THE TEACHER AND THE TECHNOLOGY: A LOOK AT THE PERCEPTIONS OF INTEGRATION.

The perceptions of teachers about the role of computer technology integration in their teaching at a private K-12 independent school in the Bahamas

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Abstract

This paper looks at the perceptions of teachers about the role of computer technology integration in their teaching at a private K-12 independent school in the Bahamas. A thorough review of existing literature on the topic was done focusing on the general concept of computer technology integration, preparation of teachers for technology integration, what technology looks like in a K-12 Caribbean classroom, theories, frameworks and strategies for integration, and the influence of existing pedagogy on integration. Five teachers spanning all grade levels of the school were consulted in the completion of the study. Interviews were conducted using the phenomenological qualitative approach to data collection and analysis. The study was conducted to provide more relevant information about computer technology integration from a Caribbean and more specifically a Bahamian perspective. The differences in the needs, resources and sizes of Caribbean schools vary significantly from others around the world, justifying requirements for more accurate data. The findings from the study show that all participants perceived that computer technology integration plays a critical role in educating today's students. Results also show that environment, resources, beliefs and support are key factors in integration. Findings from the study indicate that in order for technology integration to be successful, there needs to be sufficient professional development for teachers and clearly outlined goals, objectives and expectations from administration.

Keywords: Computer technology integration, information and computer technology, teacher's perceptions.

Chapter 1 – Introduction

Background

Technological advancements have made life easier for mankind and allow faster completion of tasks. From the discovery of fire, to the invention of the wheel, and the impact of electricity, technology has changed the way humans function. MacKenzie and Wajcman as cited in Bijker, Hughes, Pinch and Douglas (2012), posit that there are three layers of technology. The layers include physical objects or artifacts, activities or processes, and it can refer to what people know, as well as what they can do. Considering this definition for the purpose of this paper, computer technology in education refers to the use of computer tools and resources to perform a series of steps or processes to solve a problem or reach a desired result.

The invention and advancement of computer technology may have had the most prolific impact on the entire world than any of its technological predecessors. Because of the infiltration of computers in all aspects of human life, this leads many to believe that computers are in fact everywhere. This infiltration is verified by statistics from The International Telecommunications Union, which in 2015 found that about 43% of the world's population were Internet users (International Telecommunications Union, 2015). Statistics by the Bureau of Labor presented in Table 1 (see Appendix A for employment and wages for major occupational groups) outlines that almost every key industry in the United States up to the year 2020, requires the use of computers and the Internet (Lockard & Wolf, 2012). The majority of industries that indicate future growth heavily rely on computer technology.

The world's extensive use of computer technology has trickled into the educational system. The purpose of schools is to prepare its pupils for successful integration and existence in

the world, as well as to be positive contributors to society. Therefore, there is no surprise that computers play a vital role in education. Monke (2005) has found that the use of computers in school is a demonstration of its proliferation in the classroom. Accounts by the National Center for Education Statistics presented in Table 2 (See Appendix A) indicate that instructional use of computers in public school classrooms in the United States has grown significantly in less than 15 years (Snyder & Dillow, 2012).

These alarming statistics indicate that schools have found it necessary to include computer technology in their curriculum to ensure that their students are well equipped and ready for competition in the 21st century (Monke, 2005). President Barack Obama, pledged to commit 3 billion United States dollars to education technology, recognizing the need to "close the technology gap" in American schools (Bidwell, 2014). Other countries around the world have already demonstrated the importance of technology by the investments already made towards it. Li & Choi, (2013) found that technology integration is a top priority and has become a global phenomenon in schools around the world. Countries and world bodies have stressed the importance of education technology creating a balance between students in developed and developing countries. The United Nation's goal to see benefits of information technology spread widely in schools around the world was demonstrated in the launch of its World Summit Event for Schools in 2003, an online collaboration of schools around the world (United Nations, 2003). These findings speak to the significance that has been placed on technology provided in schools and sufficient reason why it is important to note the perception of teachers in The Bahamas, to its integration.

There are varying findings about the implications of technology in education or in schools generally. Jaffee (as cited in Gorder, 2008) purports that studies have found that technology can assist teachers in addressing issues related to active learning, mediation, collaboration and interactivity. Other studies have indicated negative influences on young learners. One such study by Fuchs and Woessmann (2004) has found computers to be a distraction and lead to lower scores in assessment testing.

Without disregard to what researchers have identified as implications of technology in education; the use of technology in education should not be seen solely to measure abilities on assessment testing or to entertain students, but rather to motivate students to use what they are learning as a tool to establish new knowledge. The use of technology in education should be utilized in such a way that it incorporates the transference of technological skills with pedagogical knowledge. Students should also be exposed to learning styles to help them arrive at something new; as Bruner put it in his seminal writings, to "participate in the process that makes possible the establishment of knowledge" (Smith, 2002).

Setting/context. The private international school in this study is a part of the International Baccalaureate Organization (IBO) and includes all programmes of study offered by the IBO; Primary Years Programme, Middle Years Programme and Diploma Programme. The school has an enrollment of 350 students from 24 countries. Technology is a focus of the school's development plans and students in Grades 4 - 12 enjoy a 1:1 laptop programme, with other grade levels having a 1:2 laptop programme. There is also a 1:1 iPad programme. The school is equipped with state of the art interactive boards, projection systems, and hardware peripheral devices for each class. Devices such as digital cameras, iPads, robotics, engineering

tools, and learning kits are available for check out. Teachers are assigned personal laptops with a plethora of online and installed applications. Wi-Fi Internet access is available at all points around the school and the network is stable. Professional development related to various aspects of technology is ongoing throughout the school year.

Population. The mandate of the private international school in this study stipulates that all teachers clearly incorporate technology into their teaching. This mandate is in compliance with the IBO and means that teachers should be equipped with the skills to do so. In light of the above, teachers are finding themselves in many instances as new learners for many of the fast changing resources and tools. The challenge is often a lack of pedagogical knowledge about the new technology (Li & Choi, 2013).

Teachers are usually the disseminators of learning and responsible for guiding others in gaining new knowledge. However, in the area of technology integration, their confidence is sometimes shattered as they are faced with many of the same challenges as other adult learners, in their effort to cover unfamiliar ground.

The most common approach to technology use in the classroom is in the development of Information and Communications Technology (ICT) skills. United Nations Educational, Scientific and Cultural Organization (UNESCO) take a holistic stance in the role of ICT in education with the acknowledgement that its use can contribute to "equity in education, the delivery of quality learning and teaching" (UNESCO, 2016). Hawkey (2002) suggests that ICT enables learners to acquire transferable skills and use their learning styles in the educational process. Given the capabilities, advances and expectations of technology and the role that it can play in teaching and learning, the onus has been placed heavily on teachers, for technology use in

the classroom. In addition to other factors, Li and Choi (2013) found that teachers' perception of the role of technology use and integration in the classroom greatly impact their approach and success in the infusion of technology in the classroom.

Given the importance of ICT skills in education, to teach it in isolation is to provide students with only knowledge which Ausubel (as cited in Okojie, Olinzock, & Okojie-Boulder, 2006), in his seminal writings, claims will likely lead to forgetfulness. Teaching software alone or as a set of skills such as ICT in isolation without some consideration to foundational knowledge that justifies its application, may lead to memorization of disjointed information about various technologies. Discouragement of such teaching has been replaced with a strong move toward technology integration in learning. Institutions that follow the international school philosophy, stress the importance of ensuring that all of its students have the technological skills to allow them to function anywhere in the world; as students enrolled in international schools are usually transient. The International Baccalaureate Organization (IBO) has indicated that ICT is "one of the connecting components throughout the curriculum" ("The Role of ICT in the PYP," n.d.). The connectivity of ICT suggests that its use should be integrative in nature. The IBO was clear in its stance on integration when it further stressed that the focus is not on learning ICT for its own sake, but rather to enhance learning through its trans disciplinary programme ("The Role of ICT in the PYP," n.d.). The implications for teachers in international schools, as it relates to ICT, can be appreciated in the IBO's directive to teachers, in that "all teachers are responsible for using ICT to its best effect throughout the curriculum" ("The Role of ICT in the PYP," n.d.). A table with suggestions for consideration of ways to implement ICT is shown below.

Increase emphasis on:	Decrease emphasis on:
concept-driven and transdisciplinary teaching taking place both inside and outside the programme of inquiry	teaching an isolated subject or topic
using ICT to investigate, create, communicate, collaborate, organize and be responsible digital citizens	learning ICT as a series of skill sets for their own sake
authentic embedding of ICT across the curriculum	stand-alone ICT lessons
viewing teachers and students as collaborators in the learning process	viewing the teacher as the sole deliverer of skills and knowledge
providing opportunities for student choice to encourage students to take responsibility for their learning	using specific ICT tools exclusively for particular tasks
learning as part of a broader community of learners	learners learning in isolation as a dominant feature
adapting multiple systems or approaches (for example, platform or application) according to the situation and needs of learners	reliance on one system or approach (for example, platform or application)
collaborative planning and reflection	planning for ICT instruction in isolation
professional learning as a continual process	professional learning as a one-time event or opportunity
professional learning provided within authentic contexts	stand-alone professional learning
learning beyond the classroom through global connections	learning restricted to the classroom or ICT lab
management of ICT resources to meet educational goals	management of ICT resources without strategic planning
publishing content for an authentic audience, for example, using social media tools to communicate a message to a wider group of people.	printing student work for display on the school bulletin board only.

Table 3. (“The role of ICT in the PYP”, n.d.)

Statement of The Problem

Many in-service teachers entered the profession when technology was not as popular and commonplace as it is now. As the call for integration continues, it creates a problem because there is an obvious disjoint between many teachers and their knowledge and skills to successfully integrate new technology.

Research Questions

In order review this problem, the following research question was developed: What are teachers’ perceptions about the role of computer technology integration in teaching at a private K-12 independent school in the Bahamas?

The research will further examine:

1. How does teachers' comfort level with computer technology influence its perceived role in teaching integration at a private K-12 independent school in the Bahamas?
2. How do expectations from administration to utilize computer technology influence teachers' perception about its role in integration at a private independent school in the Bahamas?
3. What are the teacher's perceptions in a K-12 private independent school in the Bahamas about the role of computer technology integration in their teaching?

Purpose/Aim of the Research

A person's success in achieving a goal heavily weighs on their perceptions of the importance of that goal. Therefore, this paper will describe the perceptions of teachers in a K-12 private independent school in the Bahamas about the role of computer technology integration in their teaching.

The purpose of this research is to describe teachers' perceptions about the role of computer technology integration in their teaching at a private K-12 independent school in the Bahamas. The study will consider the comfort level of teachers with technology and how that influences their perception of the role of technology.

Rationale of the Research

There are very published studies from a Caribbean perspective on the topic and no published study from a Bahamian perspective on the perception of teachers about the role of

computer technology integration in their teaching. Also, in the Bahamas, there is a growing expectation for teachers to integrate technology into their teaching. As in other professions, there is an expectation that the use of technology tools will yield successful outcomes in the classroom (Ertmer & Ottenbreit-Leftwich, 2010). It is therefore important, for the reasons, which will be outlined in the significance, that this research is conducted.

Significance of the Research

This research about teacher perception of technology integration, is useful in that it can provide a forum for teachers to express their feelings about the integration of technology. The expression of their feelings allows them the opportunity to reassess their views about technology integration, reassess strategies for integration and consider the found implications of integration.

As it relates to the school's management and administration, this information is useful for consideration in evaluating teacher performance. Many schools are considering technology integration as a component in successful instruction; therefore, this study can be useful for observation/evaluation in professional development planning, if necessary.

The Bahamas Ministry of Education (MOE) can use the findings of this study for consideration of the implementation of technology integration in its schools, as well as the impact of technology integration on overall student performance assessments at a national level.

At a regional/Caribbean level, this research can provide information about technology integration to act as guidance for integration in schools that may have similarities in culture, student abilities, educational philosophies, and pedagogical beliefs.

At an international level, the study can provide information for reports about technology use in smaller island states and for organizations, such as UNESCO. UNESCO and similar

organizations can use this information in their statistical data and in preparation for the joint creation of national and international programs. Many schools including the K-12 school in this study have plans for increased technology use in their strategic development plans. Having feedback from this study about the perception of teachers as well as why such perception is held would help to generate founded discussions by parents and other educators about support for future programs. Further, there should be some data available to the wider community about technology integration in preparations for meeting the needs of each community. Important in each community is the development of skills necessary for sustainability or introduction of certain industries for the growth of that community. Important for the development of future human resources is an awareness of the skills that are being developed in today's students. Existing data tells us that familiarization and comfort with computer technology is a requirement in modern world; school is where that preparation takes place. Therefore, it is important that computer technology integration is the method utilized to prepare future Caribbean communities.

