Milken Exchange on Educational Technology (1999) and The ISTE (n.d) found that, "general teacher-training programmes do not provide future teachers with the kinds of experiences necessary to prepare them to use technology effectively in their classrooms." According to Goodman, Hetterbran and Fennimore (2004):

> Professional development is often short term with a lack of adequate follow-up feedback from experts. Professional development needs to focus less on "how to" workshops and more on pedagogy that will support teachers in designing meaningful learning experiences for their students. Additionally, professional development must be collaborative so that teachers can have a voice in shaping their learning experiences to make relevant for the work they do in the classroom.

Teacher Perceptions on the use of technology in the Classroom

Teachers' perception is defined by Fisbein and Ajzen (1975) as a learned predisposition to respond to an object or class of objects in a consistently favourable or unfavourable way (Mima, Ondigi and Mavisi, 2013). In this paper, the focus is on the teacher's perception or attitudes or a state of mind or feeling towards the integration of technology enhanced learning into curriculum. Integration of technology into curriculum largely depends on "teachers' perception that is a key factor in accepting their pedagogical practices or their actual use," (Baylor and Ritchie, 2002 as cited in Mima, Ondigi and Mavisi, 2013).

A study to show mathematics teachers' readiness to integrate information and communication technologies in Israel was conducted with 475 Arabian Teachers in elementary and middle school. The findings of the study revealed that more than 70% of the participating teachers had positive perceptions of their competence in technology and technology integration in their teaching. The findings further revealed that the teachers were ready for the integration of technology in their teaching and the readiness was represented not only by participating teachers' perceptions of and attitudes towards the integration of technology in the teaching and learning, but in their intention to do so (Baya'a, Wajech, and Daher, 2013).

Teachers' perceptions are influenced by their attitudes and their beliefs. Numerous researchers (Atkins and Vasu, 2000; Crawley and Fine, 2004; Roblyer and Knezek, 2003 in Mahat, Jamsandeka, and Nalavade, (2012) point out that teachers' attitudes or beliefs is one of the several important human factors which have significant impact on computer's adoption and the implementation of technology in the classroom. Bullock (2004 as cited in Mahat et al) found that the attitudes of teachers are a major enabling/disabling factor in the adoption of the

technology. Similarly, Kersanint, Horton, Stohl and Garofalo (2003 in Uslu, 2012), found that teachers with positive attitudes towards technology feel more comfortable, while using it and that they usually incorporate it into their teaching activities. Therefore, teachers' attitudes towards computers are one of the significant factors in enhancing the quality of computer usage for instruction (Yuen, Law and Chen, 1999 in Uslu, 2012).

Rogers (1995) postulated that one of the major factors affecting people's attitudes toward a new technology is related to the features of the technology itself. He pointed out five basic features of technology that affect its acceptance and subsequent adoption: relative advantage, compatibility, complexity, observability and trialibility. Thus, a new technology will increasingly be diffused, if potential adopters perceive that the innovation: 1) has an advantage over previous innovation; 2) is compatible with existing practices; 3) is not complex to understand and use; 4) shows observable results; and 5) can be experimented with on a limited basis before adoption (Rogers, 1995 in Gulbahar and Given, 2008).

The attitudes of teachers towards technology can influence the use of technology into teaching and learning and as a result technology integration has taken a back seat with respect to conventional learning (Russel and Bradley, 1997 in Charles Buabeng-Andoh, 2012). Teachers' attitudes have been found to impede the integration of technology into curriculum delivery (Hew and Brush, 2007; Keengwe and Onchwari, 2008).

A study conducted by Demci (2009 in Charles Buabeng-Andoh, 2012) revealed that ……..teachers' attitudes towards technology were a determinant to the successful integration of technology into educational practices. Other researcher has shown that teachers' attitudes

towards technology tend to influence their acceptance of the usefulness of technology and its integration into teaching (Huang and Liaw, 2005 in Charles Buabeng-Andoh, 2012).

Resources

Lack of resources is one of the key mechanisms which hindered the implementation of technology into curriculum. Lack of resources may include one or more of the following: access to available technology, lack of technical and administrative support and lack of technology. Lack of technology includes insufficient computers, peripherals, and software (Karagiorgi, 2005, O Mahony, 2003 as cited in Hew and Brush, 2007). Without adequate hardware and software, it would be impossible for teachers to integrate technology into instructional practices. According to Fabry and Higgs (1997 as cited in Tondeur,Valcke and Braak, 2008), the availability of technology in school involves the proper amount and right types of technology in locations where teachers and students can use them.

Al-Alwani (2005 in Binglimas, 2009) found having no access to the Internet during the school day and lack of hardware were impeding technology integration in Saudi Schools. Recent research on Syrian Schools indicated that sufficient computer resources were one on the greatest impediments to technology integration in the classroom, (Albrini, 2006). Gomes (2005 in Binglimas) found that lack of appropriate materials hindered the integration of technology into curriculum. A study conducted by Apple Classroom of Tomorrow (1995) notes that this journey through the various stages "is enhanced when teachers and students have unlimited access to technology in the classroom and are able to look at different approaches to teaching and learning," (Newhouse, Trinidad and Clarkson, 2002, p.23). In Hong Kong, teachers and students certainly have more access to technology now than ever before, but are they able to adopt

different approaches to teaching and learning – the hoped for shift that was the basis for the government initiatives (EMB, 1998) in Fox and Henri (2007).

Support Systems

Technical Support

Technical Support plays an important role in determining whether or not teachers integrate technology into curriculum delivery. Jones (2004 cited in Buabeng-Andoh, 2012) reported that the breakdown of computers causes interruptions and if there is lack of technical assistance…….. then teachers will not use computers in teaching. Yilmaz (2011 as cited in Buabeng-Andoh , 2012), in assessing technology integration processes in the Turkish education system, reported that in providing schools with hardware and internet connections, it is crucial to provide schools with technical support. Against this background, a study conducted by (Korte and Husing, 2007 as cited in Buabeng-Andoh, 2012) revealed that schools in Britain and the Netherlands have appreciated the significance of technical support to help teachers integrate technology into their teaching. In Sicilia's study (2005 as cited in Bingimlas, 2009) technical barriers impeded the smooth delivery of the lesson or the natural flow of the classroom activity.

A study conducted by the National Council for Accreditation of Teacher Education (NCATE, 1997) reported lack of technical support as one of the major barriers that result in computers being underutilized. The National Center for Educational Statistics (NCES, 2003 as cited in Afshari, Kamariah, Wong, Samah, nd Fooi, 2009) conducted a quantitative study on the importance of technical coordinators in schools. The findings revealed that 68% of the teachers believed that lack of support regarding ways of using technology in the class hindered technology use. Butler and Simon (2002 as cited in Afshari et al. 2009) carried out a study on

barriers to adopting technology for teaching and learning and recommended that schools should work to convince technology staff that reliability is important, especially concerning technology in the classroom. Fullan (1992 as cited in Cakir, 2012) believes that the role of leader is crucial to the successful implementation of educational innovations. Ringstaff and Kelly (2002 in Kellogg, 2008) found lack of technical support was a major barrier to technology use and noted that even teachers who enjoy using computers will stop using technology if the equipment becomes unreliable.

Administrative Support

Cakir (2012) conducted a qualitative study in Amaysa, Turkey on administrators' attitudes towards technology in thirty-eight schools. The results of the study revealed that administrators' attitudes towards technology were largely positive. A study conducted by Hess (2003 as cited in Cakir, 2012), found that the responsibilities of school administrators have changed as a result of the increased use of technology in schools. Moreover, according to Don Knezek, President of the International Society of Technology Education (ISTE), since school principals have an influential role in the implementation of school reforms, their thoughts regarding technological integration are of crucial importance (Cakir, 2012).

Research has shown that school leadership can hinder the integration of technology by teachers. Fox and Henri (2005) found that the majority of Hong Kong teachers felt that their principals did not understand technology and its relevance to the government's proposed shift to more learner-centered activities. Consequently, the impact of technology on teachers' practices in the classroom was restricted. According to Fullan, (2001 as cited in Cakir, 2012) an effective school leader should possess characteristics such as an understanding of change, openness to

innovation and a willingness to encourage learning and teaching. As leaders in innovation, administrators should also embrace technology. Indeed, rapid developments in technology and their increasingly widespread use in schools have led to a reappraisal of the roles and responsibilities of school administrators.

> Ronnkvist, Dexter and Anderson (2002 as cited in Wisnewski, 2010) found that administrators need to lend two types of technological support to their staff: Instructional and Technical. They went on to say that the instructional support includes training, advisement of pedagogical ideas, instructional strategies, and effective teaching methods. Technical support involves providing access to hardware and software, technology resources, professional development and personal technical support.

Lack of Time

Lack of time is another barrier that affects the implementation of technology into curriculum delivery. A quantitative study conducted by the National Center for Education Statistics (2000 as cited in Afsari, Bakar, Su Luan, Samah, and Fooi, (2009) revealed that 82% of respondents in the sample thought that lack of release time was the most significant factor that prevented them from using computers in their classes as well as preparing materials for use with their classes. Approximately 80% of the teachers surveyed in the aforementioned study thought that there was not enough time scheduled for students to use computers. Even though some of the teachers had a genuine need to use computers with their students, there was no available time to do it.

Bauer and Kenton (2005 ascited in Afsari et al (2009) conducted a qualitative study to examine the classroom practice of thirty (30) “tech savvy” teachers who used computer

technology in their instructions. The results revealed that teachers needed planning time for technology aided lessons. Lack of adequate time implies that teachers are less likely to commit themselves to using technology to enhance student learning. A study conducted by Isman, Gunduz and Canan (2008 as cited in Elmas, (2012) concluded that teachers do not have enough time to integrate technology into their classes and that they are devoid of both technological and administrative assistance to realize this process.

Teachers interviewed by Sicilia (2005) commented that "the constraints of different class schedules contributed to the lack of time they spent together to work on planning classroom activities. Supporting this finding was a quantitative study conducted by Dillion, Osborne, Fairbrother, and Kurina (2000 as cited in Bingimlas (2010). The findings revealed 86-88% of the teachers in the sample articulated that lack of time was the most significant constraint.

