EXAMINING THE CHANGING RELATIONSHIP BETWEEN LITERACY AND TECHNOLOGY IN AN INTERNATIONAL SCHOOL

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DEDICATION

Mom, Dad, Tomiko and Arthur, thank you for believing
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ABSTRACT

EXAMINING THE CHANGING RELATIONSHIP BETWEEN LITERACY AND TECHNOLOGY IN AN INTERNATIONAL SCHOOL

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This research examined the forces, contexts, and situations that influence how digital literacies are perceived, taken up, or resisted at an International Baccalaureate (IB) school in Nassau, The Bahamas. This study provided an opportunity to carefully examine what teachers experienced within the IB curriculum as they learned and began to work with digital literacies. As there is very little research on technology integration from the perspective of teachers in an international, independent IB school, this study shares the challenges educators encounter in our culturally and linguistically diverse school environment as they prepare our students for living and learning in a globalized, digital age. Further, the study explored how a school’s vision of technology, organizational structure, and professional development programmes influenced the teaching of digital literacies across the grades. Finally, an analysis of school and classroom practices, including four case studies and an examination of my own work as a school leader, shed light on the changing relationship between literacy and technology in an IB school, as well as on the potential for a school leader to take action to co-create a healthy IB digital ecology to advance teaching and learning.
# TABLE OF CONTENTS

DEDICATION .................................................................................................................. ii

ABSTRACT ..................................................................................................................... v

LIST OF TABLES ............................................................................................................ xi

LIST OF ILLUSTRATIONS ........................................................................................... xii

INTRODUCTION ......................................................................................................... 1

Statement of the Problem ............................................................................................. 8

Purpose of the Study ..................................................................................................... 11

Research Questions ..................................................................................................... 13

Summary ....................................................................................................................... 14

LITERATURE REVIEW ............................................................................................ 16

New Literacies ............................................................................................................. 17

Digital Literacy ........................................................................................................... 21

Technology Integration ............................................................................................... 23

Professional Development ......................................................................................... 26

Technological Frameworks .......................................................................................... 29

Agency, Information, and Design (AID) ..................................................................... 30

Technological Pedagogical Content Knowledge (TPACK) ......................................... 32

Teacher Attitudes and Beliefs ..................................................................................... 33

Practitioner Research ................................................................................................. 36

vi
Summary .................................................................................................................. 40

METHODOLOGY ....................................................................................................... 42
Research Design Overview .................................................................................. 42
Research Paradigm ............................................................................................... 44
  Qualitative Research .......................................................................................... 46
  Quantitative Research ......................................................................................... 48
Description and Rationale of the Research Site ................................................. 50
  Selection of the Participants ............................................................................. 53
Data Collection ......................................................................................................... 54
  Researcher Positionality .................................................................................... 56
  Interviews ........................................................................................................... 59
  Observations ....................................................................................................... 59
  Focus Groups ..................................................................................................... 61
  Reflective Journaling ......................................................................................... 63
  Research Memo .................................................................................................. 64
Data Analysis ........................................................................................................... 65
  Triangulation ...................................................................................................... 68
  Trustworthiness .................................................................................................. 69
  Limitations ........................................................................................................ 70

QUANTITATIVE FINDINGS ....................................................................................... 71
Survey Results ......................................................................................................... 72
  Attitudes, Beliefs, or Personal Experiences With Technology .................... 73
Digital Literacies and Technology Integration Within the IB Programme........... 75
School's Influence on the Integration of Digital Literacies .................................. 78
Focus Groups ........................................................................................................... 80
Attitudes, Beliefs, or Personal Experiences With Technology............................ 81
Digital Literacies and Technology Integration Within the IB Programme............. 86
Summary .................................................................................................................. 92
QUALITATIVE FINDINGS........................................................................................ 95
Case Studies ............................................................................................................. 96
Rachel ....................................................................................................................... 96
Attitudes, beliefs, or personal experiences with technology................................. 97
Digital literacies and technology integration within the IB Programme .............. 101
Description of the Observations............................................................................. 104
School's influence on the implementation of digital literacies ......................... 109
Heidi......................................................................................................................... 111
Attitudes, beliefs or personal experiences with technology................................. 112
Digital literacies and technology integration within the IB Programme .............. 115
Description of the observations............................................................................. 115
School's influence on the implementation of digital literacies ......................... 121
Ava......................................................................................................................... 122
Attitudes, beliefs or personal experiences with technology................................. 123
Digital literacies and technology integration within the IB Programme .............. 126
Description of the Observations............................................................................. 127
School's influence on the integration of digital literacies ................................................. 136
Donna ........................................................................................................................................ 137
Attitudes, beliefs or personal experiences with technology .............................................. 138
Digital literacies and technology integration within the IB Programme ..................... 141
Descriptions of the Observations .................................................................................... 141
School's influence on the integration of digital literacies .............................................. 147
Cross Case Analysis ........................................................................................................... 148
Attitudes, beliefs or personal experiences with technology .............................................. 149
Digital literacies and technology integration within the IB Programme ..................... 151
School's influence on the integration of digital literacies .............................................. 152