Limitations

There are limitations in this study in that the researcher will not get feedback from respondents over a period of time. It would have been useful to see whether teacher perception changed after possible implementation of recommendations from the study.

Delimitations

The researcher has chosen not to include teachers from other schools on the island. There are drastic differences in the availability of resources from school to school therefore, what is expected from teachers, technologically, vary.

Definition of Key Terms

Perception. Fishbein and Ajzen (as cited in Miima, Ondigi and Mavisi, 2013), defined teacher's perception as "learned predispositions to respond to an object or class of objects in a consistently favorable or unfavorable way" (p. 28). Perspectives about an object therefore could be objectively true or they could be simply opinions, prejudices or stereotypes. They further found that gender, education, training and profession, religion, character, personality, and relationships could influence this perception.

Computer technology. In MacKenzie and Wajcman's study (as cited in Bijker, Hughes, Pinch & Douglas, 2012), technology refers to physical objects or artifacts, activities or processes, and what people know as well as what they can do. Given this definition of technology and for the purpose of this paper, computer technology in education refers to computer objects used to perform a series of steps or processes to solve a problem or reach a desired result.

Integration. As it relate to technology, integration refers to the use of technology in meaningful ways in the learning process (Gorder, 2008). Gorder further reinforced that integration implies full-time, daily operation within lessons that makes a difference in reforming the classroom.

Private school. In the Bahamas, private schools are those that parents pay fees for students to attend. Most private schools in the Bahamas are given 'grant-in-aid' by the Bahamas government. Grant-in-aid refers to financial assistance given to private schools in the Bahamas to assist with the education of Bahamian students ("Education Act," 2001).

Independent school. In the Bahamas, an independent school does not receive any funding from the Bahamas government and is completely autonomous in its fee schedule and its

operations. Independent schools must adhere to some stipulations by the Bahamas Ministry of Education (MOE) such as the minimum number of days in session (180) per year. Independent schools are governed by a Board of Governors and Directors ("Education Act," 2001).

K-12. K-12 schools have enrollment of students from kindergarten to grade 12. Students in such schools range in age from about five to about 17 (National Center for Education Statistics, n.d.).

Chapter 2 Literature Review

Introduction

This chapter reviews the existing literature about the perception of teachers, as it relates to integration of computer technology in teaching. There are many factors that might have contributed to existing perceptions of teachers pertaining to the role of computer technology integration in their teaching. Therefore, this section utilizes a thematic approach to reviewing literature to provide a better understanding of the findings.

Initially, the chapter examines the general concept of technology integration in teaching; looking at what it means to education and teaching, as we know it. The chapter then reviews preparation of teachers for technology integration. Next, the overall perception held by teachers is examined with a look at factors that influence such a perception, as well as the way that technology looks in the K-12 classroom in a Caribbean context. The chapter concludes with the theories, frameworks and strategies that may have be implemented during teacher use of computer technology inclusive of existing pedagogy and its influence on use and integration.

The literature will be a review of seminal writings from journals, books and well-known websites from pioneers in the field and recent findings related to the perception of teachers on the role of technology in schools, specifically, in their classrooms. The funnel approach will then be used to review each of the themes with consideration of global, regional, and national findings.

Technology Integration in Teaching

In an effort to understand the hype about teacher perception and why it is important, it is first necessary to consider technology integration in teaching and the logic behind this growing phenomenon . This brings one to consider why we need technology in teaching in the first place. When learning happens as a result of a natural experience, this helps to make the learning more meaningful. Technology is an omnipresent part of children's lives; therefore, its incorporation into the learning experience of children makes it more meaningful and revolutionizes the learning process ("Why Do We Need Technology Integration?" 2007). In addition to technology integration being critical for the development of 21st century skills, teachers are recognizing that its integration into the curriculum develops critical thinking in students and helps them to derive deeper meaning from their learning. With the logic behind the integration of technology into the teaching outlined, focus should now be placed on what this technology integration actually looks like.

Sheingold (as cited in Gorder, 2008) asserts that the concept of integration is about teachers using technology as a tool for learning, and not simply about teaching students to operate computers. While Fulton (as cited in Gorder, 2008) found that technology integration facilitates collaboration and cooperation among students, Wepner, Tao, and Ziomek (2006) asserted that technology integration is not a 'one size fits all,' and its use should therefore be initiated to what works best for individual student needs and learning styles. Pantasiz (as cited in Gorder, 2008) suggested that 'technology-enabled' learning leverages information to eliminate the one-size-fits-all approach.

Okojie, Olinzock, and Okojie-Boulder (2006) broadly defined technology integration as:

> A process of using existing tools, equipment and materials, including the use of electronic media, for the purpose of enhancing learning. It involves managing and coordinating available instructional aids and resources in order to facilitate learning. It also involves the selection of suitable technology based on the learning needs of students as well as the ability of teachers to adapt planning instruction. It also requires teachers to use appropriate technology to present and evaluate instruction as well as use relevant technology for follow-up learning activities. (p. 67)

This definition shows a clear connection with the definition of computer technology in education generated earlier. A similar definition is echoed by Johnston and Barker (2002), as they suggested that "integrated technology is technology that supports and enhances the achievement of specific teaching and learning goals" (p. 141). This definition clearly indicates that the consideration of teaching and learning are equally important in the successful integration of technology. This technology integration can take shape in many forms including: online learning and blended classrooms; project based activities incorporating technology; game-based learning and assessment; learning with mobile and handheld devices; instructional tools like interactive whiteboards and student response systems; web-based projects; explorations and research; student-created media like podcasts; videos or slideshows; collaborative online tools like wikis or Google Docs; using social media to engage students; and, new technologies and methods for engagement emerging daily ("What Is Successful Technology Integration?" 2007).

Given the importance placed on the ubiquitous impact of technology in the lives of students, a useful method to helping to acknowledge the relevance of integration is to outline the

importance of technology to the successful existence of students in their future. Lim, Zhao, Tondeur, Chai, and Tsai (2013) examined the role of modern technology in work and productivity, and the ways that we live and play. They sought to bridge the gap between modern technology and its place in schools. It was concluded that involving teachers in the development of policy planning for technology integration is critical in successful integration, as it allows them to reflect on their own educational use of technology (Lim, Zhao, Tondeur, Chai, & Tsai (2013).

Acknowledging the role of the teacher in the technology integration also requires the acknowledgement of the role of students in this process. Students should be at the center of the learning process. Having the focus of teacher planning on student outcome, based on the needs of the individual student, allows for the removal of the 'one-size-fits-all' method of planning and assessing. In addition to student centered planning there is the need for student centered learning and for students to be clear about their role in the learning process. Students also need to be self-directed in such a student-centered learning (Moeller & Reitzes, 2011). When students use emerging technology to direct their learning through individual projects or collaborative learning, they are able to appeal to their own learning needs through a focus on their own learning styles. Student engagement in alternative methods of presenting content, project based learning, use of technology in authentic ways, cloud computing, digital books, collaborative environments, use of mobile devices and augmented reality, allow more opportunity for self-directed learning (Moeller & Reitzes, 2011).

Teachers need to be aware of the tools that they already have or have access to and the different ways that they can use them to guide students in being self-directed. Encouraging

students to use common tools in ways that are different from the tool's initial intent is perhaps one way that teachers can allow students to explore and communicate their understanding. Starr (2011) identified websites, presentation, spreadsheet, and word processing software as the most common, accessible and likely to be used for technology integration. These tools along with Smart Boards can be a starting place for most teachers, as a means to seeing the benefits of technology integration in teaching and encouraging students to be the drivers in their own learning. Most teachers would probably not argue about the necessity of technology integration in their teaching, the challenge comes with identifying how this integration looks.

In order to make suggestions about integration, an awareness of factors affecting its success need to be considered. Inan and Lowther (2009) proposed a hypothetical path model based on factors reported as important by previous research. The model utilizes blocks of variables, which are described as exogenous variables (teacher demographic characteristics and school characteristics related to supporting technology integration, teacher computer proficiency, teacher beliefs and teacher readiness to integrate technology and, finally, technology integration). The study, which was designed to examine characteristics of teachers, as well as environmental factors on technology integration, concluded that teacher readiness, beliefs, and computer availability have a significant positive direct effect on technology integration. The findings also suggest that demographic characteristics, computer proficiency, and school characteristics account for a high percentage of readiness.

Johnston and Barker (2002) found that appropriate assessment is clearly a part of the integration process. Suggestions for evaluation of the success of the integration are based on a number of criteria and specific guiding questions related to the criteria. These criteria include

access to appropriate technology for learners and teachers; technology knowledge and skills of teachers and learners; professional development on appropriate models of technology integration; school support and structural changes for technology integration; competent teachers; engaged students; and, accountability and long-term goals.

Blair (2012) suggested that successful integration will be as a result of a shift in the roles of the teacher and student. The student needs to be given more responsibility for the learning process. This shift comes about with the recognition of student abilities from the teacher and the teacher giving students credit for their ability to be engaged and active participants in their learning. The teacher is responsible for sparking the interest of the students.

Chanlin, Hong, Horng, Chang, and Chu (2006) considered factors affecting integration from a Taiwanese perspective and found that there are a few key factors most prevalent. Environmental (computer facilities, budgets, availability, access, time, professional development and rewards), personal (beliefs, experience lifestyle, interest, support from family, need for personal growth), social (peer support, attitudes from superiors, students attitudes, parental and student reactions, community resources, technological trends, social value), and curricular factors (objectives, skills, assessment, considerations about integration, teaching load, subject and control of using technology) are all factors that influenced integration. They found that integrating technology allows teachers to be more creative in their teaching. A key observation was that teachers with personal lives closely tied to computer use were more likely to integrate computers into their classroom.

Teacher Preparation for Technology Integration in Teaching

The historical practices or initiatives driving teacher professional development in devising plans for technology use in the classroom have perhaps been the biggest factors impacting their preparation for technology integration. Harris, Mishra, and Koehler (2009) found that the pedagogically unsophisticated approaches to teachers' application of educational technologies in their instruction are as a result of five approaches that have dominated technology efforts, inclusive of: software-focused initiatives; demonstrations of sample resources; lessons and projects; technology-based educational reform efforts; structured/standardized professional development workshops or courses; and, technology-focused teacher education courses. Culp, Honey, and Mandinach (2005) identified similar initiatives such as investing in technology to support specific and long term needs of educators, transforming education through technology, and matching technologies to public priorities for educational improvement. These researchers opine that such a focus is conceptually different from what the educational technology leaders envisioned for integration, thus creating a mismatch.

The mismatch or "technocentric" (Papert, 1990) approach does not prepare teachers for the integration of technology into their teaching. The technology, as Papert alluded, should empower students to drive their own learning; therefore, training for teachers to integrate technology should focus on helping teachers to consider that. As the focus has been more on the technologies being used at any given time, as opposed to students learning needs, the preparation of teachers to use technology to support inquiry, collaboration, and reform practice has not historically been as successful as it should be.

A LOOK AT THE PERCEPTIONS OF INTEGRATION

In recent years, teacher preparation for technology integration with younger pre-service teachers happens at the undergraduate level as a part of the program of study (Johnston & Barker, 2002). The training at this level ensures that teachers entering the profession acquire a better level of understanding of the purpose of technology in education. The challenge with this may lie in the perpetration of the organization's belief system regarding training or overall focus of a state or region on the role of technology in education. Some states may focus on technology as a means to increase test scores while some may focus on its use merely as a teaching tool. Whatever the driving focus for integration, the positive reality is that some level of integration training is becoming a requirement. Johnston and Barker (2002) suggested that, in the big scheme of things, some level of training and consistent exposure to technology and its ability for useful integration influences student learning to some degree. Roblyer, Edwards and Havriluk (as cited in Johnston & Barker, 2002), further opined that there are shifts in behavior and attitudes, as teachers are exposed to technology, which will result in more integration. This integration they suggested will drive the focus of their preparation and teaching to be more student-centered, interdisciplinary, and opened-ended. Such a transition will lead to the empowerment of students that Papert (1987) spoke about.