Teachers' Workload

In many schools, teachers complained that lessons have to be relocated from the regular classroom to a computer laboratory which entails disruption of normal working practices and makes additional organisational demands on the teacher (Jenson and Rose, 2001; Ruthven et al, 2005) . As a result, many teachers continue to stick to the traditional methods of delivering instruction (Su Luan, Majid and Atan, 2006; Dawes, 1999, Seyal and Rahim, 2000). Cuban (2001 as cited in Wright and Wilson, 2011) purported that teachers were still using traditional methods in their teaching and not using technology to transform teaching and learning.

A qualitative study conducted by Samarawickrema and Stacy (2007 in Buabeng-Andoh, 2012) investigated factors related to the use of learning management system in Australia. The finding of the research revealed that increased workload coupled with teaching technology was critical to the participants of the study. Similarly, Neyland (2001 as cited in Buabeng-Andoh,

2012) conducted a mixed method approach of factors influencing the integration of online learning in Sydney and the finding revealed that the workload of teachers was alarming. Fullan (2003 in Buabeng-Andoh, 2012) declared for teachers to realize the aims of educational system as well as implementing new initiatives, it is necessary to lessen the workload of teachers.

Physical Structure of the School

The physical structure of the school can become a significant obstacle in terms of technology integration. Schools often struggle with how to situate computers and allocate the large amount of space they demand, Collin (1996 in Groff and Mouza, 2008). Loveless (1996 in Groff and Mouza) reiterated that the problem with setting up is the too common limited accessibility to the laboratory, leaving teachers scrambling for time to get their students onto the computers. The use of computer-based tools and resources in teaching often involves changes in the working environment of lessons: change of room location and physical layout, change in class organisation and classroom procedures Jenson and Rose (2006).

A study conducted by the same authors (Collin, 1996 and Loveless, 1996) in Watson Elementary School in the year 2000 revealed that the physical structure of the computer laboratory was small and placing the computers in the classrooms showed greater success at integrating computers in their curriculum. Sheingold (1993 as cited in Schoepp, 2005) conducted a quantitative study involving known integrators at 4-12 grade level and found that one of the top seven barriers to technology integration was problems with space. A research conducted in Turkey Elementary School using interviews, observations, document analysis and survey revealed that barriers to teachers using technology based on teachers' responses were lack of physical setting, Serhat and Muhammed (2012).

Theoretical Framework

The theoretical framework for this study was based on the social cultural theory of learning postulated by Vygotsky (1978). He postulated that knowledge is socially constructed as individuals interact with the "More Knowledgeable Other" and the "More Knowledgeable Other could be anyone in the teaching/ learning environment or cultural artifacts such as the computer and other technological devices.

Sociocultural theories view learning as the product of interactions between the learner and the environment. According to Vygotsky, human action is mediated by tools. These tools are used as aids in solving problems that cannot be solved in the same way in their absence. Atwell, 2010 (in Atwell and Hughes, 2010) reiterated that these tools should be part of a system that allows learners to link learning to performance in practice. "The most pervasive tool of modern society is the computer and associated communication technology. Thus, it is hypothesized that greater interaction with technology in the classroom environment will enhance the learning experiences of students, Rampersad (2011).

Social cultural theories acknowledge the complex, dynamic and contextualized nature of learning in social situations, this perspective can offer rich insights into conditions affecting innovative use of technology into curriculum delivery (Goos, 2011). Learning takes place when students actively interact together with concepts while they construct new knowledge, gain insight or change understanding. Students and teacher in a classroom culture is heavily influenced by school, local, national, and global factors (Armstrong, Barnes, Sutherland, Curran, Mills and Thompson, 2005) and the manner and frequency with which technology is integrated into the classroom would be determined by those factors.

Vygotsky (1978 as cited in Nanjappa and Grant, 2003) believed that children are active in their acquisitions of knowledge. However, by focusing on the learner, the role of technology can support new understanding and capabilities, through offering a cognitive tool to support cognitive and metacognitive process. John Dewey (1916 in Koc, 2005) espoused that if we teach today as we taught yesterday, we rob our children of tomorrow. Therefore, the integration of technology into the educational district of Tobago will provide the opportunity for students to become active recipients in their learning.

This study is also informed by Mishra and Koehler, 2006 framework of Technological Pedagogical Content Knowledge (TPACK) which was rooted from Shulman's (1986) Pedagogical Content Knowledge. The framework outlines three types of knowledge teachers must master to successfully integrate technology into curriculum delivery and how they might develop this knowledge. At the heart of the TPACK framework, is the interplay among three components of learning environments: Content (curriculum), Pedagogy (specific pedagogical approaches) and Technologies (allow teachers to master the technology for this twenty-first century skills). According to this framework, having access to technology is nothing without connection to content and effective instructional strategies.

Teachers within the educational district of Tobago need training in pedagogical knowledge on how to actually integrate technology into the teaching learning environment. The training they receive should not only focus on technology literacy but how to actually integrate technology into the different subject areas. Teaching with technology requires teachers to expand their knowledge of pedagogical practices across multiple aspects of the planning, implementation, and evaluation processes Gilakjani, (2012) and Coppola, (2004).

This study is also informed by Rogers's diffusion and adoption of innovation theory. Rogers postulated that diffusion is not a single, all-encompassing theory. It is several theoretical perspectives that relate to the overall concept of diffusion. He further went on to say that there are four factors that influence the adoption of an innovation; the innovation itself; the communication channels; time and the nature of the society to whom it is introduced. According to Rogers, there are four major theories that deal with the diffusion of innovation. There are the innovation-decision process theory, the individual innovativeness theory, the rate of adoption theory, and the theory of perceived attributes.

Nutty, Davis and Walter (2002 in Botha and Akins, 2005) purported that innovation-decision process theory is based on time, knowledge, persuasion, innovation, implementation and confirmation. Rogers went on to state that once these stages are achieved diffusion results. He pointed out that there are a variety of external or social conditions that may accelerate of slow the diffusion process such as whether the decision is collectively, individually or by a central authority, the communication channels and the extent of change agents'. Rogers and Scott, (1997) in the same article posited that communication is the vital key in this theory since it provides the means by which information is transmitted between individuals and social systems creating the communication channel.

Rogers, (1995) further posited that the theory rate of adoption grows slowly and gradually in the beginning and there comes a time when the growth increases rapidly and taper off and become stable and eventually declines. Rogers went on to say that this innovation must have some 'relative advantage' over an existing innovation or the status quo. Secondly, the innovation must be 'compatible' with existing values and practices. Thirdly, the innovation must

not be ‘too complex’ for a limited time without adoption. Fourthly, the innovation must have ‘trialability’ that is, the innovation can be tested for a limited time without adoption. Finally, the innovation must offer observable results.

Summary of the Chapter

The research and literature revealed that technology integration is the incorporation of technology resources and technology-based practices into the daily routines, work, and management of schools. Mention was made of the benefits that technology can offer for both students and teachers. The historical trends were observed among many psychologists. It must be noted that technology integration is not without challenges; therefore, schools should try to eliminate these challenges if there are to equip students with the skills and knowledge for this global village. The literature also confirmed that teachers’ attitudes can impact on the integration of technology. It was also recognized that if teachers are to integrate technology effectively in the teaching learning process, professional development is key in equipping them with the skills and knowledge to integrate technology into curriculum.

Theoretical frameworks of Vygotsky social cultural theory, Mishra and Koehler, 2006 TPACK and Roger’s Diffusion and Adoption and Innovation guided this research study. Vygotsky social cultural theory posited that knowledge is socially constructed and children must be provided with the opportunity to construct their own knowledge. TPACK on the other hand articulated that in order for teachers to successfully master technology integration they must master knowledge, content and pedagogy. Rogers’s diffusion and Adoption and Innovation Theory posited that diffusion cannot be achieved until teachers go through these stages of technology integration.

Chapter 3

Methodology

This chapter described the methodology used in conducting the study. It presented the relevant justifications; the delimitation and limitation of the study; the sampling procedure; the participants' profiles; data collection methods; the processes/methods of data analysis to answer research questions; and the ethical safeguards.

Research Design

This research design used the qualitative case study paradigm to investigate the use of technology enhanced learning into curriculum in the educational district of Tobago

Justification for using qualitative research

A qualitative paradigm was utilized to capture the opinions of the teachers regarding the use of technology enhanced learning into curriculum delivery. Qualitative research sits within an interpretivist paradigm in that qualitative researchers study things in their natural settings, Denzin and Lincoln (1994 in Gall, Gall and Borg 2002 p. 24). Drawing from Creswell (2003), an emergent design was used to keep a focus on learning the meaning that the participants hold about the problem or issue and understanding that the process might have changed or shifted. Recognizing the main focus of the research was to learn about the problem from the participants and address the research to obtain that information (Creswell, 2003, p. 39).

The qualitative paradigm was chosen because this researcher was interested in the description, understanding, and interpretation, (Merriam 1988, p. 20) which allowed me to gain in-depth understanding of technology and its integration into curriculum delivery. More

importantly, the human instrument in this case was imperative to collect and analyse the data was needed. Charters and Waples (1929), Bussis, Chittenden and Amarel (2976), Leinardt and Greeno (1986) and Shulman (1988), researchers in four landmark studies, were reported by Anderson and Burns (1989) to have demonstrated that data need not necessarily be statistical, (cited in Hackett, 2002). Anderson and Burns (1989 in Hackett, 2002) went on to say that human inference can be applied when statistical analysis becomes problematic.

This study sought to investigate the use of technology enhanced learning into curriculum and thus the perspectives of the respondents experiences was of paramount importance as I sought to gain insights from the respondents' experiences and how these experiences were seen by the respondents themselves.

Justification for using qualitative case study design

This case study design which was situated in the constructivist paradigm was used for what it revealed about a phenomenon, knowledge to which we would not otherwise have access (Merriam, 2009, p. 23). Denzin and Lincoln (2000 in Zucker, 2009) declared that "investigators within a constructivist paradigm, such as that used by case study research, attempted to reconstruct participants' understanding of the social world. According to Sturman (1999) and Cohen, Mohen and Morrison (2011) a distinguishing feature of case studies is that human systems have a wholeness or integrity to them rather than being a loose connection of traits, necessitating in-depth investigation. Bogdan and Biklen (1982 cited in Wang, 2005, p.50) declare that "a case study is best represented by a funnel. The start of the study is wide and gets narrower as the case study begins."