DISCUSSIONS AND IMPLICATIONS ................................................................................. 154
Discussion ............................................................................................................................ 155
Attitudes, beliefs or personal experiences with technology .............................................. 156
Teacher Technological Competence ................................................................................ 159
Digital Distraction ............................................................................................................... 161
Digital literacies and technology integration within the IB Programme ..................... 162
School's influence on the integration of digital literacies .............................................. 167
Changing the culture of teaching and learning .............................................................. 168
Professional Development Support Faculty and Student Development ...................... 170
Instructional Leadership ...................................................................................................... 172
Implications: Practice, Research, and Policy ................................................................. 175

CONCLUSIONS .................................................................................................................. 177
LIST OF TABLES

Table 1: Summary of Methodologies ................................................................. 55

Table 2: Observation of Participant Demographics and Characteristics ............... 61

Table 3: Focus Group Participant Demographics and Characteristics .................. 63

Table 4: Coding System Categories, Titles, and Descriptions ............................. 66
LIST OF ILLUSTRATIONS

Figure 1. Conceptual framework graph illustrating how the select bodies of research intersect with IB education ................................................................. 16

Figure 2. Agency, Information, and Design (AID) lens ........................................ 31

Figure 3. Technological Pedagogical Content Knowledge (TPACK) ....................... 32
Chapter 1

INTRODUCTION

Lyford Cay International School (LCIS), located in Nassau Bahamas, stands as a prestigious symbol of excellence. It represents the high standards of the community in which it is domiciled, and reflects its vision to become a leading educational institution within the Caribbean. Since it opened its doors 53 years ago, LCIS has transformed itself into a Junior Pre-Kindergarten through Grade 12 international school, boasting an enrollment of 350 students from 24 different countries. LCIS embedded the International Baccalaureate (IB) Programmes in 2005, when the school expanded its scope to add a high school. The IB programmes have established rigorous educational standards, and are recognized throughout the world by universities as an exceptional form of education. These IB programmes, which are a part of the International Baccalaureate Organization (IBO), encourage students to be internationally-minded within a complex and hyper-connected world.

The International Baccalaureate Organization (IBO) was founded in 1968. Today, there are more than 5,578 International Baccalaureate (IB) Programmes offered worldwide across 4,335 schools. The goal of the International Baccalaureate Programmes is to provide students with opportunities that will enable them to become knowledgeable, caring, respectful students who take responsibility for others in the global community (International Baccalaureate Organization, 2015.). The IBO offers four distinct programmes, which were developed over time. The Primary Years Programme (PYP)
was designed for students ages 3-12. This programme incorporates local and global issues into the curriculum through five related transdisciplinary themes: (a) who we are; (b) where we are in place and time; (c) how we express ourselves; (d) how we organize ourselves; and (e) the planet. The Middle Years Programme (MYP) was designed for students ages 11-16. The MYP comprises eight subject areas that embolden students to make meaning between the content of their courses and how that content is applied in the real world. The Diploma Programme (DP), the original programme, is intended for students ages 16-19 who are in their final two years of high school. The DP was designed to teach students to learn by critical analysis rather than by rote memorization. Most recently, but not discussed in this study, the IB has added a new fourth programme, a career-related programme created for students 16-19 that can be taken instead of DP (International Baccalaureate Organization, 2015).

Today, LCIS is one of 298 schools worldwide to offer three of the IB programmes (PYP, MYP, and DP). Designed as a continuum, these programmes stimulate students to be intellectually curious and equip them with the knowledge, conceptual understanding, skills, reflective practices, and attitudes needed to become autonomous lifelong learners. The IB programme continuum recognizes that learning is a process, not a product. Through the three programmes, teachers are encouraged to challenge students to excel in both their education and personal development, in order to become internationally minded and to think beyond their immediate environment.

Since the advent of technology and literacy pedagogy, today’s students learn differently than those in past generations. Technology requires students to have
increasingly multifaceted skills and to navigate ever more complex territory throughout their education. While the IBO does emphasize the importance of technology literacy, particularly the notion that technology literacy encourages students to express themselves in multiple modes of communication, it does not prescribe specific technological frameworks and/or hardware or software applications for schools offering the IB curriculum. Technology is considered an integral component to teaching and learning in the IB programmes. Instead, the IBO requires that technology support students’ intercultural understanding, global engagement, and multilingualism; inspire students to be effective creators and consumers of information in various formats; and help students to understand how being digitally literate will help them in the future, personally, professionally, and academically. The IBO views technology as a means to support and enhance the curriculum, not to replace it.

In December 2015, the IBO published “Teaching and Learning with Technology” for IB schools. The publication examines the various definitions of technology, discusses how technology policies can be formed in schools, and suggests frameworks to guide the implementation of technology. Most importantly, this document describes the distinction between the implementation of technology and the integration of technology. Implementation refers to the technological tools and infrastructure itself, while integration refers to how an educator uses that technology to present pedagogical content within various subject areas. While the IBO’s document does encourage teachers to use pedagogy to drive technology, it provides only a few examples of how to execute this.
One important component missing from the publication is the important conversation around “new literacies.” Traditionally, literacy refers to reading, writing, listening, and speaking (Holum & Gahala, n.d.), encompassing the vast variety of skills and knowledge that “literate” people have possessed for generations. These literacy skills were put to use from the advent of the earliest writing systems and utensils. “Literacy” existed with tools as simple as a pencil and paper, a book, or a voice and a receptive ear. Today “literacy” refers to much more than a range of skills; it is a social practice, a practice that helps literate people to create different kinds of meanings, establish different relationships, and produce different social identities (Jones & Hafner, 2012). That is, notions of reading and writing “differ according to culture and context, and have specific cognitive, cultural, and social effects” (Cope & Kalantzis, 2000, p. 16). This concept of literacy as a social phenomenon, as opposed to the traditional view of a set of thinking and technical skills, is known as new literacies (Street, 2003a; Leu, 2000; Lankshear & Knobel, 2011; Leu, Kinzer, Coiro, Castek, & Henry, 2013).