Regardless of the pre-service training, professional growth is of utmost importance for teacher preparation for the integration of technology, as methods are frequently changing to improve student understanding and performance. Bellanca (as cited in Johnston & Barker, 2002), observed staff development, in-service training, and professional development, as being the most popular options for growth. Professional development was found to allow more constructive and educational change with a better focus towards accountability. In many places,

however, technology-focused professional development was found to be rare and something that is spoken more about rather than a reality. Perry (as cited in Johnston & Barker, 2002), noted that the goal of professional development should be on the development of competence. That competency, as noted by the researcher, would allow the focus of the teacher to be more on student needs rather than their own "technical savvy." There are a number of initiatives in place to guide in the development of teachers' competence in technology integration including: National Educational Technology Standards (NETS); California Technology Assistance Program (CTAP); Utah Technology Awareness Project (UTAP); Flashlight Program; Seven Dimensions; and, STaR Chart. These initiatives promote competencies, offer professional development, and measurements for best practices for technology in the classroom.

The importance of guiding teachers in the best methodology for technology integration is evident in the numerous studies conducted about the best ways to guide pre-service teachers in strategies for incorporating technology. Kay (2006) examined sixty-eight of these studies and found that while there is no agreement on the best strategy to use to guide teachers, there have been some very useful standards developed for teacher technology use. While there is still disagreement about the best strategies to be used, the fact is that regardless of the strategy taught, the end result is more competence in technology skills of pre-service teacher and an increased reserve of integration ideas (Kay, 2006). These teaching ideas and increased skills will trickle into the classroom and this is by far the overarching goal. A critical conclusion in Kay's (2006) research was that most of the studies examined lacked a "carefully and rigorously pursued" evaluation process. Evaluations are extremely important in the implementation of any

program as it helps to determine the overall success by identifying needs to be reconsidered and why.

Teacher Perception on Technology Integration in Teaching

In an effort to understand the perception of teachers in the private independent school in the Bahamas, a general understanding of the existing perception of teachers is imperative so that a comparison can be made at the conclusion of the research. Savery (2002) suggested that perceptions are the true influences of behaviors. Therefore, our examination of the perception of teachers may help to establish good reasons for our findings at the end of the data collection and study.

In many instances, individuals do as they are taught. This suggests that if teachers incorporate technology into their everyday life, as well as in their teaching, it is very likely that their students will also incorporate technology into their daily lives and grow to see it as a tool for collecting information, and communicating ideas. In a study by Savery (2002), it was found that teacher perceptions heavily influence those of their student teachers in training. The study included 41 teachers in a college and examined the tools used by teachers in their personal and professional lives. The instrument utilized in the study, the Technology Integration Standards Configuration Matrix (TISCM), is a model for determining technology integration. This tool was used to develop a survey structured along a continuum based on technology use for productivity, technology use to enhance student learning and use for professional productivity (Savery, 2002). Tools utilized for research and authorship were easy for teachers to use and they rated themselves as being highly proficient in their use. However, tools, such as, spreadsheets, database, and web authoring software showed a novice level of proficiency or were

never used. These findings suggest that teachers' use in tools that would lead to students having a better development of ICT skills is where teachers are lacking most. They further suggest that teachers did not perceive the use of those tools as being critical for the development of student problem solving and communication skills. This minimalistic use of technology by college professors could lead to a minimal use by student teachers, and their students.

Koc's (2005) critical review of literature related to technology integration and pre-service teacher training found positive connections between technology and applications . The approach was to provide pre-service teachers with the practical and appropriate experiences to appreciate the ways that technology could be used to facilitate their instruction. Pre-Service technology integration is critical to teachers establishing a belief in their own abilities and the importance of their roles in the classroom (Ryba & Brown, 2000). Ryba and Brown (2000) further concluded that teachers who are more likely to integrate technology on a continuing basis are those with learner-centered classrooms who develop authentic learning tasks for their students.

Teacher perceptions are also heavily reliant on their pedagogical beliefs and practices. Pajares (as cited in Ertmer, 2005), noted that "Few would argue that the beliefs teachers hold influence their perceptions and judgments, which in turn, affect their behavior in the classroom…" (p. 28). This indicates a strong influence of pedagogy, as it relates to technology on integration in the classroom. However, where beliefs usually heavily influence perceptions, research has shown that it does not always influence practice. Fang (as cited in Ertmer, 2005), in his research found inconsistencies between teachers' beliefs and their instructional practices. Ertmer (2005) concluded that the perception of teachers, as it relates to technology influence, is based on beliefs as it is with every other tool. Therefore, the presentation of technology as a tool

is important in defining whether teachers will use it at all or as a method to enhance student-centered curricula. In essence, it is important that technology is perceived as having the ability to add some value to what is being done in the classroom.

Jaffee, (as cited in Gorder, 2008), identified four principles that are highly valued pedagogically by teachers, as far as classroom technology integration is concerned: active learning, mediation, collaboration, and interactivity. Gorder's (2008) study, which examined the perceived extent to which technology is being integrated in the classroom by teachers trained to use it, found that even though teachers valued the use of technology and its integration in the classroom, there were challenges with the integration of technology in teaching and learning. Teachers in the study were a part of the Basic and Advanced Technology for Teaching and Learning Academy in the United States. Gorder (2008), purports that continual and increased professional development, as well as professional collaboration about integration strategies, is key to sound integration practices.

The implementation of the eCAL, eConnect, and Learn programs by the Ministry of Education in Trinidad and Tobago were examined in a case study by Onuoha (2014). The program ushered in curriculum changes as well as changes in methodology. As noted by Onuoha (2014), the goal of the program was to make computers accessible to all students and the expectation of the MOE in Trinidad and Tobago was to have lessons designed with computer technology components.

Generally, teachers perceived that the integration of computer technology in the curriculum does indeed enhance student learning and it was also found to be a motivational tool for student learning. However, there are limitations that need to be addressed that have hindered

or can hinder the continued success of the program. Teachers perceived that there was insufficient professional development for them in the use of computers and ways that the resources could be used to integrate technology in their teaching. Their limited skills were also coupled with challenges with keeping students on-task and monitoring their distractions and activities on the computer. Teachers noted that younger students were distracted by playing games while they should be engaged in class activities. In addition to the lack of training and student distractions, teachers cited insufficient information, technical hardware problems including unreliable Internet connection, and too much down time due to damaged computers (Onuoha, 2014) .

Technology in the K12 Classroom

Critical in the examination of teacher perception are the factors influencing their classroom that impact their level of integration. Inan and Lowther's (2009) path approach in examining these factors was different from other studies that looked at the factors in isolation. Their studies examined possible factors in an interrelated and hierarchal approach. The study defined technology integration to be of three types: instructional preparation, instructional delivery and as a learning tool. In the study, use was basically considered integration "as long as it is used for or supports classroom instruction" (Smaldino et al., as cited in Inan and Lowther, 2009). This definition for integration is included in this paper's definition.

Inan and Lowther's (2009) study, made use of the Teacher Technology Questionnaire (TTQ), which is commonly used in research and evaluation studies, and analyzed the data using a research-based path model. There were eight variables believed to have an influence on technology integration in the classroom: inclusive of computer availability, technical support,

overall support, years of teaching, age, computer proficiency, teachers' readiness and teachers' beliefs (Inan & Lowther, 2009) . The results of the study found that teachers' readiness, teachers' beliefs, and computer availability were the only variables indicating a significant positive direct effect on technology integration.

Teachers' readiness had the most important influence on technology integration. These findings are critical in that they indicate that the higher the value of these variables, the higher the teacher's integration is likely to be. All factors except age indicated significant paths towards readiness, suggesting that age is not a factor in technology integration (Inan & Lowther, 2009). While age in and of itself is not a significant factor, the years of teaching experience (which is normally indicative of age) is. The study indicated that veteran teachers were less likely to utilize and integrate technology, as opposed to novice teachers. The reason for that is because novice teachers (who are usually younger) are exposed to technology integration as a part of their pre service training.

Important to this study is the role that support plays in teacher readiness leading to the integration of technology. Inan and Lowther (2009), found that overall support had the strongest effects on teacher beliefs. Their finding reinforces other studies that found that school settings providing administrative support, peer collaboration, and technical support increase integration. The results of the Inan and Lowther (2009) study are significant, as consideration is given to the context of this study. These factors are significant from a Caribbean perspective, as some of the factors identified may be limited in many Caribbean K-12 classrooms.

A LOOK AT THE PERCEPTIONS OF INTEGRATION

The Caribbean Context

Over the past ten to fifteen years, there have been numerous initiatives implemented in the Caribbean in an effort to increase the level of ICT education in the region and prepare Caribbean students for competition on the global stage. Gaible (2008) identified regional initiatives that effectively support ICT in education or were tried and require additional measures. The initiatives include OECS Education Reform Unit (OERU) policy initiative, Caribbean Universities Project for Integrated Distance Education (CUPIDE), Caribbean Knowledge and Learning Network (CKLN), UWIDEC Blended Learning Project, Caribbean Association for Distance and Open Learning (CARADOL), and Virtual University of the Small States of the Commonwealth (VUSSC). The OERU's Education Management Information System (EMIS) has been adopted and adapted by many. The focus of that initiative is on using computer technology in preparation for teaching and learning.

The larger initiatives mentioned above focus on policy, distance education, networking, knowledge sharing and blended learning. These were not directly related to the use of computer technology for the preparation of students for learning with ICT. Other initiatives, such as EduTech 2000 MOE in Barbados and HEART Trust/National Training Agency in Jamaica, focus on countrywide projects to affect change in learning across the curriculum.

EduTech 2000 focused on curriculum reform, assessment models, and professional development (Gaible, 2008) which Inan and Lowther (2009) also found to be necessary in the proper implementation and integration of computer technology in teaching and learning. HEART Trust/NTA is structured to directly connect present student learning with future employment. The interconnectivity of learning management system (LMS) utilized by 80,000

students to a database of employment-qualifications profiles is designed to ensure or craft human resources for future employment in technology related fields. The focus of the program is on ICT training for the development of specific skills, rather than for the development of critical thinking skills and use of ICT for problem solving, and effective communication. Other national programs have been developed to support the HEART Trust program, such as the National Qualifications Register (NQR) and Learning Management System (LMS).

The programs examined above considered computer technology at the macro level in the Caribbean region and in progressive countries. Such programs are critical for the 'big picture' view of computer technology in schools; that is, in ensuring availability and countrywide development of human resources for the future. At the Caribbean level, other programs allow a close focus on the actual use of computer technology in the development of critical thinkers who are self-directed in their learning.

When we consider programs at a more micro level, School of Tomorrow in Aruba provides a clear view of the initiatives that are being made in order to change the pedagogical approach to teaching across the curriculum. Founded in 2004, the School of Tomorrow provides a clear view of how technology-rich, student-centered, teacher supported Caribbean schools look. Equipped with internet-connected computers, camcorder, scanner, digital cameras, headphones, webcams and colored printers; the pilot school focuses on active learning (Gaible, 2008). Students have engaged in practical real-life projects that have involved the complete integration of ICT across the curriculum; allowing them to incorporate word processors, spreadsheets, blogs, and websites.

Clarke (2007) embarked in a study of five pre-service secondary school mathematics teachers in the English speaking Caribbean in the integration of computer technology in Mathematics. The Math teachers were assigned their teaching practice in schools with access to a computer lab, a TI-83Plus graphing calculator, and MT789 software. The study was based on the view that as many teachers in the Caribbean are a part of the National Council of Teachers of Mathematics (NCTM) of North America, computer technology integration should be the expected norm in their practice. The goal of the NCTM is the incorporation of computer technology in the classroom (Clarke, 2007). NCTM in one of its strategic priorities approved by its Board of Directors in 2012 stated, as it relates to technology, that they function to "promote strategic use of technology to advance mathematical reasoning, sense making, problem solving, and communication" (National Council of Teachers of Mathematics, 2016). Clarke (2007) found that Caribbean countries face many challenges similar to what developed countries face. These challenges relate to computer technology integration with the need for more professional development for integration in subjects across the curriculum, reduction in class sizes, technical support (access to technology in general and computer technology specifically), and human support (moral and collaborative support by colleagues and administrators). He further found that Caribbean students, like those in other countries around the world, have heightened enthusiasm to learn in settings with increased use of computer technology.