The case study approach was particularly significant for this study, which sought to understand the use of technology into the delivery of teaching and learning. It was chosen as an approach to allow the researcher to gain insights into the problem being investigated and the opportunity to ask pertinent questions to capture the richness of the data (Yin, 2009 in Creswell, 2013).

Sampling Procedure

The participants for this case study design were selected through purposeful sampling. Purposeful sampling allowed the researcher to select those participants who produced the richest information, (Best and Khan, 2006, p.19). (Patton, 1990, p.169) argued that the "The logic and power of purposeful sampling lies in the selection of information-rich cases" where the study will illuminate the questions under study.

The rationale for choosing purposeful sampling was that it allowed the researcher to choose participants who had adequate knowledge and experiences of the topic under study. Purposeful sampling was used because this researcher wanted to discover, understand, and gain insight from a sample from which the most can be learned (Merriman, 1998). Fraenkel and Wallen (2003) posited that "researchers use their judgment to select a sample that they believe, based on prior information, will provide data they need" (p. 104-105)

The Accessible Population

The accessible population for this research study was represented by one co-educational denominational primary school out of thirty-six primary schools from the Tobago Education

District. The teachers selected for this sample were from the infant, junior and senior level of the school.

School in the sample

The School Context

The school under study was a co-educational denominational school in the Educational district of Tobago. This school overlooked the picturesque Springville Beach and the Church. This institution had a student population of one hundred and eighty-two and was managed by a female principal and a staff of eight (8) teachers, three (3) of whom completed their Bachelor of Education Programme and two (2) pursuing a Master of Education Programme. The school participated in different activities throughout the Division namely: sports, cultural and educational competitions. The school hosted its own biennial school sports meeting where all students were involved.

The school was not under any "Academic Watch" by the Ministry of Education (MOE) and had a long history of excellence in performance; furthermore, the Academic Performance Index indicated that the academic performance of the school was improving. Over the past three years this school had students who came in the first twenty (20) in the Secondary Entrance Examination (S.E.A) in Tobago. An average of two students scored under thirty percent (30%) in the S.E.A examination over the last two years. Most of the students in this institution came from the neighbouring villages.

The institution under study was renovated in 2005 to accommodate a computer laboratory which has approximately 15 computers, five laptops, 2 multimedia, two televisions, an overhead

projector, two whiteboards, 1 Video Recorder, 1DVD, I-beam, an overhead projector and a video camera. Although there were no computers attached to each class, all the teachers of this institution had access to the computer laboratory.

In the year 2008 and 2010, all the teachers at this institution underwent training with the Division of Education and while two did training with the Division of Education in conjunction with Illuminat Trinidad and Tobago Limited. The teachers at this institution were capable to some extent to integrate technology into some aspect of the curriculum, yet teachers failed to teachers use technology into their educational practices. In addition, all teachers had access to some technological device at home and utilized them on a daily basis for their personal use.

Participants

Three teachers were purposively selected for conducting this research study. These teachers were invited from the three levels within the school: Infant One, Lower Juniors and Upper Juniors comprised the sample for this study. The teachers were selected on the basis of the workshops they conducted with the Division of Education and with using the different technologies for their personal and professional use.

One of the teachers in the sample was pursuing her Master in Education Degree (M.ED), another possessed the Bachelor in Education (B. ED), while one was pursuing her Bachelor in Education Degree. Two of the teachers in the study attended teachers' college and possessed a Teachers' Diploma. The teaching experience for the three teachers ranged from two years to twenty-four (24) years and their ages ranged from twenty-two (22) years to forty-seven (47)

years. All the teachers in the sample were females, since there were no male teachers attached to this institution.

Justification for Selection of Participants

Drawing from Merriam's (1998) description of purposeful sampling, I drafted participants' profiles which guided my selection criteria (See Appendix B). The participants that were chosen were engaged in different degree programmes and completed different technologies programme with the Division of Education. By selecting "information-rich cases" Patton (1990 cited in Merriam, 1998, p.61), I hoped to unlock evidence in relation to technology enhanced learning into curriculum delivery. The rationale for choosing these participants was that they possessed a wealth of knowledge in technology use and I wanted to uncover the reasons why technology was not being integrated into the curriculum.

The sample for this qualitative research paradigm consisted of three participants who were all quite competent in using technologies into curriculum; and who were qualified to assist in the research questions outlined in the study. Furthermore, these participants had access to technology equipment both at school and at home and used these technologies on a daily basis for their personal use. With this in mind, I chose to use three participants since they were qualified within the boundaries of this research.

Pseudonyms were used in place of their real names to protect their identities. Throughout this research project I will refer to them as Ms. Starr, Ms. Earthly, and Ms. Heavenly.

Data Collection Instrument

Focus Group Interview

Primary data on the perceptions of the participants were collected using semi-structured, in-depth face to face group interviews and it was the "best way to get the best data that addresses the research questions" (Merriam 2009, p. 95). Kruger (1994 in Heary and Hennessy, 2002) declared that the focus group was, "a carefully planned discussion designed to obtain perceptions on a defined area of interest in a permissive non-threatening environment" (p.47- 57). According to Stewart and Shamdasani (1990 in Kress and Shoffner, 2001), the main advantage of a focus group was the "ability to elicit a synergistic effect that cannot be obtained through individual interviews through conversational process" p. 192.

The focus group for the session was one hour in length and held in the school's computer room. The group consisted of three participants. According to Kitzinger and Barbour (1999 in Kress and Shoffner, 2001) a focus group interview was one of the most important data collections to "obtain insights on a small group of people" (p. 190). The rationale for using this data collection instrument was to "elicit a discussion that allowed the researcher to see the world from the participants' perspectives" Kitzinger and Barbour (1999 in Kress and Shoffner, 2001) of integrating technology into the teaching learning process.

Administration of Interviews

- I sought and obtained permission to conduct the study from the principal and the participants of the school under study. Information pertaining to the study was highlighted in a letter, explaining the purpose for conducting the study. I informed the

participants how important it was for them to assist in the data collection process pertaining to the use of technology enhanced learning into curriculum delivery. The questions for the interview took the format of semi-structured open-ended questions (See Appendix D).

- The data for analysis was collected through a focus group interview which lasted approximately one hour. The interview was conducted in the natural setting (Creswell. 2003) of the school's computer laboratory. With permission, the interviews were audio taped and then transcribed verbatim using Microsoft Word Processor. The audio taping of the interview allowed the researcher to focus on the words of the participants. All the data were reviewed to obtain a general sense of the information and which reflected on the overall meaning, (Creswell 2009, p. 185).

The Interview Protocol

The interview protocol included the overarching question and the sub-questions that supported the perceptions of the teachers and a predetermined list of interview questions that related to each of the five research questions as stated in chapter one. Each research questions were mapped into themes emanated from each research question formed a guide for the interview protocol. Lofland and Lofland (1984 in Hoepfl, 1997) postulated that an "interview guides ensured good use of limited interview time; they made interviewing multiple subjects more systematic and comprehensive; and they helped to keep interactions focused."

The table underneath illustrated the research questions and the interview questions that related to the research questions.

Information Sought	Research Questions	Interview Protocol Questions
1. Curriculum development, curriculum implementation curriculum delivery	Overarching question	1, 2, 3
2. Teachers' Mindset	Sub-question (1)	1, 2, 4, 5 & 6
3. Support Systems	Sub-question (2)	1, 2, 3 & 4
4. Facilitating Conditions	Sub-question (3)	1, 2, 3 & 4
5. Challenges	Sub-question (4)	1, 2, 3, 4 & 5

Ethical Considerations and Safeguards

It is important that all researchers conducting a research study must consider the ethical guidelines designed to protect the interest of the participants (Best and Khan, 2006 p.47). Ethics has become the cornerstone for conducting effective and meaningful research. Therefore, the ethical behaviour of individual researchers was under unprecedented scrutiny (Best and Khan, 2006). Researcher must put their need to carry out their study above their responsibility to develop, maintain and sustain the well-being of the study participants.

Research studies are built on mutual trust and respect between the researchers and the participants. According to the Kantian principle, researchers must treat persons as ends and thereby respect the dignity of humanity of the people who participate. The researcher had a

responsibility to maintain respect; just as s/he wanted and expected it from the individuals participating in the study at hand. According to Fraenkel and Wallen, (2003), the researcher should establish clear and fair agreement with the participants, before they participated, which clarified the obligations and responsibilities of each, (p.57).

Permission was obtained from the principals (Appendix A) of the learning institutions and the teachers involved in the study. Letters were sent to them informing them of all aspects of the research that might reasonably be expected to influence their willingness to participate and consenting to the use of data or information for the research. This was also done to enhance credibility of the study and to increase response rates. The participants were also informed that they had the right to refuse to participate in the study or to withdraw from participating at any time (Fraenkel and Wallen, 2003, p. 57). All the necessary steps were taken to ensure confidentiality, anonymity and safekeeping of the collected data.

Timeline's Narration

Timelines are important in evaluating the feasibility of any research project. A researcher conducting a study must not underestimate the length of time the various stages that a research will take. The stages of the project were mapped out from the start of the research project to the final product. The stages of the timeline were: Conceptualizing the research ideas, background of the study, literature review, research proposal, data collection, data analysis and the write up and submission of the research project.

The timeline began with conceptualizing of the research ideas. This began in October, 2012 and ended in January, 2013. This process was ongoing since it entailed researching the

topic for the research proposal and finding the adequate literature. The topic 'the use of technology enhanced learning into curriculum delivery was of great interest to the researcher. It was observed by the researcher that schools in Tobago were equipped with up-to-date technologies and yet these technologies were not being use in the classrooms.

This topic was worth studying, since I was interested in those barriers that prevented the integration from taking place. From then onwards, I framed the research proposal for my thesis. I phrased and rephrased the topic until I got what I wanted. I sent the information to my Supervisor who further refined the topic. My visits to Trinidad gave me the opportunity to meet one on one with my Supervisor who guided me through this conceptualizing stage.