According to Coiro, Knobel, Lankshear, and Leu (2008), new literacies involve “knowing how and when to make wise decisions about which technologies and which forms and functions of literacy most support one’s purposes” (p. 4-5). That is, “new literacies” engage people in texts and discourses, inclusive of multiple languages, across space and time, and on screens. Through the utilization of new media, communication occurs instantaneously and ubiquitously. These “new literacies” build on the foundation of traditional literacy skills, such as reading comprehension, phonemic awareness, and writing. This understanding suggests that students must build on these traditional literacy
skills in order to adapt to the “new literacies” of the future (New South Wales Department of Education and Training, 2010).

Assigning a new definition to the word literacy is the result of our expanded scholarships and paradigms for literacies, in particular the evolving understanding “that there are many different literacies that shift with context, text and identities of the people using the text” (Roswell & Walsh, 2011, p. 55). The term “new” encompasses multiple perspectives—from cognitive sciences (Gee, 2003) to sociolinguistics (Kress, 2003) to cultural anthropology (Street, 2003a). Other scholars conclude that literacy is multimodal—that learning evolves through image, animated movement, writing, speech, gesture, or gaze (Kress, 2003, 2010; Lemke, 2002). The New London Group (1996) asserted that digital communication media and multimodal approaches create diverse forms of literacy practices—multiliteracies—that are inclusive of one’s culture, communication, and experiences.

While some of these literacies were recognized before the widespread use of technology, these new literacies have come to inform policy and professional decisions, which now suggests that “technology has increased the intensity and complexity of literate environments” (“NCTE Definition,” 2008, para. 1). These new media, such as the Internet and communication technologies, have created affordances and constraints regarding “what we can do, what we can mean, how we can relate to others, how or what we can think and finally who we can be” (Jones & Hafner, 2012, p. 5). Our twenty-first century learners will need to engage in new social practices, communication skills, and strategies in order to effectively implement new literacies (Coiro, Knobel, Lankshear, &
Computers have become much more than a tool for retrieving information. They provide opportunities for us to make different kinds of meaning, self-expression, play, and relationship-building. Buckingham (2008) writes, “Outside of school, children are engaging with these media, not as technologies but as cultural forms” (p. 74). As educators, we therefore have a responsibility to ensure that our students have access to this media within our schools. However, it is this intersection of media, both commercial and technological, that often causes confusion for educators. The optimist concludes that this media allows us to do things better and faster, providing more time for students to create and collaborate with one another. Conversely, the pessimists believe media causes distraction and prevents students from thinking deeply.

These contrasting views have resulted in a critical analysis of “digital literacy.”

“Digital literacies” has become a crucial topic for educators in general, and for the IBO in particular. In acknowledgment, this study examined digital literacies in relation to IB contexts and pedagogy. Gilster (1997) defined digital literacy as “the ability to understand and use information in multiple formats from a wide variety of sources when it is presented via computers and particularly through the medium of the Internet” (p. 6). Digital literacy practices—blogs, social media (i.e., Facebook, Twitter, Instagram), video games, video chats, and online texts—reflect the influential role that technology has in our lives, specifically where communication is concerned. Habits of critical thinking (e.g., balancing skepticism and open-mindedness, evaluating sources of information, and analyzing information for validity and usefulness) are essential to developing skills within the area of digital literacies practices (New London Group, 1996; Gee, 2007;
Street, 2003b). Additionally, given ominous and salient threats such as hacking and privacy invasion, it is especially important to develop abilities to innovate and to problem solve both individually and collectively, in order to prepare for the full scope of technological evolution and to ensure our well-being as digital participants.

With so much at stake and so much to gain, technology stands at the center of our lives. In an IB setting, however, it is students who are always at the center of our programmes. Teachers support students in learning how to think for themselves and how to drive their learning processes. The challenge for IB educators is to understand how to effectively integrate digital literacy within the IB programmes and how to equip students with the skill sets they need to construct meaning, shape their understanding in diverse formats, and develop ways of working for both their future and our shared global future. More specifically, teachers need to ensure that technology integration is derived from their own pedagogical content knowledge and extends to the pedagogical practices they employ to successfully teach their subject (Shulman, 1987).