Theoretical Framework

In an effort to understand and gauge the perception of teachers, as it relates to the integration of computer technology in their teaching. There is need to examine the previous factors mentioned, such as preparation with existing skills, technology's role in teaching and

learning, and general factors affecting overall integration. Where these factors are critical, there is also the need to focus on technological pedagogical content knowledge (TPACK) with an emphasis on the understanding that "there is no such thing as pure content, pure pedagogy, or pure technology"; but rather an understanding of "the complex manner in which all three of these domains - and the contexts in which they are continually formed - co-exist, co-constrain, and co-create each other." The onus is then on the teacher to become reflective and to develop strategies to enhance their own critical thinking skills for the successful integration of technology in the classroom during the exploration of the relationship between technology and pedagogy (Okojie, Olinzock, & Okojie-Boulder, 2006).

Strategies and theories utilized during the development of skills for integration sometime affect the perception of integration. As Gorder (2008) found, the successful integration would be determined by more than a pedagogical belief. The findings of Harris, Mishra, and Koehler (2009) point to the fact that theories, frameworks and strategies implemented and utilized by teachers influence their perception of technology integration in the classroom.

The TPACK strategy developed by Harris, Mishra, and Koehler (2009), is structured in its approach to the integration of technology into the curriculum. The framework calls for an initial focus on the differences in the content of differing subjects, the pedagogical strategies utilized in teaching the different subjects, the differences in the requirements of teaching different subjects to different grade levels, the varying student abilities, and the requirements of differing professional knowledge in addressing these focus areas. The understanding of the integration and interrelatedness of technology, pedagogy, content, and context are the focus of the TRACK strategy (Harris, Mishra & Koehler, 2009). Teachers utilizing the TPACK strategy

have an opportunity to see a good correlation between the individual subject and the technology to be integrated in order to understand the subject better..

The Second Information Technology in Education Study 2006 (SITES) involved 28 countries from around the world and focused on how those schools were engaging in "constructivist, knowledge-building practices" that are geared toward integrating ICT use into the classroom (Pelgrum & Law, 2008, p. 7). The framework examined in the study focused on the teacher's existing pedagogical practices. What stood out in the study is the need for pedagogical changes for the success of learning outcomes. These can be brought about by a shift in the role of the teacher from being the sole source of information provided to taking on the role of facilitator in the learning process. The involvement of the administrators and the entire school was seen as being critical in the findings from SITES 2006.

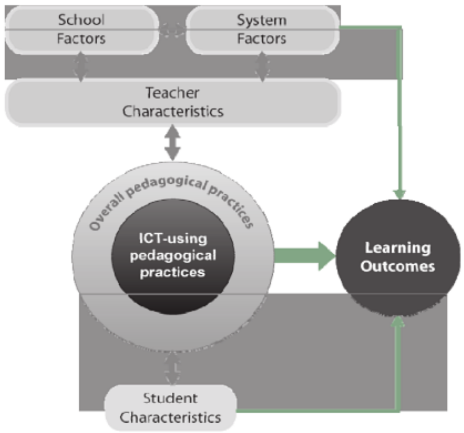


Figure 1. Overall conceptual framework for SITES 2006 (Pelgrum & Law, 2008, p. 19)

In addition to outlining the importance of bridging the technology gap in schools another strategy that can assist teachers in the integration of technology is recognition of how integration looks or what are some things that can be done to provide integration.

Dr. Ruben Puentedura's Substitution, Augmentation, Modification, Redefinition (SAMR) model provides a guide for changing the perception of technology use from that of mere substitution to complete redefinition ("What Is Successful Technology Integration?" 2007). The model can be used as a guide for teachers in their measurement of their level of technology integration. Puentedura posits that with substitution the technology is used as a direct tool substitute with no functional change. In other words, the tool is used to substitute something that may be done manually and that is the full extent of its use. Augmentation suggests that the tech tool is used as a substitute and also provides some functional improvement. In such a case, there is a greater use to that substituted resource. Modification provides a complete redesign of the task at hand and Redefinition is where technology allows for the creation of new tasks that were previously inconceivable by the teacher.

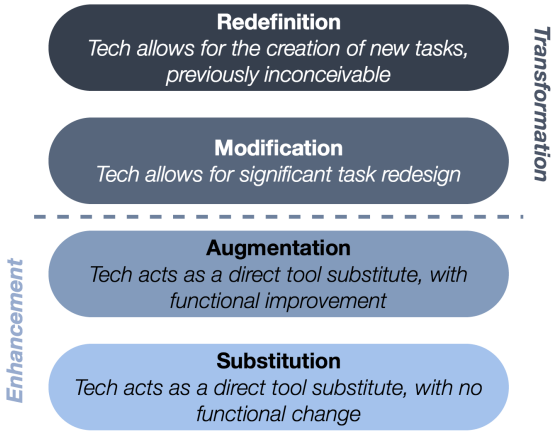


Figure 2. The SAMR Model

Puentedura, R. R. (2016, May)

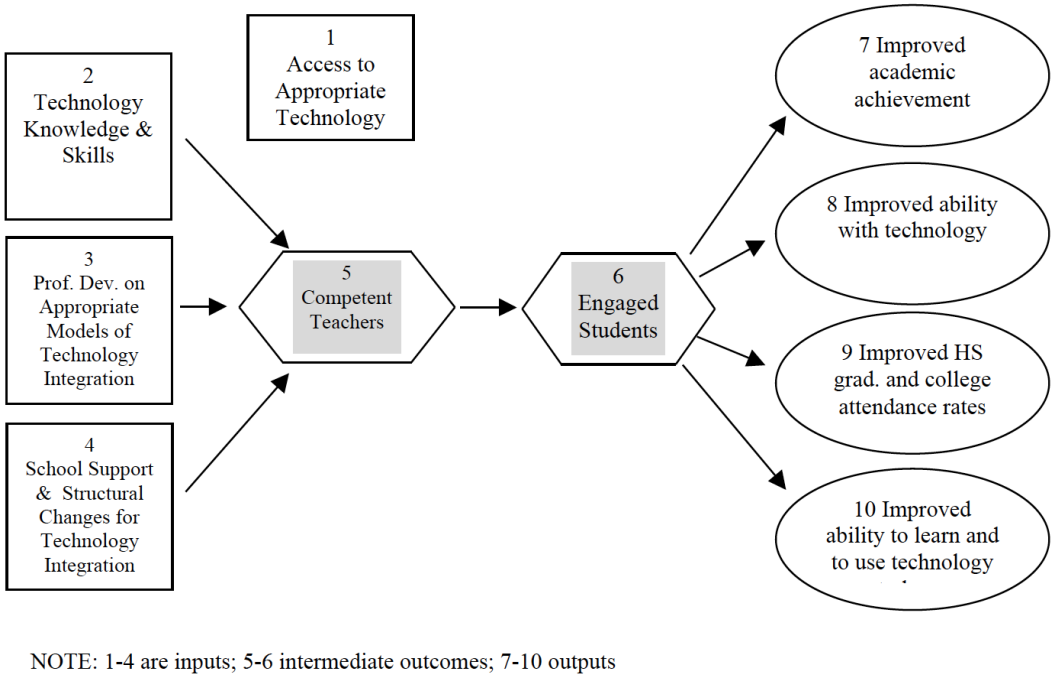
Davies' (2011) proposed framework for understanding and assessing technology literacy is based on a continuum of reeducation similar to that required for cognitive development; which is fitting since the goal of technology integration is also to develop cognitive thinking skills. The framework involves: (1) awareness; (2) praxis or training; and, (3) phronesis, that is practical competence and practical wisdom. This framework suggests that teachers need to utilize strategies that allow students to achieve the phronesis level. Students need not only know what tools are available and how to use them, but there needs to be a clear ability to make decisions about which technology to use and when. Davies (2011) refers to this as being able to answer the *why* question.

The Cognition and Technology Group at Vanderbilt (CTGV) framework places important consideration on the goals to be addressed by technology integration and the context for teaching and learning. The framework makes a clear distinction between the transmission and constructivist model and their direct implication for technology integration (Johnston & Barker, 2002). Where transmission models are teacher centered and involve the teacher as the disseminator of facts and skills, with the accounting of those facts and skills as an assessment of learning; the constructivist model is student-centered and involves knowledge constructed with learner interaction, the teacher taking a secondary role with the facilitation of learning and assessment includes formative assessments that are performance- based. This model aligns more closely with technology integration with a reformation of the school's pedagogy (Johnston & Barker, 2002).

The logic model is used to measure or evaluate the overall success of technology integration utilizing the CTGV framework. Adoption and use of the logic model makes the

assumption that it is recognized that successful implementation of integration happens over time and that all of the critical elements of access to appropriate technology, technology knowledge and skills, professional development on appropriate models of technology integration and school support and structural changes for technology integration are all present (Johnston & Barker, 2002).

Figure 1. Logic Model for Evaluation of Technology Integration



NOTE: 1-4 are inputs; 5-6 intermediate outcomes; 7-10 outputs

Figure 3. Logic Model for Evaluation of Technology Integration

(Johnston & Barker, 2002)

Conclusion

The findings from the literature reviewed point to the influence of a few critical factors in the perception of the integration of computer technology in teaching. These are inclusive of existing pedagogical beliefs, teaching environment, resources, and support from peers and

administration. The literature further indicates that successful technology integration is a science that requires the implementation of key frameworks and models that have considered the role of both teacher and student in this relatively new approach to teaching.

The literature manifests a gap in the best approaches to guiding teachers with practical ways to successfully integrate technology into their teaching. Further, there is a gap the literature as it relates to school administration's part in the formulation of the perception of teachers. This research study will seek to fill the identified gaps by adding to the knowledge in professional development and administrative responsibility in computer technology integration. The methodology in the next chapter establishes how the research will be conducted.

Chapter 3 Methodology

Introduction

This section will present the method utilized to collect data regarding the perception of teachers of the role of computer technology integration. This researcher utilized a qualitative approach to data collection and analysis.

The Qualitative Approach

Research in this paper was conducted utilizing the qualitative method of data collection and analysis. This paper, through its research questions, sought to find out "what" perceptions of teachers are based on their descriptions of their experiences. Qualitative research seeks to understand the meanings that individuals attach to phenomena that they experience within their world. Its aim is to capture experiences in a very natural environment (Ritchie, Spencer, & O'Connor, 2003). The research sought to describe the perception of teachers based on their understanding of the phenomena of technology integration. Data collection was done in the teacher's work environment providing the opportunity to better capture the natural experience that Ritchie Spencer and O'Connor (2003) spoke about.

Phenomenology

This study made use of the phenomenological design. Phenomenology aims to understand the constructs people use in everyday life to make sense of their world (Ritchie,

Spencer, & O'Connor, 2003). In the context of the research, this study sought to understand the nature of technology integration based on the understanding that teachers have developed in their mind based on personal experiences, philosophical and pedagogical beliefs, understanding of learnt frameworks, strategies, practices, and numerous other phenomenon.

Phenomenology uncovers meanings to situations based on conversations (Cohen, Manion, & Morrison, 2007) with those experiencing the phenomena. The goal of phenomenology is to 'explore' and 'probe' the lived experiences of the participants without contaminating the data or feedback with the perceptions of the researcher (Wimpenny & Gass, 2000). Since the charge to integrate technology is given on a worldwide scale, this method of research design has the ability to reach a broad audience and has the capability to have teachers share the lived experiences of their peers all over the world.

Population

This study examined the experiences of teachers in an independent private school in the Bahamas. Participants were teachers in that school. The school is a K-12, which means that it caters to students from kindergarten to the twelfth grade level. In order to get a good cross section of the teacher population, participants were chosen across the various grade levels. Therefore, one teacher was chosen from each range of grade level: K-2, 3-5, 6-8, 9-11 and grade 12 for a total of five teachers. Cohen, Manion, and Morrison (2007,) opine that the sample should best represent the entire population under study, therefore, selecting participants from a range as opposed to a random selection provides a more holistic coverage of the population.

Sampling

All teachers in the selected school are expected to integrate computer technology into their teaching. Therefore, any teacher from the various grade levels should make a good participant candidate. In order to aim for the best sample for the study, use was made of a non-probability sample method. Heterogeneous samples from the teaching population were utilized. This type of sample seeks to include phenomena, which will vary from each other (Ritchie, Spencer, & O'Connor, 2003). In this case, the variation will be across grade levels. This allowed us to get what Patton (as cited in Ritchie, Spencer, & O'Connor, 2003) described as maximum variation sampling.

Data collection

Gaining entry. Employment at the private international school made for easy access to respondents to participate in the collection of data for this research.