The background for this research project stemmed from the fact that computers and other technologies were at the disposal of every teacher, yet they failed to integrate technology into their educational practices. We live in a world where technology is constantly changing and the teachers within the division of Tobago are not preparing our children for the demands and challenges of the twenty-first century. The background of the study began in October, 2012 and ended in February, 2013.

Collecting information for this research project began in October, 2012 and ended in May, 2013. The literature review was very time consuming and tedious. I had to review several articles to get the literature for my study. I took several trips to Trinidad to use the School of Education library, since some of the books were not available to us in Tobago. This was a very costly exercise but it was worthwhile getting the information. I also collected information from the Internet which at times was very tedious.

I began my proposal in the month of January after getting approval from the University in the month of September. I worked along with my Supervisor to get the proposal ready. My presentation date was on March 5th 2013 and my Supervisor and I worked tirelessly sending emails back and forth to get the proposal ready for the presentation

In January 2012, I approached three teachers from the school under study who participate in the data collection process exercise. They consented verbally and this was followed up with written letters. The details of the study were outlined in the letter and the objective was to find out the barriers that prevented the integration of technology into educational practices. The data collection gathering began from March, 2013 and ended in April, 2013. The interview sessions with the participants took place in the school's computer laboratory and lasted approximately one hour. The interviews were audio taped and transcribed.

The analysis of the data began in April, 2013 and ended in May, 2013. This process was also tedious; however, the interview transcriptions were repeatedly read to reduce the data to one that was manageable. The reduce datum were colour coded and put into themes and categories. These themes that were related to the research questions were given serious considerations which were included in the narration of the study.

The write up for the study began in March, 2013 and ended in June. This process was time consuming; however, the researcher ensured that all the items in the rubric were in the final write up. The researcher was engaged in the study over a period of seven months from conceptualization of the research to final submission of the research project.

Overview of Data Analysis

Data analysis is the process of making meaning of the data (Creswell, 2009). It involves interpreting what the participants said and how the researcher observed and read. According to Creswell data analysis involves preparing the data for analysis, conducting different analysis, moving deeper and deeper into understanding the data, representing the data, and making an interpretation of the larger meaning of the data, p. 183. Merriam indicated that the analysis usually results in the identification of recurring patterns that cut through the data or into the delineating of a process (Merriam, 1998, p.11).

The data analysis procedure entailed transcribing the audio taped responses from the interview data. The participants' responses were coded in keeping with Strauss and Corbin (1990 in Creswell, 2009), 9. 183. The transcribed data were read repeatedly by the investigator who ensured that the meaning and depth of each interview was fully understood. The data were coded and rearranged into categories.

This iterative process continued until saturation of the data. The data were reduced using a method called constant comparative which generated the themes and summarizing of all the essential data. Narrative descriptive passages using rich thick description of the data based on the themes from the participants' 'emic' (Creswell, 2003) perspectives were used in an effort to communicate the findings of the analysis using references from the transcripts. The final stage of the data analysis involved the researcher's perspective of the themes derived from the original data from the interviews questions.

The internal validity of this study was ensured through participant-checking and peer-checking. A copy of the transcribed data was then sent to each respondent which offered them the opportunity to clarify or add information and to confirm the data. The coded data were sent to a colleague of mine who was also involved in the same programme. My colleague reviewed all coding of the data to conform the categories and themes that emerged from the data.

Research Questions of the study

The overarching question: To what extent have schools in the Tobago Division of Education been able to integrate technology into curriculum development, implementation, and delivery?

The sub-questions:

5) What mindset do teachers in the Tobago Division of Education display towards the use of technology in schools?
6) What support systems are available for the maintenance and upgrade of technological equipment and materials in Tobago schools?
7) What facilitating conditions prevail to help promote the introduction of technology into Tobago primary schools?
8) What are the main challenges to the introduction of technology into Tobago primary schools?

The rationale for selection of the first research sub-question was to find out teachers' perceptions as to the reasons why teachers within the educational district of Tobago were not integrating technology into curriculum. With respect to the second sub-question, the rationale

for selection of this question was to find out teachers' views on the technology support system afforded at the school for the maintenance and upgrade of the technologies. The rationale for the selection of sub-question three was to find out if this integration is to take place what conditions are available at the schools to promote the smooth delivery of the curriculum. With respect to sub-question four, the rationale for the selection of this question was to find out the challenges that existed within the educational district of Tobago that prevented the integration of technology. Finally, the overarching question was supported by all the sub-questions in relation to the perceptions as to what extent the schools have been able to integrate technology into curriculum.

Limitations of the Study

Limitations are those conditions beyond the control of the researcher that may place restrictions on the conclusions of the study and their application to other situations, (Best and Khan 2006, p.39). Explicitly stating the research limitations was vital in order to allow other researchers to replicate the study or expand on a study (Creswell, 2005). Additionally, by explicitly stating the limitations of the research, a researcher can help other researchers "judge to what extent the findings can or cannot be generalized to other people and situations" (Creswell, 2005, p. 198). Human instruments were as fallible as any other research instrument. The researcher as human instrument was limited by being human-that is, mistakes were made, opportunities were missed, personal biases interfered, (Merriam, 1998, p.20).

The data collection process could not be generalised due to size of the sample in relation to the population of the study. The information accumulated was unique to the school understudy and may not reflect what was happening in other schools in Trinidad. The study was also limited

to the perceptions of three participants and does not include the perceptions of the participants who were not included in the study. Participants' willingness to disclose their feeling about relevant pertinent information may have impacted on the study. Time constraints may have pose limitations on conducting the study since a case study requires longer time to go in-depth with the study. Due to this time constraints some aspects of the study may have been overlooked.

Delimitations of the Study

Delimitations are the boundaries of the study (Best and Khan, 2006, p. 39). In scholarly research, the goals of the research outlines what the researcher intended to do; without the delimitations, the reader will have difficulties in understanding the boundaries of the research. In order to constrain the scope of the study and make it more manageable, researchers should outline in the delimitations – the factors, constructs, and/or variables – that were intentionally left out of the study, (Levy and Ellis, 2009). The study was restricted to one primary school in the educational district of Tobago and therefore the findings cannot be generalised. Participation of the study was also delimited to the perceptions of the three teachers and as such the results cannot be generalized or warranted.

Summary

In summary, this qualitative case study design sought to investigate the use of technology enhanced learning into curriculum delivery within the educational district of Tobago. The study utilized a semi-structured focus group interview with three participants. Data were transcribed using Strauss and Corbins (1990) method to develop patterns, categories and themes. Finally, member checking and peer debriefing were used to establish the validity of the findings.

Chapter Four

Analysis and Presentation of Findings

This chapter deals with the data analysis and presentation of findings for the five research questions that guided this case study design of teachers' perceptions of the use of technology enhanced learning into curriculum. In order to narrow the focus on the qualitative study, a series of four sub-questions follows the central questions. The questions that guide this research study are found in Chapter 3 of this document.

Interview questions from the overarching question and research question (See appendix D) were drafted and transcribed in keeping with Strauss and Corbin (2008 in Kolb, 2012) and Creswell (2009), p.183. Research sub-question four will be used for operationalization.

Research Sub-question four:

"What are the main challenges to the introduction of technology into Tobago primary schools?"

Five underlying themes were predominant in the study which can be categorized into the following.

- Professional Development
- Teachers' Attitudes
- Lack of Resources
- Teacher Workload
- The layout of the physical structure

Interview question # 1: What could be done that would help you improve the area of integrating technologies in the classroom?

Professional Development

Teachers reported that lack of ongoing and continuous professional development prevents the integration of technology enhanced learning into curriculum. Strong disheartenment was expressed by all the participants; they felt that the training they received from the Division of Education was not adequate to integrate technology into the teaching/learning process. In elaborating Ms. Earthly explained:

> "I need to be trained; just knowing the basic skills in computing operating the laptops and the computers are not enough. I need to be taught how to integrate technology into classroom instructions. Right now what I am doing is just trial and error."

Ms. Heavenly agreed with Ms. Earthly, however, she expressed her disappointment:

> "I need refresher courses, ongoing and continuous training and this thing about continuous training if I don't use it, then it is of no use to me because I will not remember so I need a refresher course….."

Ms. Starr echoed the same sentiments as Ms. Heavenly and Ms. Earthly; however, she felt the training she received was inadequate for her to infuse technology into curriculum. She lamented that, "I need continuous and ongoing training. I need professional development workshops on how to actually integrate technology into the curriculum."

Interview Question #2: What prevents teachers at this institution from implementing technology into curriculum?

Teachers' Attitudes

Teachers 'attitudes were identified among the respondents as a significant challenge that prevent the integration of technology into curriculum. Respondents felt that since technology integration into curriculum was not assessable, it was not a mandate from the Ministry of Education and it was time-consuming. In elaborating Ms. Heavenly explained:

> "No one said we have to do it; as a matter of fact it is not mandated or compulsory from the Ministry. Another problem is that I will shy away from it and I will not use it because I have to take the technology to and from the classroom….and setting up is very time-consuming……"

Ms. Earthly shared the same view as Ms. Heavenly: however, she felt that technology is not assessable and teachers were incompetent to integrate technology into curriculum. In elaborating she articulated:

> "It is not tested…..teachers will shy away from it knowing they are not competent to use the technology."

Ms. Starr shared a different view from Ms. Heavenly and Ms. Earthly. She felt that technology integration is a distracter to some of the students and very time consuming. She articulated:

"Technology integration will be a distracter to some of the students and as such, time will be wasted."

Lack of Resources

Lack of resources was identified as one of the barriers that prevented the integration of technology enhanced learning into curriculum. This view was expressed by the teachers in the study. In elaborating Ms. Heavenly lamented:

"…….. the number of children to the computers in other words the student to computer and the setting up….."

Ms. Earthly on the other hand reiterated that they needed a support system from the Division to assist teachers in the implementation of technology into curriculum delivery. She asserted that, "support systems from the Division of Education to assist teachers."

Ms. Starr also shared a different view from Ms. Heavenly and Ms. Earthly, she posited that the computer laboratory was too small and the classroom environment was not conducive to learning. In lamenting she explained, "The computer laboratory is too small and the classroom is not conducive to learning."