As few studies have been conducted in IB schools regarding digital literacies and technology integration, this practitioner research study examined the forces, contexts, and situations that influence how digital literacies are perceived, take up, or resisted at an IB School in Nassau, The Bahamas. In particular, this study provides an opportunity to carefully examine teachers’ experiences within the IB curriculum as they learn and begin to work with digital literacies. Further, the study explored how a school’s vision of technology, organizational structure, and professional development programs influence the teaching of digital literacies across all grade levels.
Statement of the Problem

Increases in information and communication technologies have now created a need for the integration of digital literacy and technology throughout the educational arena. These are now critical elements of successful participation in academic life, the workforce, and society. It is thus surprising that the IBO has only recently begun to examine the notion of digital literacy and how it should be implemented in an IB school. This delay is especially puzzling given the emphasis the IB places on being responsive to new research in pedagogy.

As principal of Lyford Cay International School (LCIS), I confront regular demand from parents and community members to ensure that the school upholds its rigorous IB programmes, especially its holistic and innovative approach to education. The community earmarked donations for the rollout of educational technology platforms, fundraising well over $1.5 million over 10 years. This dedication to educational technology came with clear expectations that the school develop a curriculum that effectively integrates technology and that educators expand their notions of literacy. A pilot study was conducted in the spring of 2014 to examine teacher attitudes and beliefs regarding the utilization of technology as an instructional tool at LCIS. Data collected during this study suggested that teachers are ill equipped to strategically incorporate technology in their curriculum. The IBO requires that teachers use technology to support students’ intercultural understanding, global engagement, and multilingualism, as well as to teach them to be effective creators and consumers of information across various formats. Yet if teachers are ill equipped to provide this integration, the LCIS students are
at risk of leaving school without being **digitally literate**. Teachers must therefore believe and embrace the fact that meaningful integration of technology plays a critical role in instructional practices, especially as it relates to **digital literacies**.

Digital literacy has been the focus of educators since the early 1990s, when technology became affordable, readily usable, and pervasive. Now, digitally literate individuals are not only required to share their ideas through the use of appropriate tools, but they also need to engage in the following:

- Build intentional cross-cultural connections and relationships with others, in order to pose and solve problems collaboratively and strengthen independent thought.
- Design and share information for global communities to meet a variety of purposes.
- Manage, analyze, and synthesize multiple streams of simultaneous information ("NCTE Definition," 2008).

If we are to accomplish this goal, IB educators must begin to rethink their methodologies as they relate to literacy and their previous assumptions about teaching and learning. Currently, there is a mismatch between informal learning—learning that occurs outside of a school or institution, often done voluntarily and generated by personal motivation—and formal education—learning that occurs in a highly regulated environment (Davidson & Goldberg, 2012). Our current educational institutions are not using the digital literacy practices and tools in formal education settings that are available to and employed by our students in informal learning contexts.
The goal of technology integration is for teachers to use technology to enhance their lessons, increase students’ critical thinking and research skills, and engage students in solving open-ended problems. This should not be confused with technology implementation, which can be distinguished as “the process of acquiring and introducing devices and applications as well as managing systems that support technology use” (International Baccalaureate Organization, n.d, para 5). Simply using a device or digital tool is not integration.

If technology integration and digital literacy is to be connected to teaching and learning, we must start with our teachers. Teachers directly affect classroom instruction, and there is substantial research (Ertmer, 1999; Sandholtz, Ringstaff, & Dwyer, 1997; Dexter, Anderson, & Becker, 1999) that suggests that their attitudes and perceptions affect their pedagogical strategies. Consequently, the scholarship surrounding teacher attitudes and beliefs are critical for educators to understand, especially where technology is concerned (Lim & Chan, 2007). While there is ample research (Mishra & Koehler, 2006; Wozney, Venkatesh, & Abrami, 2006) suggesting that teachers’ pedagogical beliefs can and do influence the choices that teachers make regarding technology, there is significantly less scholarship on teachers’ pedagogical beliefs regarding the use of digital literacies and technology integration specifically within an IB setting. Ertmer, Gopalakrishnan, and Ross (2001) posited that we must understand teachers’ pedagogical beliefs so that we can transform them. These pedagogical beliefs are often a direct result of their experiences. Ertmer, Gopalakrishnan, and Ross (2001) also suggested that increased professional development opportunities, coupled with specifics regarding how
teachers can adapt their constructivist practice to reflect the barriers that they experience at their school sites, will increase teacher growth. Therefore, it is imperative that educators and stakeholders in school settings become aware of the impact that teachers’ beliefs have on the implementation of digital literacies and technology integration. This understanding is critical if teachers are to begin to think differently about digital literacy practices.

**Purpose of the Study**

Students entering the Lyford Cay International School (LCIS) are already curious and keen on schooling. They are generally inquisitive, hungry for knowledge, and capable of thinking about their local environment within a global context. This student profile lends itself well to a curriculum that mandates the integration of technology into academic and daily life. Our students need to manage, analyze, and synthesize multiple streams of information. Likewise, our teachers need to promote higher-order thinking skills in our students, inclusive of digital literacies and technology, to more effectively facilitate their students’ construction of knowledge and meaning.