Data collection instrument. The interview was used as the main tool for data collection. Englander (2012) acknowledges preference of the interview as the main data collection procedure for the qualitative research. The interview grasps the point of view of the respondent and is powerful in associating meaning to the phenomenon being researched. The interview allows the simple recording of the lived experience of the participants and allows the interviewee to derive additional meaning from a single question through the use of follow-up questions. Gill, Stewart, Treasure, and Chadwick (2008) opined that interviews are best where there is little existing knowledge about what is being explored and specifics and details are needed from participants on a sensitive topic. The interview is the best method for our purposes, as the

perception of teachers about their role in technology integration has never been collected from teachers in this private, independent school in the Bahamas. Further, there is no recorded evidence that such information has been collected from teachers in any school in the Bahamas.

Data collection procedure. The interview utilized was in-depth, which is considered a "conversation with a purpose" (Ritchie, Spencer, & O'Connor, 2003). They noted that the purpose is developed based on the role in which the interviewer perceives himself. Kvale (as cited in Ritchie, Spencer, & O'Connor, 2003), describe the interviewer metaphorically as either a 'miner' or a 'traveller' where the conversation is as a result of the interviewer actively digging for the knowledge about the existing phenomena or leads the interviewee into telling his deep story about the existing phenomena.

The interviewer utilized the semi-structured technique for data collection. This allowed the interview to be guided by a few structured questions, with the freedom to deviate and ask follow-up questions (Gill, et.al, 2008). Utilizing this interview technique allowed teachers to share their experiences about technology integration in the classroom, but also stimulated ideas about certain practices that were not previously considered. This forges a deeper meaning, stimulates questioning and generates new ideas. The interviews were conducted over a period of two weeks. See Appendix B for the guiding interview questions.

Data Analysis

As previously indicated, the goal of the research is to collect personal accounts in the natural environment of teachers, as it relate to their perception of their roles in the integration of technology into the classroom. Interviews were used as the data collection method for teachers

to relate their story; therefore, the more fitting method of data analysis is that of a narrative analysis.

Riessman (as cited in Ritchie and Lewis, 2003), asserts that the narrative analysis identifies the story that is being told with a focus on the construction, intention of the teller, nature of audience, and meaning of the story. A narrative analysis in this research will allow a recall of the teacher's story about their perceived role in technology integration. The purpose of the responses is simply for the participants to tell their story and for the researcher to record the story being told. The narrative will allow the teacher to tell their perceived role in technology integration, as well as details inclusive of inhibitions, beliefs, and skills.

Presentation of Data

The findings will be presented in response to the research interview questions, as this method seems more practical given the research topic. Cohen, Manion and Morrison (2007) opined that this method allows the research questions to be analyzed in a fairly coherent manner.

The interviews were audio recorded for accuracy and field notes were written about facial expressions, body language, and other nonverbal cues during the interview process. Field notes and responses to interview questions were pared down in order to establish their intended meaning, labeled, and coded to make the analysis more practical. The interview questions in each of the sub-questions were further broken down into a table with direct responses to the question included. Similar or exact responses from different teachers were grouped together forming the first level coding. Individual questions were printed with highlighted notations, which led to the identification of categories within each of the sub-questions helping to form themes. Thematic charts were developed from the data, which allowed the key points in all of

the data to be easily summarized (Ritchie, Spencer, & O'Connor, 2003). The use of non-cross sectional data organization was used which involves looking at particular parts of the data separately; each of which may require a different conception of categories.

Ethical Issues

Where the employment situation of the researcher presents easy access to participants in the study, it also presents ethical concerns. In an effort to ensure the integrity of the research, certain issues need to be identified and addressed. The interview process is preferred in qualitative studies such as this because they allow and encourage feedback in natural environments and allow natural responses. In an effort to maintain natural responses, the interview questions were not be shared with respondents before their scheduled interview. This allowed more natural and unrehearsed responses. Another issue to be addressed is that of confidentiality. Interviewees may be a bit hesitant to offer non-guarded responses because of familiarity with the interviewer and apprehension about their identity and responses being revealed . Therefore, there were assurances given to participants that their identities (the researcher used pseudonyms) and responses would be kept confidential. Recognizing that it would be unethical to carry out such a study without the knowledge of the principal; permission was sought for the study to be conducted at the school. Consent from the head of the school is important as an indicator that the principal is willing to have teachers participate and data collected. Upon receiving consent, assurances were given that all parties (including the principal and the school) had the option to withdraw consent and participation at any time.

Limitations

Time and access proved the major limitations in the study. The interviews were conducted during the regular school day. As such, even though interviews were scheduled, unforeseen circumstances arose that prevented some interviewees from meeting at the scheduled time. This limited access to the teacher caused a major time delay as the interviews had to be rescheduled for the same time the following week. Rescheduled interview sessions extended the time planned for the sessions from one week to two.

The interviewer is not trained to conduct interviews from an academic perspective. Therefore, opportunities may have been missed during the interview to ask follow up questions that could have helped to enhance the findings of the study.

Delimitations

The interviews took place in the teacher's classroom or an area very near where instruction took place. This proximity to actual instruction allowed teachers to be in their natural environment with the likelihood to provide accurate and concise responses. The sample size was also a delimitation. Having a sample size of five allowed the interviewer to sample teachers from all levels of the school while providing data that was manageable given the time allocated.

Key factors in the research process are validity and reliability (Cohen, Manion, & Morrison, 2007). Having these in place ensures that others are able to feel confident in the results of the findings. Winter, (as cited in Cohen, Manion & Morrison, 2007, p. 133), found that validity is more than ensuring that the data collection instrument does what it should do, but included additional aspects of validity including "honesty, depth, richness and scope of the data

achieved." The overall attitude of the researcher is also a critical component as the interest or lack thereof can be detected by participants and thus responses can be reflective of that. It should also be recognized that respondents bring with them a level of bias, opinions and subjectivity; therefore, it should be recognized that the goal should be to minimize invalidity rather than a complete eradication of it, which may be an impossible feat (Cohen, Manion, & Morrison, 2007).

Where many writers have varying definitions of what constitutes validity, common in the findings is the attention that needs to be given to the accounts or events from the perspective of the respondents and the importance placed on understanding what is being shared (Cohen, Manion, & Morrison, 2007).

Reliability in research is a 'fit' between what actually happens and what is recorded to have happened in the natural setting. The achievement of this fit leaves room for subjectivity. A reliable fit can however be achieved through stability of observations, parallel forms and inter-rater reliability (Cohen, Manion, & Morrison, 2007). During data collection with teachers, the researcher can determine whether the same conclusions would be drawn at a different time and place, if attention was being placed on other phenomena during data collection or whether another researcher would have made the same conclusions. It is critical that efforts are taken in order to ensure the validity and reliability of the findings is achieved.

Conclusion

Technology in education is seen as a necessity for preparation of school age children all over the world. As a matter of fact, technology use is sometimes advanced as a measuring stick for preparation for the 21st century. It remains an imperative that teachers continue to view

computer technology as they do all other technology that has been used in the classroom; as another tool that can help students to become engaged and purposeful learners.

Chapter 4 Results

This study was conducted to explore the perception of teachers in the integration of computer technology in their teaching at a private K-12 independent school in The Bahamas. The purpose of this chapter is to present the findings from that study. The collection of data was done over a period of two weeks at the selected school. Five teachers were interviewed in order to ascertain a personal account of their experiences and views on the research topic. Data from the findings will be summed up here.

Table 4: Participant demographic information

Teacher Pseudonym	Simon	Hannah	Melanie	Karen	Camille
Age	25	47	25	43	30
Gender	M	F	F	F	F
Years Teaching	7	15	6	12	6
Grade Level	12	9 - 11	6	3 - 5	K - 2
Subject	Physics, Biology	English	Math, Language, Social Studies, Science	Math, Language, Social Studies, Science	Math, Language, Social Studies, Science

A LOOK AT THE PERCEPTIONS OF INTEGRATION

The findings from this research will be presented in three main sections in response to the three research questions presented in the study. Non-Cross sectional data organization was used, which involves looking at particular parts of the data separately each of which may require a different conceptualization of categories. The structured recount of the findings is based on the derivation of themes developed in the examination of the findings.

Research question 1. How does the comfort level of teachers with computer technology influence its perceived role in integration at a private K-12 independent school in the Bahamas?

To answer research question one, the data from the interviews was examined and used to generate codes and categories. These categories formed the emergence of the following themes:

Theme 1: Guide students in making connections between their learning and the future use of what is being learnt

Theme 2: Use practical examples for integration to make learning more meaningful

Guide students in making connections between their learning and the future use of what is being learnt - There were a number of interview questions asked of the participants in order to best ascertain their feelings about question one. Their responses on the familiarization and comfort with a number of Web 2.0 tools and ways that they could use these tools in their teaching caused themes to emerge.

Teachers acknowledged familiarization and comfort with a number of Web 2.0 tools. These tools included: telephone apps, such as WhatsApp for ease of communication and collaboration; desktop productivity tools, such as word processors, spreadsheets and

presentation tools; communication tools, one of which was email; video conferencing tools, such as Skype, banking, blogging, shopping; and, social media tools and applications.

Teachers further acknowledged that the tools that they used personally are the ones that they find themselves using in their classroom. Teachers saw the connection between what is done in the classroom and its connection to the real world. Most teachers accede to the fact that their main goal, as educators, is to prepare students to be able to function in the future. Therefore, computers are a must in the classroom.

Karen pointed out that

> Education leads you to the world and the fact that the computer is being used heavily in the world - registers, credit card, banks, government offices - children have to be able to use those tools when they get there, as a client or as a customer or even when they become an employee at the end of the day so the classroom is almost a microcosm of what is in the world.

From Hannah's interview, it was noted that the tools used most personally are the ones that are used in her class, perhaps without recognizing it. She said of her personal use, " I use email, social media, Skype, iPhone, Viber, more things to stay in touch with my children who are away. More communication than anything else, online banking, shopping some, taxes, schooling - total online degree." When asked about the computer technology tools integrated into her lessons, Hannah who noted that she would not consider herself the most "tech savvy person," stated that she makes use of "Docs, slides trying to put my lessons in slides and have more presentations that way - that is my goal this year - the LMS, EdPuzzle (flipped classroom). I use

the videos and quizzes on there, Facebook." These tools almost mimic the ones that she uses personally.

Simon, who is considered very tech savvy and uses computers heavily personally, pointed out that he integrates computer technology in his classes by using it for "Simulations, iPad Apps - simulators, interact with different things like waves, projector, websites, cell phones, students download apps (on their phones) and interact, spreadsheets - graphing data, video recording, analyzing data". He further pointed out that his learning using computer technology personally is directly connected to what he gives his students in the classroom. He reflected by saying,

> For example in my own personal life, in my own personal pursuits, there is something called MOOCs, which means that I can learn something to improve myself and the way that I teach my students, which was not available 5 - 10 years ago. I can learn something in programming free at my computer at home and then use what I learned to teach my students. So, as a teacher, you can learn and bring the excitement back in yourself and then transfer that excitement back to your own students.

Melanie acknowledged that she recognized that integrated computer technology allows the preparation of students for future employment. She stated that teachers "should help them to prepare for that future in order to secure those jobs that technology is needed in."

Use practical examples for integration to make learning more meaningful - Teachers generally realized that the more comfortable they were with computer technology, the more likely they were to use it in their teaching.

Simon acknowledged that comfort level plays a critical role. “I guess it plays a big role. Because I am comfortable and aware of so many things that it can do, that helps me to be more aware of the role that it can and does play.”

Many respondents indicated that they had received training for technology integration during professional development sessions with the technology specialists or with colleagues. These sessions allowed them to develop their personal technology skills and see practical ways that they could integrate computer technology to enhance their students learning. Simon noted that he learnt quite a bit during professional training for his degree, which helped to form practical ways of using technology as a teaching tool, as well as ways to integrate technology to enhance student learning.

> I look at my own training which was some time ago. The level to which it was integrated was limited to the technology that was available at that time, so I could have just stuck with PowerPoint and said that this is what I learnt, so as long as I am doing this, then I am integrating technology. There are many teachers who may be stuck like this at that level and not looking forward, so if you, as a teacher, are not looking for new ways of keeping it relevant, it can be not utilized to its fullest potential.