Professional Development

Teachers in the study felt that they lack the pedagogical knowledge on how to implement technology into the curriculum and they needed professional development to infuse technology into curriculum. In elaborating Ms. Earthly articulated: "I need professional development to integrate technology into the curriculum the correct way."

Interview Question #3: What barriers prevent teachers within the educational district of Tobago from implementing technology into curriculum?

Lack of Resources

This theme explored resources that impeded the integration of technology into curriculum delivery. All the teachers reported that lack of technologies prevented them from infusing technology enhanced learning into the teaching and learning process. This theme was collapsed into four sub-categories: lack of technology support, lack of administrator support and lack of access.

Lack of Technical Support

Teachers reported that lack of technical support within the Division prevented them from integrating technology into curriculum delivery. Ms. Earthly expressed her views by stating

> "Not enough resources……lack of support system……..readily available technicians are barriers that prevent teachers from implementing technology within the educational district of Tobago."

Lack of Access

A strong dishearten was expressed by Ms. Heavenly. She reported that limited access to the internet prevented her from integrating technology into the classroom and as such this discourages her from using the technologies. She articulated:

> "We are given the internet but it is limited so if you log on and you cannot access what you want it discourages teachers."

Professional Development

Professional Development was highlighted by the teachers in the study as one of the main barriers that impeded the integration of technology into curriculum. Teachers felt that they needed professional development from the level of the school and from the Division of Education. In elaborating Ms. Heavenly reiterated, "…..professional development workshops both in-house and out from the level of the school and from the Division of Education."

Interview question #4: What are teachers concern regarding the implementation of technology into curriculum delivery?

Teachers' Workload

Participants shared their concerns about the demands of the curriculum. They felt that the curriculum was very demanding and teachers regarded technology integration as very tedious. In elaborating Ms. Earthly postulated:

> "We have a packed curriculum and we tend to leave technology at the background and teach the core subjects such as mathematics, science and language arts. We will use it but it is not a priority."

Ms. Heavenly echoed the same sentiments as Ms. Earthly; however, she felt that technology integration is not time consuming and once structures are in place teachers can have a very productive day. She further stated that technology is not taught separately but is infused into the different subject areas. She declared:

> ".....teachers think it is 'too much work.' I mean we have to prepare for everything. In your daily duties, teachers have to research prepare, organise and at the same time do

activities with the students, so I deemed it as 'too much work.' Teachers have the perception that it is plenty work but technology in teaching is not hard but if everything is put in place, your laptops set up, projectors set up and the room is ready; we can teach a number of subjects in one day. Gone are the days when we say that it is impossible because it is not taught separate but integrated into the different subject area."

Ms. Starr agreed with Ms. Heavenly and Ms. Earthly; she felt that technology integration into the curriculum is time consuming and content timetabled for the day will not be covered. In expressing her views she stated:

"….because at the end of the day you have to cover certain subjects. The use of technology is time consuming for instance in teaching concrete, taking conceptually takes time. It can be very time consuming and as a result the subjects listed on the timetable for that day will not be covered."

Interview Question#5: What are the perceived problems associated with using technologies during classroom instructions?

The layout of the physical structure

Participants expressed their view that the layout of the physical classroom prevented them from integrating technology enhanced learning into curriculum. They mentioned that the classrooms are the old barn type structure and it is not entirely enclosed causing distraction to the nearby classes. In elaborating Ms. Heavenly explained:

"…….if technology is being used in the classrooms, they must be entirely enclosed. If we are using the overhead projectors there will be lighting factors. Since the classrooms

are not enclosed the sound factors can be a distracter to the other classes because the students will be so motivated and they will distract the nearby classes. Another perceived problem is that we do not have a room that is set up where the children can experience technology learning so we have to be moving projectors, setting up projectors and this can be time consuming….."

Mr. Earthly expressed her disgust by stating that the space within the classroom does not cater for cooperative learning. In elaborating she expressed:

"…….in terms of space within the classroom, the students cannot get to move around….and if a teacher has to take the students to the computer lab, time is lost getting them from the class to the lab and back."

Ms. Starr shared the same perspective from Ms. Heavenly and Ms. Earthly. She lamented that:

"…….the computer laboratory is too small to accommodate the number of students and the structure of the classroom makes it impossible……"

TABLE 2

TABLE 2 – SHOWING DATA ANALYSIS

Research Question	Emergent Themes	Category Themes
To what extent have schools in the Tobago Division of Education been able to integrate technology into curriculum development, implementation, and delivery.	Train teachers, workshops and professional development and training sessions, readily available technicians, personnel in place to assist teachers, adequate resources, someone with skills and technical support	Professional Development Resources
What mindset do teachers in the Tobago Division display towards the use of technology in schools?	Add substance or improve the content, using technology to excite and get the attention of the students, engagement, improve the teaching and learning process, motivates learners, enhance and engagement higher order thinking skills, preparing students for this global village, knowledge at our fingertips, provide students with opportunities to	Motivational Effect Engagement

	use what they know, constructivism form of learning teachers' de-motivation , time consuming, it is not compulsory, limited space in the classroom, discouraging, teacher centred method of instruction	Teachers' Attitudes
What support systems are available for the maintenance and upgrade of technological equipment and materials in Tobago schools?	Not enough technical support, readily available support, collaborate teacher efforts, access to some pertinent sites is banned, limited support, administrative support, principals as administrators can put measures in place, principal is responsible for providing resources and training, principals should put forward recommendations	Support
What facilitating conditions prevail to help promote the introduction of technology into Tobago primary schools?	Hop-a-Long programme, Availability of computer laboratory, availability of resources in the schools…….. some aspect of training, students will	Resources

	interact better with computers, teacher centred classroom……. ……limited space to work with, traditional method of teaching, training in basic computer skills using Microsoft processing, spreadsheet and power point.	Professional Development
What are the main challenges to the introduction of technology into Tobago primary schools?	I need to be trained, I need refresher courses, ongoing and continuous training, I need professional development, know how in training, in-house and out-house professional development workshops Teachers' incompetence, now one said we had to do it, it is not mandated or compulsory, I will shy away from it, Too much work, pack curriculum, subjects listed will not be taught, Computer lab too small, availability of space, barn type structure of the	Professional development Teachers' Attitudes Teacher Workload The layout of the

	classroom, lack of support, up to date resources, lack of access, lack of time, availability of resources, limited internet access, software and student friendly resources	physical environment Lack of resources

Presentation of Findings

The findings for the four research sub-questions will be presented in this section of the paper. Themes from the interviews were generated and the basis for my findings drawn from the study is as follows:

Overarching question: To what extent have schools in Tobago Division of Education been able to integrate technology into curriculum development, implementation and delivery?

My first finding revealed that schools in the Tobago Division of Education have not been integrating technology into the curriculum development, implementation and delivery due to problems such as resources, professional, limited technical support and obsolete resources.

In answering research question two: What mindset do teachers in the Tobago Division of Education display towards the use of technology in schools? I made the following ensuing finding. Some teachers within the Division of Education displayed negative attitudes towards the integration of technology. Based on results of the findings, teachers felt that lack of motivation prevented them from integrating technology in the teaching and learning environment.

The findings for the third research sub-question: What support systems are available for the maintenance and upgrade of technological equipment and materials in Tobago Schools? In answering this research question, the findings revealed that technical support, administrative support and teacher support are available for the maintenance and upgrade of technological equipment and materials in Tobago Schools.

The findings for the fourth research sub-question: What facilitating conditions prevail to help promote the introduction of technology into Tobago Primary Schools? In answering this research question, the findings revealed that teachers within the Tobago district have available resources, training and a programme (Hop-a- Long) to integrate technology into the schools of Tobago.

The findings for the fifth research sub-question: What are the main challenges to the introduction of technology into Tobago Primary Schools? In answering this research sub-question, the findings revealed that lack of professional development, lack of support system, teachers' attitudes, the layout of the physical structure and teachers' workload were challenges that prevented the introduction of technology into the primary schools of Tobago.

Summary of the Findings

Despite the consensus among the teachers that technology integration into curriculum engages and motivates the learner, adds value to the teaching learning process, stimulate interest and make learning fun and meaningful; teachers discussed many barriers that impeded the integration of technology into curriculum. The barriers mentioned were: Lack of resources such as limited technical support, inadequate and outdated resources, time and lack of access coupled with professional development resulted in the teachers' inability to integrate technology into curriculum. Teachers articulated that the technical support was limited and they were not housed on the school's compound but at the Division of Education who had to be accessed on demand. They discussed that the principals as administrators were responsible for providing adequate resources and training for all the teachers.

The perceptions of the need for professional development and teacher training were strong among the teachers in the study. Teachers felt that the Division of Education did not place much emphasis on technology integration into the teaching and learning process and as a result of this they were reluctant to integrate it. Although teachers were taught to use the technologies they were only taught the basic skills of using programmes such as Microsoft Word processing, Excel spreadsheet and Power Point and not how to actually integrate technology. Teachers postulated that professional development workshops should be ongoing to as to allow continuity, and as such they can readily embrace technology integration. Teachers also felt that the workshop should be done within the school and at the Division of Education

The layout of the physical structure of the school was another barrier discussed by all the teachers. They felt that the computer laboratory was too small to accommodate the number of students and there was insufficient space within the classrooms to cater for technology integration to take place effectively. Teachers discussed that it was very time consuming to set up the technologies in the classroom and the lighting and sound factors interfered with the nearby classes, they also felt that moving the students to and from the computer laboratory was also time consuming and as a result discourages teachers from using technologies in the curriculum.

Chapter 5

Discussion and Recommendations

The chapter focused on the discussion and recommendations of the findings of the use of technology enhanced learning into curriculum in the educational district of Tobago. The conceptualizing of findings within the extant literature was in keeping with the recommendations of Mills (2007 in Sanchez, 2011). Mills (in Sanchez) suggest that "researchers draw connections between their findings and those that they have uncovered in their review of current literature."

Reprise of the Findings

Emerging from the findings of research sub-question four, teachers perceived the barriers of technology enhanced learning into curriculum based on five underlying predominant themes.