The IBO expects teachers to use technology to support students in becoming “problem solvers who can appreciate the role of technology in their daily life” (International Baccalaureate Organization. 2011, para. 1), and who can respond critically and resourcefully to real-life challenges. Through Information Communication Technology (ICT), LCIS aims to provide students with opportunities to “investigate, create, communicate, collaborate, organize and be responsible for their own learning and actions” (International Baccalaureate Organization, 2011, para. 2). The IB programme
requires students to be creative and innovative users of technologies. Teachers should thus expose students to globally significant ideas and should “explore different perspectives in order to understand evolving cultural and social norms” (International Baccalaureate Organization, 2011, para. 1). Technology has become an invaluable, stimulating component of our students’ educational experience. However, at LCIS, there appears to be a disconnect between the understanding of technology integration and the implementation of technology, specifically where digital literacies practices are concerned. LCIS does not face this problem alone. In a recent study by the National Center for Educational Statistics (NCES; Gray, Thomas, & Lewis, 2010), only 40% of 3,300 teachers surveyed reported using technology for instructional purposes. Rather, the majority of teachers reported that they use technology primarily for taking attendance and grading. Further, Russell, Bebell, O’Dwyer, and O’Connor (2003) argued that, despite the increased spending and access to technology that schools provide, many question whether these emerging technologies are improving teaching and learning.

A recent survey conducted by the LCIS Technology Director indicated that only 50% of teachers are effectively implementing technology into all components of their curriculum. According to the National Education Technology Standards for students:

Effective integration of technology is achieved when students are able to select technology tools to help them obtain information in a timely manner, analyze and synthesize the information, and present it professionally. The technology should become an integral part of how the classroom functions —as accessible as all other classroom tools. (“What Is Successful Technology Integration?” 2007, para. 4)

Further, research clearly indicates that educational leaders must expand their personal knowledge about technology and develop an understanding of how technology
affects teaching and learning (Davies, 2010). That is, administrators are a key component to successful technology integration; they must be personally invested in building a shared vision as it relates to technology.

**Research Questions**

The use of digital literacies within the IB programme is gaining more attention. The IBO encourages school leaders to “carefully examine technological concepts and processes that broaden student experience and prepare them for participation in the larger world” (International Baccalaureate Organization, 2014, p. 5). Therefore, my focus and positionality as a principal are reflected in the following research goal: examining how teachers in all three divisions of the school — Early Learning Center (ELM), Elementary (ELM) and Secondary School (SS)— are integrating digital literacies within the International Baccalaureate Programme (IB). Three research questions advance this goal:

1. How have teachers’ attitudes, beliefs, or personal experiences with technology shaped their instructional practices?

2. How have teachers interpreted “technology integration” within the IB programme, and how has the programme influenced their teaching of digital literacies practices and technology?

3. What happens when I, as a school administrator, begin to explore how the school’s vision of technology integration is influencing the implementation of digital literacies within the IB programme? How does what I learn influence my work as a school leader?
4. This research led me to deepen my understanding of the forces, contexts, and situations influencing current perspectives of digital literacies at LCIS. By examining teachers’ attitudes and beliefs, I evaluated whether these collective professional convictions affect the implementation of digital literacies in the classrooms.

How teachers implement their pedagogical strategies is directly linked to their belief systems (Pajares, 1992). Satchwell and Miller (2006) proposed that students’ successes or failures are dependent upon teachers’ expectations. Therefore, I examined, described, and interpreted these teachers’ belief systems about digital literacies as they relate to instructional practices at LCIS. By employing case studies to focus more closely on four teachers from each division of the school and their classroom practices, I examined their ideas about what impact professional development had, what professional development should encompass, and how their personal experiences and the school culture affect their instruction. The results of this study informed my practices as the school leader and helped me to work with the faculty to co-create a healthy digital ecology in an IB setting to advance teaching and learning.

**Summary**

This chapter outlined the significance and purpose of this study and its specific research questions. This study has been designed to understand teachers’ mindsets—their ways of thinking and their attitudes about technology integration and digital literacies practices within our IB setting. As the leader of the school, I am responsible for acquiring and implementing technology. Therefore, it is imperative that I comprehend how
teachers’ attitudes are affecting the integration of new technologies in relation to the scope of my leadership and to the school’s goals. The next chapter discusses the key bodies of literature that frame this scholarly research.
Chapter 2

LITERATURE REVIEW

The purpose of this study is to examine the forces, contexts, and situations influencing the faculty’s current perspective of digital literacies at LCIS. This chapter outlines three key bodies of literature that inform this study: new literacies, with emphasis on digital literacy, professional development, and practitioner research.

Figure 1. Conceptual framework graph illustrating how the select bodies of research intersect with IB education
New Literacies

In this study, I drew primarily on Street (2003a; 2003b), the New London Group (1996), Gee (2007), and Lankshear and Knobel (2011), all of whom defined literacy as a social practice in which people construct, utilize, and interact with texts in multiple contextual ways. In other words, what counts as literacy is governed by the socio-cultural norms of groups and institutions, as influenced by history, economics, politics, and other social contexts. According to Street (2003a), two models of literacy have historically dominated its definition: autonomous and ideological. The autonomous model defines literacy as traditionally instantiated in schools—literate competence across contexts and a set of discrete skills. In other words, the autonomous model frames literacy as the key to improving students’ critical thinking and to improving their social and economic opportunities, which, together, help make students better citizens (Street, 2003a). The “ideological” model, however, suggests that individuals do not just read and write texts. Instead, they interact with texts and with one another (Gee, 2007). Street (2003b) posited that literacy is about “knowledge, identity, and being,” (p. 78) rooted in a “particular worldview” that is driven by context and power (p. 78). Critical to Street's framing is the distinction between “literacy events” and “literacy practices.” This concept has since been augmented to include spoken languages as well as written ones. Heath (1982) first defined “literacy events” as “occasions in which written language is integral to the nature of participants' interactions and their interpretative processes and strategies” (p. 50).