Simon shared other practical ways for integration as he reflected that

> Sometimes it’s the app that I give them and I say that you can use this phone, but we are going to use this app. But the intent that I am showing them at the advantages that they have over when I was in school, because when I was in school, I had to do the same thing in such a laborious way, but now you have this

technology and you can use this and find out any information in a short space of time showing them one, how the app is used to learn the particular content and two, you have the opportunity to use a tool that I was not able to so why not use this to do some more exploring on your own.

Research question 2. How do expectations from administration to utilize computer technology influence teachers' perception about its role in integration at a private independent school in The Bahamas?

To answer research question two, the data from the interviews was examined and used to generate codes and categories. These categories formed the emergence of the following themes:

Theme 1: Generates a sense of being mandatory for student development

Theme 2: Generates a sense of urgency for student future

Theme 3: Viewed as something requiring substantial planning

Generates a sense of being mandatory for student development - Where teachers could not recall a clearly documented policy for the type or level of computer technology integration, they acknowledged that there were quite a few non-verbal, non documented cues as to the expectations of administration, as it relates to integration. The comments of teachers gave a clear indication that the actions of administration generate a sense that computer technology integration is mandatory for student development.

Simon believes that administration " realizes that students are exposed to tech on a daily basis, so they want us to utilize it as much as possible." Hannah indicated that administration's expectations and sense of urgency is evident in the requirements for student resources: "There is an expectation - it is not very explicit. Because the students are required to have laptops and the

school has provided lots of resources for it." Similar to Hannah, Karen realized that there is an expectation from administration for student development. She pointed out that based on the money spent, "it's expected that it is happening that the students are efficient and proficient in some instances." Melanie also pointed to what she believed were the expectations for student development through computer technology integration by suggesting that the Academic Technology Director and Instructional Technology Specialist were hired to teach kids how to be responsible in computer technology. Karen suggests that the expectations from administration help her to realize the importance of computer technology to the lives of students. She said of administration that "their expectations definitely reinforce what I have always realized to be truth, in that, computer technology really has a big part to play in educating our students. Their expectations cement that belief for me."

Where teachers generally recognized the importance of administrator expectations in supporting student development through computer technology integration, they did not see it as the thing driving their perception. Many teachers interviewed suggested that they include and integrate computer technology into their teaching because they themselves view it as being very important. This is evident in what Simon said "I realized what the role of technology was before coming here and having all of these resources. Before, I was merely limited by not having the resources that I needed." Melanie echoed similar sentiments when she stated that "I have always realized the role of technology as a tool to enhance student learning, so their expectations do not really influence my perceptions." Camille suggested that there was no influence at all stating that, "Not at all. I am unclear about what the expectations are, so I just do what I think should be done as it relates to integration."

Generates a sense of urgency for student future - All teachers indicated that the involvement of administration gives a clear indication about the urgency that administration places on preparing students for their future.

Simon recalls that

> There are times when they come in and you're using it and a member of administration stops in and if there is an opportunity for them to become engaged, they become engaged and they show the students that you're using technology in the right way to learn, let me show you how we can enjoy this for the right purposes and the students see that.

Karen indicated that administration's response via listening to teachers' suggestions and making resources available allows the accomplishment of goals. Similar to Karen, Melanie's feedback that the provision of resources, such as 1:1 class laptops, this school year allows the accomplishment of so much more with the students.

Viewed as something requiring substantial planning - Simon pointed to the money invested in the computer technology resources available in the school as an indicator of the importance that administration places on successful integration.

Training for technology integration is an aspect that came across as requiring substantial planning; thus indicating administration expectations about the role of technology. Teachers acknowledged that planning for training should be at all levels.

Teachers acknowledged that there is some planning for training from the technology department. There are some ideas, resources, and training about technology integration provided by the technology department in PD and one-to-one training as indicated by Karen and Melanie.

Camille pointed out that, "Some provided by the Instructional Tech Specialists and the help desk. But not a whole lot."

These teachers pointed out that planning for training provided by this department acts as a testament of the importance that administration places on technology integration in teaching, but noted that there could be more. Karen suggested that the technology department staff, "Gives feedback on integrated lessons and being sure to have technical support readily available." Melanie was also specific about the overall support from the head of the academic technology department "when I say to the director I want to do this - she says let me talk to the other administrators." The hardware and software support for Simon by this department was also evident. He suggested that, "If there is something needed, I can get it, I've never been denied anything as yet and for me that is all of the support that I need." He further pointed to the planning for training that he has received, stating that, "In some instances in Physics, the dead of department has trained me in using some of the tools that I was not familiar with."

Research question 3. What are the perceptions of teachers in a K-12 private independent school in the Bahamas about the role of computer technology integration in their teaching?

To answer research question three, the data from the interviews was examined and used to generate codes and categories. These categories formed the emergence of the following themes:

Theme 1: *enhances learning*

Theme 2: assists with learning

Theme 3: engages students more

Theme 4: promotes deeper learning

Theme 5: reinforces lessons

Theme 6: increases OR enhances expertise development

Theme 7: presents more efficient method

Theme 8: facilitates student-teacher communication

Theme 9: manifests students strengths and weaknesses

Enhances learning - Many teachers interviewed in the study felt that the use of computer technology improved the quality of the learning experiences for students. Teachers acknowledged that the integration of computer technology brought some variation to the monotony of a regular lesson.

Simon provided an example of this enhanced learning when he described ways that he used computer technology in his biology lesson:

> In Biology there are apps, so when you take the phone and you test the heartbeat and they can see the little bleep and they realize that hey this is giving me some information on my body - well it's called biometrics. Things like that are always relevant and they are keeping technology relevant for the lesson and showing the students that it always has a place, as something that can be used.

Enhancement of lessons was supported by what Melanie said, as she made comparisons between teaching with and without computer technology:

> Its role is to enhance what you are able to do - I've taught at a school where there was no tech, so when I see what I can do with the internet and apps and computers to what I could do on Eleuthera, there is a big difference when I am teaching the

> same content. There is a better-enhanced way where I can bring in the rest of the world easily.

Assists with learning - Some teachers interviewed acknowledged computer technology as a tool for assistive learning. Recognizing that all children do not learn the same and that some students have learning challenges, teachers felt that if integrated correctly, computer technology could provide the extra help that some students need when learning new content. This was clearly expressed by Karen when she opined that

> It's also an assistive tool with students who may have had a diagnosed situation or students who can't write. They are struggling with that, so the computer would be a tool and they still will be able to complete the task using a different method.

She further acknowledges that she is able to reach more types of students with technology; indicating that, "Technology levels the playing field for more students". Camille held a similar stance pointing out that,

> I've been able to see how it can aid learning - especially differentiating learning and different types in the classroom. It helps me to see how the kid in the classroom, who is a visual learner, is really getting the content and quality of learning like the kid who is an oral learner. Those kinds of things.

Engages students more - Simon found that the engagement of students using computer technology helps more in stimulating interest in the lesson as well as makes the students more active in their own learning:

> So there are some times when I guide them and there are some times when I leave it open and hope for them to explore by challenges - Like sometimes I can give

> them a challenge for homework and say who can come up with the five best ways that this app can be used to apply this law of physics and I make it a challenge. I make it fun; and when you get them involved like that it helps.

Some teachers suggested that the introduction of technology into a lesson is of itself an enhancement to the lesson. Melanie found that this is because of the traction that technology brings with it: "Students love technology so if you are using technology they are already a little more engaged. Because there are so many different things that you can do, there are so many different ways that they can show what they are learning."

Camille's views were reflective to those of Simon in recognizing the increased level of student engagement with the introduction of technology into a traditional classroom. She further suggested that technology helps students to experience things that they would not have been able to experience in any way without the use of technology.

> Because when you think of a curriculum that is experiential based and you ask what is it that they should be doing rather than sitting and being told - when you are able to introduce technology into a more traditional classroom where children are just sitting and being told, you are able to make it more exciting and engaging, more interactive. You're able to help them to experience things.

Promotes deeper learning - Melanie acknowledged that computer technology integration allows students to experience some things that would not have been possible without having computer technology as a tool. She also acknowledged the questioning that she self-engages in as she prepares for computer technology integrated lessons, as well as the changing to her thinking as she transitions the use of the computer.

> The more I learn, the more I think it's beneficial provided there is true goal setting behind it and not using an iPad. Because I can use an iPad it's like the SAMR model. How do I change my assignment to make it better and more authentic using technology? Where some of the things that we can do, you can do it just as easily writing it as using technology, but other things would be totally impossible if we didn't have the technology.

It was observed that this teacher promotes deeper learning of geography and map skills in social studies lessons by guiding students in being engaged in an activity called Mystery Skype with students and teachers from other countries around the world.

Hannah also perceived computer technology integration as helping to facilitate deeper learning in a regular and necessary activity, such as providing feedback on student essay drafts. She noted that an activity like this is possible through a shared collaborative document where she is able to give feedback on students work while they are typing it. She uses the opportunity, provided in the activity to ask questions of them, which stimulates them to question their writing and think more deeply as they write.

Simon pointed out that the challenges that he gives students using computer technology is what enhances learning for them:

> Sometimes I'll put the technology up front and say - this is related to the topic that we have been discussing, figure it out and see what you can get from it. Look at the sensors, read the manual and see if you can tell me what we're going to be using this for and I don't say anything else, I just let them toy with it for about 15

- 20 minutes and sometimes because they are so comfortable with technology, they figure it out and tell me how it's related to the content that we are studying.

Reinforces lessons - Hannah pointed out that she does not view technology as a separate tool but something that can be used to reinforce lessons. Camille pointed out the ways that technology is used to reinforce the experiential based nature of teaching that is done at the school. She reinforced how technology can be used to get students out of their seats and to participate in the lesson in ways that it was designed to be experienced. She later pointed out that, as a tool that can quickly be used for assessments, those results quickly highlight the students who "might be struggling and who might need ideas reinforced."

Increases or enhances expertise development - Teachers acknowledged that computer technology integration helps to develop experts in many areas, specifically, from those skills taught and learnt by the teacher. Students deemed experts in certain areas help others and, in some instances, provide assistance to teachers; something that teachers are not ashamed to acknowledge.

Karen welcomes students taking the lead in technology, clearly stating that she is open to students taking the lead and teaching new things which she views as collaboration between her and the students. She further noted that, "If a student would have learnt it before, I would say here is an expert, let's learn from him together. So it's very open, very non-threatening. So, it's collaborative happening at the same time." Camille acknowledged that using computer technology enhances the development of problem solving skills; helping to develop experts in that area. She pointed out that she lets students help to troubleshoot technical problems then decide when to call it quits and what other options could be used to carry on with the lesson.

Presents more efficient method - Most teachers interviewed suggested that computer technology integration allows more efficient methods of completing tasks from both the teacher and student perspective.

Karen compared the tools used in school when she was a student and what she was able to get done compared to what students are able to accomplish today through the use of computer technology. She pointed out that, "It is another resource. I remember, for example, in my days of school the textbook would have been the resource, so the computer is another resource, a easier and more efficient way to get work done. Efficient in terms of getting more done within the time." Camille alluded that the use of smart boards is one way to share information with her students allowing her to use her time more efficiently:

> I think that one of the ways that I have tried to use it - since we have our smart boards, I try to use it in more of a sustainable way … I have replaced some things. I would be generally handing things out, on paper or using Expo markers. So its replaced sort of things that I would do orally. I use it in a group setting and am able to post information with kids.

Melanie pointed out that integrated computer technology allows students to have more efficient methods of presenting what they have learnt. She says that, "There are so many different ways that they can show what they are learning. It doesn't just have to be an essay anymore - it could be a video, stop motion movie, it could be a slideshow, there are so many more possibilities."

Facilitates student-teacher communication - Many teachers acknowledged the role of computer technology integration in the facilitation of student-teacher communication. Hannah

views the use of Google Docs as a great way to provide feedback to students in real time with the opportunity for students to ask questions that they may not normally ask:

> I did not know how to use the technology and once I started using it, I saw its role in student - teacher communication, it's so much easier to find student work as I have students save all of their work online in Google Drive and I can give marking and feedback online quickly, so it facilitates communication.

Hannah also confirmed that the tools that she uses most in her class are those that allow for more communication; for example, the Google Docs, Skype.

Karen acknowledged that students collaboration on documents and by blogging allow her to communicate with them. She further reiterated that when students teach her something new to be shared with the class, that collaborative communication proves very useful and builds student-teacher interaction.