- Professional Development
- Lack of Resources
- Teachers' Attitudes
- Teacher Workload
- Layout of the physical structure

The findings from the study revealed that teachers cited lack of training/professional development as one of the main impediment for technology integration. Teachers under study emphasised that the training they received taught them basic computer skills. Support was found in Milken Exchange on Educational Technology (1999) and Goodman et al. (2004). The findings from the Milken Exchange revealed that general teacher-training programmes do not provide future teachers with the kinds of experiences necessary to prepare them to use

technology effectively in the classrooms. This finding was corroborated with Matzen and Edmund (2007), Bauer and Kenton (2005) and Ertmer et al (2003 who posited that teachers were provided with adequate technical skills but they lack knowledge on how to integrate technology in teaching and learning process.

Consistent with the findings of Demi (2009) and Liaw (2005), teachers under study felt that since technology was not tested and was not mandated by the MOE; it was not compulsory for them to integrate technology into teaching. Similarly, Kersanint et al. (2003) contradicted the findings of this study. They purported that teachers with positive attitudes felt more comfortable incorporating technology into curriculum. A study conducted with Arabian Teachers in Israel also contradicted the findings of the teachers under study. The results of the finding revealed that more that 70% of the participating teachers had positive perceptions of their competence in technology in the teaching (Baya'a et al, 2013). Roger's (1995) pointed out "one of the major factors affecting people's attitudes toward a new technology was related to the features of the technology itself. Veen (1993) concurred with Rogers who concluded that teachers will adopt new technology "if they can use them in accordance with their existing beliefs and practices."

The findings also revealed that lack of technology support impeded the integration of technology into curriculum. This finding was corroborated with Jones (2004) and the findings of a study conducted in Turkey by Yilmaz (2011). The result of the findings revealed that lack of technology support impeded the integration of technology. Support was also found in Silicia (2005) which found that lack of technical support was one of the major barriers that resulted in computers being underutilized. Korte and Husing (2009) contradicted the findings of Silicia, Jones and Yilmaz. They concluded that schools in Britain and Netherland have appreciated the

significance of technical support. Teachers under study felt that the technical support was housed at the Division of Education and had to be called on demand. They also felt that the technical support within the division was not readily available.

With respect to administrative support, teachers under study reported that lack of administrative support both from within the school and the Division of Education was lacking, contradicting with the findings of the school under study, Hess (2003) revealed that administrators have changed as a result of the increased use of technology. Support was also found in a study conducted by Cakir (2012). Fullan (2001) declared that school leader should possess characteristics such as understanding of change, openness to innovation and a willingness to encourage learning and teaching. Ronnkvist, Dexter and Anderson (2002) supported the finding of this study who posited administrators need to lend both instructional and technological support.

Limited access to the internet and the student to computer ratio were reported by the teachers under study. This finding was corroborated with ACOT (1995) which states that this journey through the various stages is enhanced "when teachers and students have unlimited access to technology in the classroom. Support was also found in Al-Alwani (2005) who found that having no access to the Internet during the school day was impeding technology integration in Saudi schools. Support was also found in the National Centre for Education Statistics (2000) report revealed that over 50% of the respondents used computers for research and lesson preparation in their schools. About 78% of the respondents complained of inadequate access to computers in classroom.

Consistent with the findings of Samarawickrema and Stacy (2007), this study revealed that teachers' workload prevented them from integrating technology into curriculum. Teachers were of the opinion that if technology were to be integrated into the curriculum it would not be a priority since they have to concentrate on the core subjects such as mathematics, science and language arts. Support was also found in the findings of Neyland (2001) which revealed that the workload of teachers was alarming. Fullan (2003) also agreed that for teachers to realize the aims of educational system as well as implementing new initiatives, it is necessary to lessen the workload of teachers.

Teachers reported the layout of the physical structure of the school prevented them from integrating technology into the teaching and learning process. Some felt that the computer laboratory was too small and the available space within their classroom was not adequate for the students to move around. The teachers also reported that taking the students to the computer laboratory and back was very time consuming. The results of these findings was substantiated by Sheingold (1993) who conducted a quantitative study with students in 4-12 grade level and found that one of the top seven barriers to technology integration was problems with space. Support was also found in Loveless (1996) who posited that when teachers have to take students to and from the computer laboratory it leaves the teachers scrambling for time to get their students onto the computers. This finding was also corroborated by Jenson and Rose (2006) who purported that computer-based tools and resources in teaching often involves changes in the working environment of lessons, change of room location and the physical layout and change in the class organisation.

Recommendations

The following recommendations have been provided as a guide for any attempts designed to bring about the integration of technology enhanced learning into curriculum delivery. The use of technology enhanced learning into curriculum was examined in the context of teachers' mindset, challenges, support system, facilitating conditions and the extent to which schools in the Tobago Division were integrating technology into curriculum development, implementation and delivery.

Based on the results from the findings, teachers felt that for them to integrate technology into the curriculum some barriers needed urgent attention. For this to be realized it is recommended that systematic attention needs to be focused on teacher training and professional development. The Division needs to be aware of the important influence that teachers' perceptions have on integrating technology on their practices and incorporate strategies into the professional development programmes to reduce teachers' perceptions and increase their commitment to relevant training and opportunities and ongoing support, Ertmer, Ottenbreit-Leftwich and York (2003). It is therefore submitted that the professional development workshops be conducted within the schools and at the Division. These workshops should exposed teachers to pedagogy, content, technology and knowledge so that they can integrate technology effectively in the teaching and learning process. It is also recommended that with the introduction of the Continuous Assessment Component (CAC) Programme, the Minister of Education ensure that some aspect of technology integration be assessabled so that implementation of technology in the primary schools will be done.

Technical services and support are essential if the integration of technology is to take place within the primary schools of the Division. It is therefore recommended that the Division of Education hire experts in the field of technology to assist teachers and to upgrade those resources as they become obsolete so as to reduce all or most of the challenges. It is also suggested that the Division provide available resources within the schools and to put measures in place (policies and monitoring of schools) to ensure that these resources are utilized properly within the schools.

Administrators must support the efforts of their staff to adopt new technologies in order to achieve new levels of productivity and achievement. They need to empower teachers and learners in new ways and then learn how to manage these empowered teachers and learners. School administrators should encourage teachers to integrate technology into curriculum and help them obtain the tools and resources necessary for success. The principals as administrators should be proactive so as to develop plans and formulate policies to ensure that teachers integrate technology into curriculum.

The administrators must ensure that correspondence be sent to the Division of Education to ensure that technical support are done frequently in the areas of staff support and for the upgrading and maintenance of all the technical equipment available at the school. They must ensure that the technologies are up-to-date so to prevent problems with troubleshooting and internet issues along with password problems. According to Fullan (2001), (cited in Cakir, 2012) an effective school leader should possess characteristics such as an understanding of change, openness to innovation and a willingness to encourage learning and teaching.

The teachers themselves should also be proactive and be responsible for their own professional development. It is therefore recommended that the Ministry of Education put measures in place to ensure that teachers make use of professional development programmes to ensure that they keep up to date with new knowledge and skills to prepare our children for lifelong learning and to face the challenge and demands of this global village.

Access to resources is imperative if technology integration is to be integrated into curriculum. The principal as administrator should liaise with the Division of Education to ensure that there are enough computers available at the school. S/he should ensure that the division puts measures in place to ensure that the schools have adequate internet access for teachers to implement technology into curriculum if they have to equip students with the knowledge and skills for the twenty-first century and beyond.

Conclusions

Based on the literature, teachers typically encounter a variety of barriers that make the integration of technology difficult, Ertmer et al (2003). Through the use of literature, the concepts of technology integration, historical development of technology education, teachers' mindset, support systems, facilitating conditions and the challenges to technology integration were explored within this study. The study revealed that technology is beneficial both to teachers and the students; however, they are certain challenges that impede its integration within the teaching and learning environment. The absence of systematic training to prepare teachers to integrate technology in their pedagogy, the limited technical and administrative support system, the physical layout of the school, teachers' perceptions and the demands of the curriculum are

some barriers that hindered the implementation and institutionalization of technology into Tobago Primary Schools.

It is apparent that teachers were able to identify the factors through their own observations and experiences. As such, one can conclude that the main inhibitors to technology enhanced learning into curriculum include teacher training and professional development, teachers' perceptions, limited or lack of support systems, demands of the curriculum and the physical layout of the schools.

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Appendix A

Letters to the Principal and Participants

The Principal

[redacted]

Dear Madam

In partial fulfillment of the requirements for the completion of the Masters in Education Degree at the University of the West Indies, I am conducting a research study in which I will use the qualitative paradigm on technology and its use in curriculum delivery. At present, there is a large body of literature that describes how effective technology is in curriculum delivery, but I am interested in first-hand knowledge on what prevents the integration of technology into curriculum delivery at this institution.

I am therefore, seeking your permission to conduct this study with two teachers from your institution. I assure you that the information obtained in this interview will be kept in strictest confidence and will only be used for this research project. The identity of the school as well as the participants involved in the study will be kept in strictest confidence.

Thank you for your kind consideration

Respectfully yours

_____

Debbie Guy-Phillips

Adopted from Gall, Gall and Borg, (2002)

The Participant

[redacted]

Dear Participant,

In partial fulfillment of the requirements for the completion of the Masters in Education Degree at the University of the West Indies, I am conducting a research study in which I will use the qualitative paradigm on technology and its use in curriculum delivery. At present, there is a large body of literature that describes how effective technology is in curriculum delivery, but I am interested in first-hand knowledge on what prevents the integration of technology into curriculum delivery at this institution. I want to capture realistic scenarios including breaks or any interruptions that may influences during the data collection process.

If you decide to participate in my study, there are certain information I must enlightened you on.

1. I will conduct a face to face interview with you to find out about your knowledge of technology and curriculum delivery. The interview session will last less than one hour and will be tape recorded to transcribe your comments for future references.
2. After collecting the data for my study, I will analyse the results. You will be given the opportunity to read the portion of my research project that pertains to you.

Participation in this study is voluntary. Your decision whether or not to participate will not affect your relationship with the researcher. During the interview, you are free to withdraw your consent and discontinue participation at any time without penalty. The study will be conducted

during the school hours. Any information that can be identified with you will remain confidential and will not be disclosed without your permission. I will use pseudonyms to protect your identity from the other participants.

.Yours sincerely

…….