Literacy practices are the patterns of literacy events in a society. Personal experiences, social structures, institutions, and power relationships influence these practices. They are
also shaped by an individual’s cultural practices, both locally and historically. Street (2003b) defined literacy practices as “being embedded in socially constructed epistemological principles” (p. 78). Simply put, “literacy practices are what people do with literacy” (Barton, Hamilton, & Ivanič, 2000, p. 7).

This lens of literacy practices was important not only because it is frequently discussed in relation to digital literacies practices, but also because literacy practices are not always observable (Barton, Hamilton, & Ivanič, 2000). Literacy practices include attitudes, values, beliefs, and social relationships (Barton, Hamilton & Ivanič, 2000). Individuals also constantly change their literacy practices as they communicate via websites, Twitter, Snapchat, or blogs (Leu, Kinzer, Coiro, & Cammack, 2004). According to the International Reading Association (IRA), the Internet and other forms of technologies are redefining the nature of reading, writing, and communication.

Further, the International Baccalaureate Organization (IBO) encourages the teaching of digital literacies. To be digitally literate means to:

Access a broad range of practices and cultural resources that you are able to apply to digital tools. It is the ability to make and share meaning in different modes and formats, to create, collaborate and communicate effectively and to understand how and when digital technologies can best be used to support these processes. (Hague & Payton, 2010, p. 4)

IB teachers are encouraged to establish a culture that critically engages students with technology and supports the development of their social awareness about how technology is used to convey meaning and information. Teachers must demonstrate how communication is represented in different contexts to different audiences (e.g., visual, audio, or textual modes) and teach students how to critically evaluate and select relevant
information. However, understanding how to translate digital literacies into teaching and learning is not always clear or well understood (Hague & Payton, 2010). If teachers at LCIS incorporate digital literacies effectively, students will have the opportunity to become creators, consumers, and competent users of technology. For generations, individuals have been consuming information, via print and broadcasts. With the advent of new technologies, students now have the opportunity to consume information not only through print but also through the Internet, blogs, wikis, and so forth. They can create, problem solve, collaborate, and share their creations. The school’s goal is to nurture digitally literate students who are poised for greater personal, academic, and career success and who better understand and value the IB concepts of global citizenship and lifelong learning as a result of their skills.

Consequently, examining how and why teachers are integrating digital literacies as a part of IB programme is critical for LCIS. As technology integration is a key component of the IB programme, looking closely at how teachers enact “technology integration” in the classroom and how IB has influenced the teaching of digital literacies will shed light on how it has been taken up or resisted at LCIS. Moreover, this examination enabled me to home in on teachers’ interactions with digital literacies relative to integrating technology—specifically, how teachers’ social processes and interactions factor into their classroom practice.

In the 1980s, researchers began to examine the traditional view of literacy, which was defined as areas such as reading, writing, listening, and speaking. As a result of these examinations, a new field emerged: New Literacies Studies (NLS; Gee, 1990). NLS
framed literacy not only as a set of skills one acquires, but also as something people do within society (Gee, 1990). Gee (1990) argues that literacy was a social practice—“literacy was about ways of participating in social and cultural groups—not just a mental achievement” (p. 2). That is, literacy needs to be inclusive of varying contexts—cognitive, but also social, cultural, historical, and institutional.

Another perspective of new literacies is that literacies are multiple and demand different modes. Linguistic, aural, spatial, visual, and gestural modes are regularized sets of resources for meaning-making. While many of these modes have always existed, they were not previously recognized acceptable forms of expression. These modes are resources utilized together or in isolation and are integrated through the use of a wide range of semiotic resources. This concept is defined as multimodality—how individuals make meaning with different kinds of modes. Kress (2010) concluded that in order for us to truly understand individuals we must begin to accept the many modes of communication that individuals utilize.

Multiliteracies, a term developed by the New London Group in the mid 1990s, was used to describe a new approach to literacy pedagogy—specifically, how literacy can equip students for the changing social environment that both students and teachers face. The New London Group (1996) comprised 10 leading scholars from around the world who came together to understand the new direction of literacy education. They argued that new technologies led to a shift in the way individuals were communicating and called for a broader view of literacy pedagogy than the traditional language-based approach (New London Group, 1996). According to the New London Group, the
multiliteracies perspective combines modes of communication and meaning-making with
the idea that literacy is influenced by an individual's culture, communication, and
experience. Therefore, it includes the diverse forms of literacy practice required for work
and play, community participation, personal growth, and cultural expression (O’Rourke,
2005). Multiliteracies are also often used to describe the aptitudes and abilities
individuals need to acquire in order to create digital media. It is thus helpful to think of
digital literacy not as a set of skills but, instead, as a framework that draws across
multiple literacies.