Manifests student's strengths and weaknesses - Camille views the computer as a tool with the "power for assessment and to check where kids are at and be able to meet them there - who might be struggling and who might need ideas reinforced - that is the thing that I found most helpful." Melanie acknowledged that she is able to see the difference in the level of understanding in students through the use of computer technology being integrated. She further suggests that the integration of computer technology and the learnt familiarization of the technology by the students empower them. She noted that empowerment happens when "we say that we don't know and we want them to try it out and see what happens, then to share it with us." Hannah acknowledged the use of technology integration as being able to assist students in being able to "research to a higher degree.

Chapter 5 Analysis of Results

Overview

The perception of teachers about the role of computer technology integration in a K-12 independent, private school in The Bahamas was the focus of this research paper. The findings in this paper are based on very structured interviews with five teachers from all levels of the school and with varied years of teaching experiences. Some of the findings from the research were consistent with the literature reviewed from previous studies. The findings from the research questions will be discussed using the themes established.

Teachers in this research generally believed that computer technology integration is critical for teaching today's 21st century learners. They also generally believed that administration at this K-12 independent private school is supportive in this venture and that computer technology integration has many benefits for students in the school environment.

Conclusions

The findings from this research are that teachers perceive computer technology integration to be more useful and they are more successful when students are able to see some value in its use and connect it to their future. Earlier research also found this to be true such as the collaborative writing, *"Why Do We Need Technology Integration?"* (2007) where the writers found that the incorporation of computer technology into the learning experience of children makes it more meaningful and revolutionizes the learning process. Further, Lim, Zhao, Tondeur, Chai, and Tsai (2013) highlighted the importance of teachers in being involved in the process to develop policy and curriculum critical to students in the future. Savery (2002) found that when

pre-service students see teachers incorporating technology into their everyday life, they see the practicality of its use and will most likely incorporate it as a tool for collecting information and communicating ideas. Ryba and Brown (2000) also supported this belief, taking it a bit further by recognizing that teachers who established authentic learning task for students were more likely to integrate technology in their teaching. In the research, Hannah's initial hesitation towards integration was as a result of the lack of pre-service training for integration. Age, as translated by years of teaching experience, may have also been a factor here, as Inan and Lowther (2009) noted, that veteran teachers were less likely to integrate technology as compared to novice teachers. This important role of modeling by teachers for the future of students was echoed by Karen and Camille in their interviews, helping to develop the theme of the connection between what is being learnt through integration and the future use by students.

Thematic results from this study about the use of real life examples to make learning more meaningful were highlighted by Simon and Karen. In their interviews, both pointed to their comfort and familiarity with computer technology, pre-service training, professional development, and beliefs about the importance of computer technology in learning as the keys to the level of computer integration they are able to use.

These teachers personal use of many applications and tools transitioned into their teaching in very practical ways, as was seen especially with phone apps and communication tools, such as Skype, email, and Google Docs. The teachers in the study support the conclusions by Inan and Lowther (2009), using the path model. These researchers found that teacher readiness, beliefs, and proficiency have a significant positive direct effect on technology integration. Johnston and Barker (2002); Chanlin, Hong, Horng, Chang, and Chu (2006);

Harris, Mishra, and Koehler (2009); Culp, Honey, and Mandinach (2005); and Inan and Lowther (2009) also pointed to the teacher's ability through experience and use with tools, personal use of computers, professional development with computer technology integration in teaching, pre-service training, readiness and personal beliefs, as being important in the success of computer technology integration into teaching.

Results from the study point to the personal and pedagogical beliefs of teachers about the role of technology integration for student development. Ertmer (2005) found that beliefs will definitely influence practice, as it relate to computer technology integration. Hannah and Camille both indicated that their initial lack of technology use in the classroom was as a result of pedagogical beliefs. They both admitted to a 180-degree turn in beliefs and then in use once they realized how important technology were to the development of their students' future and to administration's cues that technology use is mandatory for student development in the 21st century. Melanie, in making reference to Puentedura's SAMR model, recognized the transitions that needed to happen in her own pedagogical thinking in order to make use of computer technology, as a means of integrating for student development.

Gaible (2008) substantiates Simon's analysis of the importance of the involvement of administration for having a clear vision about how technology integration can impact and guide student future. The difference is in the view of the purpose of the future role, where the focus of HEART Trust/NTA is on ICT training for future employment, the purpose of technology integration in this school is in the development of critical thinking skills and the use of ICT for problem solving and effective communication.

Expectations from administration, as it relate to the role of integration in teaching, caused the generation of the theme that teachers viewed integration as something requiring substantial planning. This planning is critical not only at the classroom level but especially at the administrative level. This study echoed Onuoha (2014) in the study of the implementation of the eCAL and eConnect and Learn programs. Teachers perceive that clear and transparent goals and objectives, thorough planning of hardware and software, require substantial planning and will lead to better computer technology integration.

Structured professional development was also something viewed as requiring substantial planning by teachers. This was similar to what SITES 2006 found in that school setting inclusive of administrative support, peer collaboration, and technical support; all lead to increased integration. Camille corroborated the findings of Onuoha (2014), Clarke (2007) and Gorder (2008) as it relate to the necessity of continual and increased professional development and collaboration for success in computer technology integration. She was adamant in her stance that there was a lack of personal administrative support and that the little time given for collaboration among peers was insufficient for growth in the area of computer technology integration.

The findings from this study, as it relate to the perception of teachers about the role of computer technology in teaching reinforce what Ertmer (2005) found, in that computer technology, when viewed as a tool, enhances learning and adds value to what is being done in the classroom. Teachers in the study reinforced the findings of Jaffe (as cited in Gorder, 2008), where they concluded that the value of computer technology integration, in that it assists with

learning, engages students more, promotes deeper learning, reinforces lessons, facilitates student-teacher communication, and manifests students strengths and weaknesses.

Discussion

This research has resulted in a number of finding, as it relate to the perception of teachers about the role of computer technology integration in their teaching. All teachers in the study perceived computer technology integration to have a critical role in their teaching. All teachers further acknowledged that their comfort level with computer technology influences their perception of the role of technology in their teaching, as well their ability to successfully integrate it in their teaching. Comfort level is determined by the level of training, and the teachers in the study opined that professional development provided to staff for computer technology integration is insufficient for proper computer technology integration. Faculty at all levels should be provided with training, so that they are able to have the necessary skills to properly integrate technology in their teaching. Proper integration allows computer technology to be used as a tool for the development of critical thinking skills needed to solve problems.

The expectations from administration to utilize computer technology do not greatly influence the perception of teachers about its role in integration. That is mainly because the expectations are not clear to faculty. It is critical that faculty is aware of the expectations across all grade levels, so that they can make the necessary effort to meet those expectations.

It was hoped that this study would fill gaps from the existing literature reviewed in this study. As it relate to the best approaches in guiding teachers with practical ways to successfully integrate technology into their teaching. The teachers interviewed made a few suggestions. Teachers found that participating in meetings where actual classroom subject teachers had an

opportunity to share strategies and resources that they were successfully using was a great help, and should be encouraged. This peer sharing removes trepidation about integration and provides practical solutions to real world problems. Other teachers reiterated the need for time to be allocated for colleagues teaching the same subject and grade levels to sit and collaboratively plan for technology integration. This collaboration is separate from time spent with an integration specialists providing initial guidance.

As it relates to administration's part in the formulation of the perception about technology integration, teachers also had suggestions. Some teachers suggested that administrators should carefully map out the overall goals and objectives of technology integration. Other teachers suggested that administrators should demonstrate how technology integration looks by using integration in meetings and during training sessions that they give to staff.

Implications

Some teachers in this research claimed that they have "no idea what the expectations are," as it relates to computer technology integration, and others have made assumptions and educated guesses based on the provision of resources. Therefore, the big goal outlined in the school's strategic plan, as well as the expectations at all levels, need to be clear. Having a clearly stated strategic plan that outlines computer technology integration will provide clarity and direction at an institutional level about the importance of computer technology in the preparation of students for the future. Documented expectations can hold all faculty responsible for their role in integration. Presently, the expectations of this important process are a 'guessing game' to too many faculty . Clearly stated goals for computer technology integration will set the path for

teachers to be able to reassess their views about technology integration, to reassess strategies for integration and to better consider the found implications of integration.

Recommendations

The researcher recommends that administration take a structured approach to the assessment of staff needs and design training programs for faculty at all levels. This training should be frequent and focused according to Bellanca (as cited in in Johnston & Barker, 2002). As Wepner, Tao and Ziomek (2006) asserted that technology integration is not a 'one size fits all,' staff need to be trained in the integration of computer technology in their teaching at their level and within their specific subject area. This will happen after the identification of a model that is best suited for the school to integrate technology considering guides by Okojie (et al., 2006); Harris, Mishra and Koehler (2009); Pelgrum and Law (2008); Davies (2011); or Johnston and Barker (2002). Planning training topics and sessions with staff to teach them how to use SAMR model, is also a useful method, as indicated by Melanie in the study. Appropriate methods also need to be employed to evaluate teacher understanding of learnt concepts in order to provide more individualized learning plans.

Conclusion

This study described the perception of teachers about the role of computer technology integration in their teaching at a private K-12 independent school in the Bahamas. This paper provides evidence that most teachers recognize that the integration of computer technology in their teaching is critical for the success of their students as 21st century digital citizens. Limitations in clearly defined computer technology integration goals by the school's administration and a lack of structure in professional development threaten the level of success that teachers are able to achieve and by extension the critical thinking and problem solving skills attainable by students. These limitations and potential barriers were gathered via interview responses. Recommendations were made to mitigate those barriers and to guide teachers in continued successes in integration.

On a broader scale, the study reveals the proximity of this school in the successful integration of computer technology into its overall curriculum. Based on findings by key researchers in the literature reviewed, there are only a few minor adjustments and additions necessary. As such, the significance of this study can be appreciated by the identified stakeholders. A clear goal and structured professional development will allow the school's management and administration to easily measure teacher's performance and make plans for human resource development. The Bahamas MOE can use the school as a model for technology integration in its schools. The school operates in the climatic conditions and has access to the same service providers available to MOE schools. Caribbean and international bodies are able to use these findings to measure the application of such a critical component to today's educational system from the perspective of a school in a small island state.

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Appendix A

Table 1. Employment and wages of major occupational groups, 2006, 2010, and projected 2020

(Numbers in thousands)

Matrix code	2010 National Employment Matrix title	Employment			Change, 2006–2010		Projected change, 2010–2020		Median annual wage, May 2010[1]
		2006	2010	2020	Number	Percent	Number	Percent	
00–0000	Total, all occupations	150,620.0	143,068.2	163,537.1	–7,551.8	–5.0	20,468.9	14.3	$33,840
11–0000	Management occupations	8,771.9	8,776.1	9,391.9	4.2	.0	615.8	7.0	91,440
13–0000	Business and financial operations occupations	6,831.9	6,789.2	7,961.7	–42.7	–.6	1,172.5	17.3	60,670
15–0000	Computer and mathematical occupations	3,313.2	3,542.8	4,321.1	229.6	6.9	778.3	22.0	73,720
17–0000	Architecture and engineering occupations	2,583.2	2,433.4	2,686.2	–149.8	–5.8	252.8	10.4	70,610
19–0000	Life, physical, and social science occupations	1,172.6	1,228.8	1,419.6	56.2	4.8	190.8	15.5	58,530
21–0000	Community and social service occupations	2,385.5	2,402.7	2,985.0	17.2	.7	582.3	24.2	39,280
23–0000	Legal occupations	1,222.2	1,211.9	1,342.9	–10.3	–.8	131.0	10.8	74,580
25–0000	Education, training, and library occupations	9,033.7	9,193.6	10,597.3	159.9	1.8	1,403.7	15.3	45,690
27–0000	Arts, design, entertainment, sports, and media occupations	2,677.0	2,708.5	3,051.0	31.5	1.2	342.5	12.6	42,870
29–0000	Healthcare practitioners and technical occupations	7,197.6	7,799.3	9,819.0	601.7	8.4	2,019.7	25.9	58,490
31–0000	Healthcare support occupations	3,723.5	4,190.0	5,633.7	466.5	12.5	1,443.7	34.5	24,760
33–0000	Protective service occupations	3,162.9	3,302.5	3,667.0	139.6	4.4	364.5	11.0	36,660
35–0000	Food preparation and serving related occupations	11,352.4	11,150.3	12,242.8	–202.1	–1.8	1,092.5	9.8	18,770
37–0000	Building and grounds cleaning and maintenance occupations	5,744.6	5,498.5	6,162.5	–246.1	–4.3	664.0	12.1	22,490
39–0000	Personal care and service occupations	4,877.6	4,994.7	6,331.4	117.1	2.4	1,336.6	26.8	20,640
41–0000	Sales and related occupations	15,985.4	14,915.6	16,784.7	–1,069.8	–6.7	1,869.1	12.5	24,370
43–0000	Office and administrative support occupations	24,344.0	22,602.5	24,938.2	–1,741.5	–7.2	2,335.7	10.3	30,710
45–0000	Farming, fishing, and forestry occupations	1,037.8	972.1	952.6	–65.7	–6.3	–19.4	–2.0	19,630
47–0000	Construction and extraction occupations	8,294.5	6,328.0	7,735.2	–1,966.5	–23.7	1,407.2	22.2	39,080
49–0000	Installation, maintenance, and repair occupations	5,883.3	5,428.6	6,228.7	–454.7	–7.7	800.2	14.7	40,120
51–0000	Production occupations	10,674.6	8,594.4	8,951.2	–2,080.2	–19.5	356.8	4.2	30,330
53–0000	Transportation and material moving occupations	10,350.8	9,004.8	10,333.4	–1,346.0	–13.0	1,328.7	14.8	28,400

[1] For wage and salary workers, from the Occupational Employment Statistics survey.