DEBBIE GUY-PHILLIPS

Gall, Gall and Borg, (2002)

Appendix B

Participants' Profile Questionnaire

Teachers' Initial: _____ Age Range _____

Gender:_____ Ethnicity: _____

Type of School:_____

Class Level_____

Qualifications: _____Institution:_____

Population: Student _____ Teacher _____

Teaching Experience:_____ years

No. of Computers for Staff/Students: _____

List of personally owned digital and multimedia technologies:

_____
_____
_____
_____
_____
_____

Appendix C

Data Analysis

Colour Coding the Interview Data

COLOURS AND THEMES

BENEFITS OF INTEGRATING TECHNOLOGY INTO CURRICULUM

RESOURCES

TEACHER TRAINING AND PROFESSIONAL DEVELOPMENT

SUPPORT SYSTEM

TEACHERS' WORKLOAD

THE LAYOUT OF THE PHYSICAL STRUCTURE

TEACHERS' ATTITUDES AND BELIEFS

USES OF COMPUTER

TEACHER CENTRED/STUDENT CENTRED

Adopted from Margaret Dennis, (2007)

Appendix D

Interview Protocol Questions

The overarching question:

To what extent have schools in the Tobago Division of Education been able to integrate technology into curriculum development, implementation, and delivery?

1. What resources are available promote the introduction of technology into Tobago primary schools?

   Ms. Earthly – We have laptops, desktops, multi-media. I Pad, IPod, white board, laptops, desk tops, Internet, tablets, E-beam and radio.

   Ms. Heavenly – We have the multi-media, white board, the Internet, software available to use with the Internet and the multimedia that's the projector.

   Ms. Starr – They have projectors, television, e-beam, VCR, DVD and video camera

2. What can the Division do to encourage teachers to use technologies in the classroom?

   Ms. Earthly – The division can train teachers how to actually integrate technology into curriculum. We need workshops and professional development and training sessions on how to actually integrate technology where the curriculum is concern. We also need readily available technicians to assist us with the hiccups during the delivery of instructions. The Division must have personnel in place to assist teachers with the technology.

   Ms. Heavenly – Personally, I think they provide resources that are adequate, up to date and functioning. We also need personnel in place to train teachers and to provide

assistance; they always have to be coming to see if things are up to date and to check to see if teachers' needs are fulfill or provided and to see if the technologies are working.

Ms. Starr – We need personnel to work along with schools and to help teachers to better able use the technology in classroom instruction. The Division should assign personnel to school to assist teachers.

The sub-questions:

What mindset do teachers in the Tobago Division of Education display towards the use of technology in schools?

1. What do you understand by the term technology enhanced learning?

   Ms. Earthly – technology enhanced learning is using technology such as the computer, cell phone, the tablet, iPod, multi-media and those kinds of devices to add substance or improve the content on how we deliver the content of the lesson.

   Ms. Heavenly – the term technology enhanced learning is using whatever means of technology in the whole process of pedagogy in teaching, learning, research, activities and projects. Both teachers and students will be involved in the process of teaching and learning. Technology enhanced learning is using technology to excite and get the attention of the students, so when they are involved in the learning they are so interested that it helps them to remember, to associate, store information whatever they are learning in their brains and they learn because the engagement may be in the touching and the doing and they can store this information in their memory banks where they will remember for a long time.

In activities they will be so involved in terms of the e-beam, they will be engage, if you present a story online seeing the whole activity in the story will help them to be engaged in their learning and thus stimulate their interest.

Ms. Starr – technology enhanced learning is using technology to improve on the teaching practice or to improve in the teaching and learning process.

2. What are your perceptions of integrating technology into curriculum?

Ms. Earthly – Using the technology in all the subject areas, for me it is a good thing although there are many challenges. I see technology as computers. If a teacher has to take the students to a fixed area, time is lost and as a result teachers tend to gravitate to the teacher centred method of instruction because of those shortcomings. Another problem is that we do not have individual classroom and as such it disturbs the nearby classes. On the other hand, students will be excited just knowing they are using the technology, however, if things are not in place students will not be provided with the opportunity to use higher order thinking skills because of limited space.

Ms. Heavenly – I think it is the best way to teach in terms of preparing our children for the twenty first century. Gone are the days when we have to tell students now they have to experience things for themselves. That's how they learn, that's what they remember, and that's how they will organise their learning in their memory. We are living in a world where technology is advancing, today it is made tomorrow it is obsolete. So we are preparing students to live in this global world so whatever they do in the classroom something must be attach so that they see learning can also take place using different medium of technologies.

Ms. Starr – I agreed with what Ms. Heavenly say however, I think that since it is not assessed by the Ministry of Education teachers will not be motivated to use technology into curriculum and as such will continue with the same traditional methods of teaching.

3. What are teachers' attitudes towards the use of technologies in the classroom?

Ms. Earthly – most know if not all the members of staff they know some aspect of the technology they are knowledgeable but in terms of actually integrating it into the classrooms. They may use if in preparation of their lessons, getting the content, pictures, but to actually set up an e-beam or laptops teachers will find it time consuming; and to move the students from one place to another, teachers will find it time consuming.

Ms. Heavenly – teachers are not that motivated. It is not compulsory, nobody made it compulsory for us so teachers may not use any form of technology in the classroom; so our students miss out sometimes on exciting learning experiences that can boost their interest.

Ms. Starr – The limited space in the classroom discourages teachers and allows them to lose interest. It will be a little discouraging to me to some extent but somehow I will try to incorporate it into the curriculum even if it means getting all the students around the computer and allow them to see what is taking place.

4. What are teachers' beliefs towards the integration of technology into curriculum?

Ms. Earthly - It can and should be done. It gives you a wider scope in terms of knowledge at our 'fingertips,' preparing students for the world of work, the world as a global village helping them aware that they can have information at the touch of a button.

It is a good thing even it is not tested we can still use it and the students will gravitate to it. We as teachers must use the things that students are drawn to. When we use technology into the teaching learning process we cater for the different intelligences that exist in our classrooms.

Ms. Heavenly – My belief is this is what children know and at this point in time we should use what they know to help them to learn, therefore, we should provide them with opportunities to use what they know. It is very weird when children are very advance in technology and they can learn from it when we use the 'dinosaur' way of teaching. My belief is that we are living in this technological era so as teachers we should use what the children know to teach them.

Ms. Starr – it would stimulate interest and enhance the teaching and learning process. It will allow children to use the things that are familiar to them. The students will better able to understand.

5. What are the benefits for students and teachers using technologies during classroom instructions?

Ms. Earthly - They will be motivated, they will be eager to learn. It will enhance and engage them. It will be something they love so they will gravitate to it. Students can work at their own pace with the guidance of the teacher. They can work on projects and other assignment given by the teacher. The students can explore with the guidance of the teacher. in terms of the teacher will be up to date not within her scope of Trinidad and Tobago but worldwide and that will be a plus. They will be exposed to different

strategies outside of their comfort zone. It helps you to add value to the teaching learning process. It is also more attractive for the children to participate.

Ms. Heavenly – improve and enhance learning. For this kind of learning to be meaningful, the teacher must be prepared since he or she is the one who initiates the learning. It follows the constructivist form of learning where teacher is the facilitators as she supply all the learning needs, materials, activities and the technologies and the students base on what they know about research they interact, they share, they help one another learn so there is more group work, peer-learning, they learn from one another and the students build on what they know.

Ms. Starr – using technology will make learning fun and meaningful for the students. It motivates both teacher and students since they will be both interested in the learning, the teacher will be interested in developing and preparing work so that they can get what is best for the students. It also engages the learners and as such enhances them in the learning process.

What support systems are available for the maintenance and upgrade of technological equipment and materials in Tobago schools?

1. What kind of support/services is available to encourage teachers to use technologies in the classroom?

Ms. Earthly – we were given these computers and other technological devices and not enough technical support. The technician is not situated on the plant but you can call

him, it does not mean that he will come in time because the technicians are housed at the Division of Education.

Ms. Heavenly – the little support we have as Ms. Earthly mentioned we have technical support attached to the school must they are not readily available, we have one or two persons who can help. We have these collaborative teacher efforts where the teachers help one another with what little they know, however, the technical support is key in the integrating of technology and as a result of this teachers felt that they are not capable enough to troubleshoot or solve the hiccups.

Ms. Starr – I agree with Ms. Earthly and Ms. Heavenly, however, support in terms of equipment and support in terms of the man power in terms of teachers.

2. What are you perceptions of the level of access to technology and technology support afforded to you at the school?

Ms. Earthly – We have access but not readily to our convenience. Support limited in terms of access. In the event someone wants to do a quick research and problems occur, we cannot get the technical support readily since the technicians may be at another school and have to be summoned on demand.

Ms. Heavenly – We are not provided with the availability of the World Wide Web we are given the internet but it is limited. It is of no use to me and to the students so what I want to access for the teaching and learning I can't use it. Since the Internet fluctuates frequently and access to some pertinent sites is banned this discourages teachers from using the technology.

Ms. Starr - Limited support. Access to the Internet is limited and000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000

not available when needed most. One day you come and the internet working another day you come and it is not working. So if you want to do a quick research it is not available for you at that time.

3. Do you believe that principals as administrators have a crucial role to play in the implementation of technology into curriculum?

   If No: Explain

   If Yes: Explain

   Ms. Earthly – Yes, technology is not really compulsory from the Ministry of Education perspectives that we have to teach it. But in terms of the principal if is she sees it as a good thing she could have her own in-house arrangement. We could come to an agreement because at one point in time we had it timetable and the children were very elated in attending their classes and one could have seen what they were learning. So it is a good thing because it is part of us now. It is something our lives have becoming to revolve around so it is a good thing but I think in terms of the principal as administrator, the principals can and put measures in place. Since it is not tested, we cannot go full scale but at least we can expose the students to some extent.

   Ms. Heavenly – I think the principal is responsible for providing resources and training and whatever is available for teachers to use seeing that there are only advantages to

using the technology into the classroom. The principal is responsible for making sure that are enough resources, there is training of teachers, and there is the use of it in the classroom as well..

Ms. Starr - The principal knows the needs of the students and teachers and s/he should see it necessary to ensure that provisions are in place to integrate technology into the curriculum. The principal should put forward recommendation to the personnel of the Division of Education that they see it necessary for their schools to integrate technology into curriculum.