**Digital Literacy**

Digital literacy is one of these “new literacies.” Gilster (1997) first proposed the
term, defining it as a need to know not simply how to use the Internet but also how to use
it critically. Digital literacy was defined in terms of attitudes, character, and technical
performance. Eshet-Alkalai (2004) describes digital literacy as “a large variety of
complex cognitive, motor, sociological, and emotional skills that users need in order to
function effectively in digital environments” (p. 93). He asserts that literacy extends
beyond being a competent computer user. Lankshear and Knobel’s (2011) work supports
this viewpoint. Inclusive of Gee’s sociocultural perspective, they broaden the notion of
digital literacy to digital literacies. As indicated above, Gee (1990) frames literacy as not
just a set of skills, but as a spectrum of multiple literacies that vary according to space
and time. As the technological age advanced, NLS evolved into *New Media Literacy
Studies (NMLS)*. According to Gee (2009), NMLS was concerned with “how people give
meaning to and get meaning from media, that is, things like advertisements, newspapers,
television, and film” (p. 10). Therefore, NMLS seeks to understand how people can become more “critical” or “reflective” consumers of digital literacies. Gee (2009) argues that digital tools gave rise to major transformations in society, and that technology has changed the nature of social groups, formations, and power. With the development of social media, individuals also have the ability to stay connected in real time regardless of location (Gee, 2009, p. 12-13).

Martin (2008) has identified three levels of digital literacy development: digital competence (skills, concepts, approaches, and attitudes), digital usage (applying one’s digital competence), and digital transformation (when digital usage enables innovation and creativity). The importance of this perspective is rooted in the understanding that digital literacies practices are producing a “profound shift” (Cope & Kalantzis, 2009, p.172) in education in a social as well as a pedagogical sense. Instilling digital literacy within the IB curriculum has the potential to enable students to engage with such shifts in formal education contexts. A digitally literate IB classroom could offer opportunities for students to practice higher-order skills, such as collaborating on a web-based, multi-authored Google document, blogging, and analyzing credible sources on the Internet. Further, it would offer students the opportunity to discover and utilize resources that assist them with creating a personal learning connection to their subjects. Martin (2008) summarized the importance of digital literacies:

In viewing literacy within the context of digitally infused society as, at one level functional, and another socially engaged, and at a third as transformative, we can see it is a powerful tool for the individual and the group to understand their own relationship to the digital: to be aware of the role of the digital in their own development and to control it; to place the digital at the disposal of their own goals and vision. (p. 156)
Both digital literacy and technology integration are necessary in order to successfully infuse emerging technology throughout the curriculum and, ultimately, to extend these kind of transformative experiences and roles to students.

**Technology Integration**

Technology has long been present in K-12 classrooms, from typewriters and calculators to computers and tablets. As these new technologies have evolved, so has the notion that they have become an integral part of classroom activities (Dias, 1999; Gee, 2007; Lankshear & Knobel, 2011). The challenge for educators is how to utilize these emerging technologies to create innovative learning opportunities for students.

Dockstander (1999) describes technological integration as “using computers effectively and efficiently in the general content areas to allow students to learn how to apply computer skills in meaningful ways” (p. 2). This suggests that successful technology integration should improve the learning process and outcomes, involve multiple opportunities for practice, and be interactive and transparent. In order to facilitate these goals, software applications need to provide students with the opportunity to integrate technology “purposefully and creatively” (Dockstander, 1999, para 3) As Dockstander (1999) further elaborates, “technology integration is having the curriculum drive technology usage, not having technology drives the curriculum” (para 3). The National Center for Educational Statistics (NCES) has also defined technology integration as the “incorporation of technology resources and technology-based practices into the daily routine, work and management of school” (United States Department of Education, 2002, p. 2). These definitions demonstrate that technology integration should
increase the intensity and complexity of literate environments and provide students with opportunities to develop the ability to retrieve, access, and apply information (Dockstander, 1999). Further, technology integration is most effective when it is used to engage students in meaningful learning (Dias, 1999).

In “Teaching with Technology: Creating Student-Centered Classrooms,” Sandholtz, Ringstaff, and Dwyer (1997) drew on 20,000 teacher experiences from a longitudinal study with Apple Classrooms of Tomorrow that was designed to examine pedagogical issues in relation to technology. The authors employed case studies focused on teacher learning and teacher beliefs as they related to technology integration. Their findings identified five stages that teachers engage in as they navigate how to integrate technology: entry, adoption, adaptation, appropriation, and invention.

During the entry phase, teachers are still utilizing instructional technologies such as “blackboards, textbooks, workbooks, and overhead projectors” (p. 37). They struggle with how technology will fit into their instruction. During this phase, students also indicate that teachers have little understanding of how technology is beneficial. Once teachers acquire the basics, they find new ways to integrate technology and thus begin to think differently about it. When teachers enter the adoption phase, they begin to incorporate activities such as “keyboarding, word-processing, or drill-and-practice activities” (Dias, 1999). Teachers consider how software can be utilized for instruction, as they report that students are more motivated during this phase. By the time they reach the adaptation phase, technology is thoroughly integrated into teachers’ instructional practice. Students now use “word processors, databases, some graphic programs, and
computer-assisted-instruction packages” (p. 40). Productivity is key in this phase. Next, 
appropriation is viewed as a milestone rather than a phase. Specifically, there is a 
significant change in teachers’ attitude toward technology. Teachers embrace the idea 
that technology is an essential tool for instruction and apply it effortlessly. Finally, during 
the intervention phase, teachers begin to see technology as means for creating meaningful 
learning. Teachers experiment with new pedagogical approaches to enhance their 
teaching and with ways of interacting meaningfully with students and their colleagues. 
Teachers begin to reflect on their teaching as it relates to technology integration, to 
increase collaboration among students and teachers, and to examine the changes they are 
seeing in their students. In this stage, teachers are now comfortable with a new set of 
beliefs about teaching and learning.