SOURCE: U.S. Bureau of Labor Statistics.

Table 1 - Occupational employment projections to 2020.

Lockard & Wolf (2012.)

Table 109. Number and internet access of instructional computers and rooms in public schools, by selected school characteristics: Selected years, 1995 through 2008

Instructional computers and rooms, and access	All public schools		Instructional level[1]				Size of school enrollment								Community type[2]								Percent of students eligible for free or reduced-price lunch[3]							
			Elementary		Secondary		Less than 300		300 to 999		1,000 or more		City		Suburban		Town		Rural		Less than 35 percent		35 to 49 percent		50 to 74 percent		75 percent or more	
1	2		3		4		5		6		7		8		9		10		11		12		13		14		15	
Computers for instructional purposes																														
Number (in thousands)																														
1995[4]	5,621	(—)	3,453	(—)	2,021	(—)	850	(—)	3,600	(—)	1,171	(—)	1,497	(—)	1,526	(—)	1,404	(—)	1,195	(—)	2,905	(—)	806	(—)	950	(—)	882	(—)
2000	8,776	(174)	5,296	(149)	3,271	(113)	1,135	(73)	5,524	(121)	2,117	(103)	2,537	(179)	3,396	(213)	1,155	(132)	1,689	(131)	4,394	(147)	1,373	(93)	1,606	(112)	1,384	(107)
2005	12,672	(281)	7,701	(251)	4,783	(148)	1,566	(98)	7,966	(243)	3,139	(163)	3,132	(177)	4,058	(242)	1,819	(193)	3,663	(255)	5,352	(261)	2,193	(185)	2,687	(244)	2,440	(152)
2008	15,434	(193)	9,711	(159)	5,415	(125)	1,746	(68)	9,486	(144)	4,202	(130)	3,611	(155)	5,787	(255)	2,062	(159)	3,974	(180)	6,195	(174)	2,364	(155)	3,805	(190)	3,070	(175)
Average number per school																														
1995[4]	72	(—)	60	(—)	112	(—)	41	(—)	72	(—)	164	(—)	84	(—)	83	(—)	72	(—)	54	(—)	78	(—)	59	(—)	74	(—)	67	(—)
2000	110	(2.0)	89	(2.4)	178	(5.3)	57	(3.1)	106	(2.3)	259	(9.0)	120	(4.9)	128	(4.3)	97	(5.6)	82	(3.6)	120	(3.4)	111	(5.9)	94	(5.7)	99	(5.5)
2005	154	(3.4)	124	(3.8)	253	(6.8)	75	(4.2)	149	(4.2)	388	(13.5)	165	(7.2)	170	(6.3)	154	(13.4)	132	(5.9)	166	(5.5)	153	(9.3)	147	(6.9)	139	(7.4)
2008	189	(2.9)	157	(2.8)	301	(6.5)	87	(3.4)	179	(2.9)	486	(10.4)	205	(7.5)	221	(6.1)	189	(8.0)	147	(4.2)	209	(5.6)	182	(7.7)	181	(6.8)	170	(8.2)
Number with internet access (in thousands)																														
1995[4]	447	(—)	232	(—)	187	(—)	59	(—)	315	(—)	73	(—)	96	(—)	131	(—)	126	(—)	94	(—)	286	(—)	46	(—)	57	(—)	36	(—)
2000	6,759	(174)	3,813	(136)	2,779	(113)	882	(69)	4,191	(114)	1,686	(97)	1,782	(148)	2,688	(178)	955	(111)	1,335	(91)	3,608	(139)	1,064	(80)	1,215	(93)	858	(87)
2005	12,245	(274)	7,361	(246)	4,706	(151)	1,515	(98)	7,642	(239)	3,089	(162)	3,009	(173)	3,912	(238)	1,784	(193)	3,541	(239)	5,239	(259)	2,090	(176)	2,583	(228)	2,332	(146)
2008	15,162	(204)	9,508	(169)	5,356	(128)	1,710	(69)	9,308	(153)	4,144	(130)	3,517	(154)	5,716	(253)	2,028	(154)	3,901	(178)	6,131	(174)	2,321	(153)	3,739	(188)	2,971	(175)
Percent with internet access																														
1995[4]	8	(—)	7	(—)	9	(—)	7	(—)	9	(—)	6	(—)	6	(—)	9	(—)	9	(—)	8	(—)	10	(—)	6	(—)	6	(—)	4	(—)
2000	77	(1.1)	72	(1.5)	85	(1.2)	78	(2.6)	76	(1.3)	80	(1.8)	70	(2.1)	79	(1.7)	83	(2.5)	79	(2.1)	82	(1.2)	77	(2.9)	76	(2.6)	62	(3.1)
2005	97	(0.4)	96	(0.5)	98	(0.4)	97	(0.7)	96	(0.5)	98	(0.5)	96	(0.7)	96	(1.1)	98	(0.6)	97	(0.7)	98	(0.6)	95	(1.0)	96	(1.0)	96	(0.8)
2008	98	(0.2)	98	(0.3)	99	(0.2)	98	(0.7)	98	(0.3)	99	(0.4)	97	(0.5)	99	(0.3)	98	(0.7)	98	(0.4)	99	(0.3)	98	(0.5)	98	(0.4)	97	(0.7)
Ratio of students to instructional computers with internet access																														
2000	6.6	(0.10)	7.8	(0.20)	5.2	(0.20)	3.9	(0.30)	7.0	(0.20)	7.2	(0.30)	8.2	(0.40)	6.6	(0.20)	6.2	(0.30)	5.0	(0.30)	6.0	(0.20)	6.3	(0.40)	7.2	(0.40)	9.1	(0.70)
2005	3.8	(0.10)	4.1	(0.10)	3.3	(0.10)	2.4	(0.10)	3.9	(0.10)	4.0	(0.10)	4.2	(0.20)	4.1	(0.10)	3.4	(0.20)	3.0	(0.10)	3.8	(0.10)	3.4	(0.20)	3.6	(0.20)	4.0	(0.20)
2008	3.1	(0.04)	3.2	(0.05)	2.9	(0.05)	2.2	(0.07)	3.2	(0.05)	3.2	(0.06)	3.4	(0.12)	3.2	(0.08)	2.7	(0.09)	2.9	(0.07)	3.1	(0.06)	3.2	(0.08)	2.9	(0.08)	3.2	(0.14)
Instructional rooms[5]																														
Number (in thousands)																														
2000	2,905	(35)	1,864	(28)	972	(24)	377	(22)	1,871	(23)	657	(23)	866	(56)	1,086	(61)	413	(47)	541	(39)	1,380	(46)	465	(28)	570	(36)	482	(29)
2005	3,283	(71)	2,152	(70)	1,078	(27)	426	(23)	2,152	(70)	705	(30)	849	(62)	1,050	(61)	439	(41)	945	(67)	1,339	(50)	593	(51)	695	(56)	655	(39)
2008[5]	2,663	(21)	1,723	(20)	887	(15)	282	(9)	1,692	(20)	689	(18)	639	(26)	1,003	(35)	338	(24)	683	(28)	1,053	(27)	425	(26)	653	(27)	532	(22)
Percent with internet access[6]																														
1995	8	(0.7)	8	(1.0)	8	(1.0)	9	(1.6)	8	(1.0)	4	(1.0)	6	(1.3)	8	(1.4)	8	(2.0)	8	(1.5)	10	(1.2)	6	(1.4)	6	(1.9)	3	(1.0)
2000	77	(1.1)	76	(1.5)	79	(1.6)	83	(2.8)	78	(1.5)	70	(2.2)	66	(2.2)	78	(2.0)	87	(2.6)	85	(1.7)	82	(1.5)	81	(2.9)	77	(2.8)	60	(3.3)
2005	94	(1.3)	93	(1.9)	95	(0.9)	92	(1.9)	94	(1.9)	94	(1.5)	88	(3.7)	96	(0.8)	98	(0.7)	95	(1.8)	96	(0.8)	88	(4.3)	96	(0.8)	91	(2.5)
2008	—	(†)	—	(†)	—	(†)	—	(†)	—	(†)	—	(†)	—	(†)	—	(†)	—	(†)	—	(†)	—	(†)	—	(†)	—	(†)	—	(†)

—Not available
†Not applicable.
[1]Data for combined schools are included in the totals and in analyses by other school characteristics, but are not shown separately.
[2]Due to definitional changes for community type, estimates for years prior to 2005 may not be directly comparable with estimates for later years.
[3]Free or reduced-price lunch information was obtained on the questionnaire and supplemented, if necessary, with data from the Common Core of Data (CCD).
[4]Includes computers used for instructional or administrative purposes.
[5]In 2008, instructional rooms included classrooms only and excluded computer labs and library/media centers. Prior to 2008, instructional rooms included classrooms, computer labs and other labs, library/media centers, and other rooms used for instructional purposes.
[6]Some data differ slightly (e.g., by 1 percent) from previously published figures.
NOTE: Detail may not sum to totals because of rounding. Standard errors appear in parentheses.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System (FRSS), *Internet Access in U.S. Public Schools and Classrooms: 1994–2005* and *Educational Technology in U.S. Public Schools: Fall 2008*, and unpublished tabulations. (This table was prepared August 2010.)

Table 2 - Number and Internet access of instructional computers and rooms in public schools, by selected school characteristics: Selected years, 1995 - 2008

Snyder & Dillow (2012).

Appendix B

Interview Questions

1. How does the comfort level of teachers with computer technology influence its perceived role in teaching computer technology integration at a private K-12 independent school in the Bahamas?
    - Discuss your comfort level with computer technology.
    - What computer technology tools do you utilize most in your personal life?
    - To what extent do you integrate computer technology in your teaching?
    - What computer technology tools do you utilize most in your teaching?
    - Are there any computer technology tools that you think would help to reinforce your teaching but you are not using them?
    - Why are you not using those tools?
    - What training have you had in the computer technology tools that you use in your classroom?
    - What training have you had in the ways that computer technology can be integrated into your teaching?

2. How do expectations from administration to utilize computer technology influence teachers' perceptions about its role in computer technology integration at a private independent school in the Bahamas?
    - What are the expectations from administration as it relates to computer technology integration?
    - To what extent do the expectations from administration influence the level of computer technology integration in your lessons?

- How does administration express its expectations about computer technology integration?
- How does administration demonstrate its support of computer technology integration in your teaching?
- What is the role of administration in the integration of computer technology in your teaching?
- How would you rate administration's level of skills/comfort with the computer technology tools that you use to integrate in your lessons?
- How important is administration's level of comfort with computer technology to you?
- What can administration do to help you to improve computer technology integration in your class/lessons?

3. What are the teacher's perceptions in a K12 private independent school in the Bahamas about the role of computer technology integration in their teaching?

- What do you understand by computer technology integration?
- How have you formed the basis of your understanding of computer technology integration?
- What is the role of computer technology in education?
- How has your perception of computer technology integration in education changed over the years?
- How important is it to integrate computer technology in your teaching?
- Discuss the role of computer technology integration in your teaching.

- Discuss the effectiveness of your computer technology integration in assisting and reinforcing student learning in your class.
- How often do you seek out new computer technology tools or strategies to use in your lessons?
- How does that compare to how often you seek out other new tools or strategies to use in your lessons?