4. Do you believe that technical support afforded at the school has a crucial role to play in the implementation of technology in curriculum?

   If No; Explain

   If Yes: Explain

   Ms. Earthly – Yes I believe because many times in using the technology one is face with glitches or hiccups in getting these things to work and if they are no technical support readily available at the school. The lessons tend to go "as tray, "and sometimes these technologies fail to function.

   Ms. Heavenly – Yes, we need someone with skills and technical support because most teachers will have the knowledge but not specialized or have that expertise in troubleshooting, setting up as well, after setting up putting back together and storage.

   Ms. Starr – Yes I do as Ms. Earthly spoke about the glitches or hiccups right now. At this school there is only one special laptop to work with the multi-media projector and if the teacher does not know the teacher will be trying trying and s/he will have a problem

because they do not know which laptop works with the multimedia, so having a technician here would be very helpful.

What facilitating conditions prevail to help promote the introduction of technology into Tobago primary schools?

1. Do you think technology can better meet the needs of special needs? How so?

Ms. Earthly – Yes, there was a programme called 'class work' by the Ministry of Education which had the whole syllabus and teachers could have utilised it with his or her students or the students can access it anytime on their own time and at their own pace. Some schools have access to a programme called Hop-a-Long where the students can use at their disposal and which cater for students with special needs.

Ms. Heavenly – Yes it does, to me technology caters for all types of learning whether advance or proficient, even the slow learners will be motivated and interested in using the technology and they will interact better with the technology than the teachers, because they are doing, seeing hearing and touching. So it caters for all the needs of the students; even the slow learners.

Ms. Starr – I agree with Ms. Earthly and Ms. Heavenly, however, teachers have some aspect of training and there is availability a computer laboratory and technologies within the system even if they are obsolete.

2. Would you describe your classroom as being more student-centered or more teacher-centred? Why?

   Ms. Earthly – I would say teacher-centred in terms of limited classroom space. There are certain things that you will do that are student-centred and there are certain things you will do with student centred/ teacher centred. Child or student centred encourages learning more but there are certain areas depend on the concept that need the involvement of the teacher. I would say half-way.

   Ms. Heavenly – Although I wish my class was student centred but it is teacher-centred in terms that we try as much as possible to provide activity centres and everything that goes with the perfect classroom. It is not reality in terms of what we are actually working with example, smart board, e-beam and all the works, however, my class is teacher-centred but I wish it was student-centred with different activity centre and all that go with the perfect student-centred classroom.

   Ms. Starr – My classroom is teacher-centred. Limited space to work with in the classroom and I cannot afford to move around the tables to do individual work or to do group work to encourage cooperative learning. I try to make use of the available resources, however, the traditional mode of instruction continues.

3. What kind of training have you received to implement technology into curriculum?

   Ms. Earthly – I did not receive any formal training to integrate technology into the curriculum but I was trained with the NSCE and BPTT in basic computer skills in Microsoft Word Process, Power Point and the Spreadsheet.

Ms. Heavenly – The programmes I just did was an introduction to computer literacy, the basic functions, the basic skills a teacher would use in the classroom I did courses first with the NSCE programme and then in my B.ed programme.

Ms. Starr – I did courses with NSCE in Microsoft processing, Microsoft Power Point, Spreadsheet and some aspects of database. Most of the computer courses I did only taught me the basic computer skills but not to actually integrate technology into the teaching and learning process. Right now I am doing instructional design and I hope that some aspect of that course will help me.

4. How are you currently using technologies for personal and professional use?

Ms. Earthly – I use it every day to get up to date information in conducting my personal work for research and for assessment and test scores using word processing and spreadsheet.

Ms. Heavenly – My personal use is for my studies and for my children at home where we can log on and find websites with activities for the children to do. For professional use, Microsoft words to make worksheets, assessment, power point, and logging on to websites for stories, ideas, information and for grade books for test results. Showing videos to the class and logging on for online e-books.

Ms. Starr- personal for research and professional using worksheets for end of term assessment, online resources like you-tube and online software and interactive software for graphics, Microsoft word, excel and power point.

What are the main challenges to the introduction of technology into Tobago primary schools?

1. What could be done that would help you improve the area of integrating technologies in the classroom?

   Ms. Earthly – I need to be trained; just knowing the basic skills in computing is operating the laptops and the computers are not enough. I need to be taught how to integrate technology into classroom instructions. Right now what I am doing now is just trial and error.

   Ms. Heavenly - I need refresher courses, ongoing and continuous training and this thing about continuous learning if I don't use it, then it is of no use to me because I will not remember. So I need refresher courses and a support system in place to work with and I need resources to work with.

   Ms. Starr – I need continuous and ongoing training. I need professional development workshops on how to actually integrate technology into curriculum. The Ministry could bring in experts and have one located at each school to assist teachers in using the technology.

2. What prevents teachers at this institution from implementing technology into the curriculum delivery?

   Ms. Earthly – One, it is not tested. Two, teachers will shy away from it knowing that they are not competent to use the technology. I need professional development to integrate technology into the curriculum into the correct way and three, support systems from the Division of education to assist teachers.

Ms. Heavenly – No one said we have to do it; as a matter of fact it is not mandated or compulsory from the Ministry. Another problem is that I will shy away from it and I will not use it because I have to take it to and fro to my classroom. The availability of space, the number of children to the computer in other words the student-computer ratio and the setting up is very time consuming and those are my challenges.

Ms. Starr – The computer laboratory is too small and the classroom is not conducive because of the lighting factors to accommodate technology.

3. What barriers prevent teachers within the educational district of Tobago from implementing technology into curriculum?

Ms. Earthly – Not enough resources we do not have it across the board, lack of support system, availability of space and the know how in training of the necessary areas. The structure of the classroom is another problem because of the barn type structure where the classes are separated by black board and this will affect the nearby classes. Readily available technicians, up to date resources, availability of resources and lack of time are barriers that prevent teachers from implementing technology within the educational district of Tobago.

Ms. Heavenly – Another barrier is that we are given the internet but it is limited so if you log on and you cannot access what you want it discourages you one time. We cannot access information as we ought to so this can discourage teachers. Another barrier is professional development workshops both in house and out from the level of the school and from the Division of Education

Ms. Starr – Support system is another barrier. Up to date computers so teachers could readily embrace technology and willing to change, software and student friendly resources

4. What are teachers concern regarding the implementation of technology into curriculum delivery?

Ms. Earthly – We have a pack curriculum and we tend to leave technology at the background and teach those core subjects such as mathematics, science and language arts. We will use it but it is not a priority and teachers felt that it is time consuming.

Ms. Heavenly - One concern, teachers think it is "too much work". I mean we have to prepare for everything. In your daily duties, teachers have to research, prepare, organise and at the same time do activities with the students. So I deem it as 'too much work.' Teachers have the perception that it is plenty work but technology in teaching is not hard but if everything is put into place, your laptops set up, projectors set up and the room is ready; we can teach a number of subjects in one day. Gone are the days when we say that it is impossible because it is not taught separate but integrated into the different subject areas.

Ms. Starr – I will add to what Ms. Earthly said because at the end of the day you have to cover certain amount of subjects. The use of technology is time consuming; for instance in teaching concrete, teaching conceptually takes times. It can be very time consuming and as a result the subjects listed on the timetable for that day will not be covered.

5. What are the perceived problems associated with using technologies during classroom instructions?

Ms. Earthly – The technologies are not working as they should. The multimedia and the laptops are not configuring together. In terms of space within the classroom, the students cannot get to move around. Not enough computers to cater for each student so they can experiment at their own level and their own pace…….and if I have to take the students to the computer lab, time is lost getting them from the class to the lab and back.

Ms. Heavenly – I agree with Ms. Earthly. She mentioned some valid points; however, if technology is being used in the classrooms, they must be entirely enclosed. If we are using the overhead projector there will be lightning factors. Since the classrooms are not enclosed the sound factors can be distracted to the other classes because the students will be so motivated and distract the nearby classes. Another perceived problem is that we do not have a room that is set up where come to where the children can experience technology learning so we have to be moving projectors, setting up projectors and this can be time consuming. As Ms. Earthly mentioned, whatever we used will not be adequate so we are talking about numbers. Some things are very outdated. So we need up to date modernized computers that the students can use.

Ms. Starr – It might be very distracting because not all the students will respond to it. The visual learners may appreciate the pictures, the tactile learners might appreciate touching and so forth but it might not really apply to them. Problems in terms of up to date resources or videos may not properly uploaded.

TABLE 3 SHOWING DATA ANALYSIS

Research Sub-Question #4	Ms. Earthly	Ms. Heavenly	Ms. Starr

What are the main challenges to the introduction of technology into Tobago primary schools/	I need to be trained; just knowing the basic skills in computing is operating the laptops and the computers are not enough. I need to be taught how to integrate technology into classroom instructions.....	I need refresher courses, ongoing and continuous training…. So I need refresher courses and a support system in place to work with and I need resources to work with.	I need continuous and ongoing training. I need professional development workshops on how to actually integrate technology into curriculum.
	I need professional development to integrate technology into the curriculum…..support systems ……	No one said we have to do it; as a matter of fact it is not mandated or compulsory from the Ministry…… The availability of space… student-computer ratio and the setting up is very time consuming..	The computer laboratory is too small and the classroom is not conducive…….
	Not enough resources ……. lack of support	….the internet ….. is limited…. cannot	Support system….. Up to date

	system, availability of space …… how in training of the necessary areas. The structure of the classroom ……Readily available technicians, up to date resources, availability of resources and lack of time ……	access what you want….. professional development workshops both in house and out from the level of the school and from the Division of Education……	computers…. software and student friendly resources
	We have a pack curriculum……. it is time consuming	…… too much work…. So I deem it as 'too much work.' ……..	….is time consuming…… subjects listed on the timetable for that day will not be covered.
	The technologies are not working as they	….. classrooms are not enclosed the sound	……. up to date resources …….

	should…. space within the classroom……. Not enough computers….. time is lost getting them from the class to the lab and back.	factors can be distracted to the other classes….. we do not have a room that is set up….. be moving projectors, setting up projectors and this can be time consuming….. some things are very outdated……	