This study acknowledges that it was extremely difficult for many participating 
teachers to reach this final phase. It expanded on support mechanisms to assist teachers to 
this end; however, participating teachers were unable to identify specific triggers or 
turning points that moved them through these stages of development. This suggests that 
while technology can serve as a catalyst for improving teacher practice and instructional 
change, effective technology integration is generally arduous and requires a high level of 
support (Ringstaff & Yocam, 1994). Through this study, Sandholtz, Ringstaff, and Dwyer 
(1997) demonstrated that meaningful use of technology requires going beyond just 
placing computers in classrooms. Technology alone cannot be a change agent for 
education. However, technology combined with curriculum could make a difference 
(Sandholtz, Ringstaff, & Dwyer, 1997).
It is evident that we must increasingly put technology into the hands of students. Nevertheless, we cannot deny that learning to integrate technology can be a daunting task for some educators. It is important to consider that many educators did not grow up using these modern technologies. As a result, learning how to use them requires more time and effort than they may want to invest. Therefore, it is equally important to recognize how teacher beliefs, attitudes, and barriers are both informed and surface, and how schools address the changes that take place (“Transform Teaching and Learning,” n.d.). That is, if teachers can see the benefits of technology, particularly via professional development or frameworks that can guide their instruction, it may become possible to confront their beliefs about teaching, learning, and, ultimately, technology integration (Ringstaff & Kelley, 2002).

**Professional Development**

Both national (“CDW-G Higher Education IT Security Report Card,” 2006; Ertmer & Ottenbreit-Leftwich, 2010) and international (Voogt, 2008; Ertmer & Ottenbreit-Leftwich, 2010) research has indicated that teachers’ efforts to use technology to support student learning have improved. In the *Teachers Talk Tech* survey, to which more than 1,000 teachers responded, 79% reported using computers “to teach students” (“CDW-G Higher Education IT Security Report Card,” 2006; Ertmer & Ottenbreit-Leftwich, 2010). However, other research, such as Project Tomorrow (2008), has suggested that we still do not have adequate technology integration, either in the U.S. or internationally (Kozma, 2003). A technological infrastructure alone does not change teacher practice to facilitate or engage with constructivist teaching strategies (Ertmer &
If we want our teachers to effectively integrate technology in the classroom, we need to provide adequate training that will help teachers understand how technology integration can support students in constructing deep knowledge that they can connect to real life situations (Ertmer & Ottenbreit-Leftwich, 2010).

Professional development is critical to advancing the use of technology for teaching and learning. It also has an important role to play if we want to encourage teachers to differentiate their teaching for an increasingly diverse student population (Lawless & Pellegrino, 2007). In Teachers Talk Tech (“CDW-G Higher Education IT Security Report Card,” 2006), the authors discussed the following findings:

- Technology is bridging the gap between twenty-first century skills and the core curriculum.
- The teaching process is fundamentally changing as professional development takes teachers from learning how computers work to using technology to change how they teach.
- Teachers believe technology is increasingly influencing how they teach thinking and learning skills to develop lifelong learners.
- Education is today where businesses were 20 years ago—on the cusp of radically transforming their fundamental environments.

While the Talk Tech data indicate that professional development is changing teachers’ pedagogical practices, Bauer and Kenton’s (2005) classroom observation study of 30
tech-savvy teachers indicated the contrary, suggesting that technology in the classroom is not being used to enhance the curriculum. Teachers need support in understanding how technology can facilitate meaningful learning through which students can construct deep knowledge (Fullan & Langworthy, 2014). As Lawless and Pellegrino (2007) noted, “technology can make it quicker or easier to teach the same things in routine ways” (p. 581). It also makes it possible to “adopt new and arguably better approaches to instruction and/or change the content or context of learning, instruction, and assessment” (p. 581). Today’s teachers find the latter idea most challenging, possibly because they require a fundamental change in their attitudes and beliefs, as well as a meaningful program of training and support (Ertmer & Ottenbreit- LETwich, 2010). This research suggests that the most successful professional development experiences occur when they are tied to the content and the grade level taught and include continuous practice and support (Ertmer, 2005; Fishman, 2006).

Multiple studies (Ertmer, 2005; Fatemi, 1999) also suggest that professional development regarding technology integration needs to contain the following essential components:

…a connection to student learning, hands-on-technology use, a variety of learning experiences, curriculum specific application, new roles and functions for teachers, collegial learning, active participation of teachers, ongoing process, sufficient time, technical assistance and support, administrative support, adequate resources, continuous funding, and built-in evaluation. (Glassett & Schrum, 2009, p. 140)

The context in which professional development for technology integration occurs is also a key factor. The most effective professional learning often occurs in “social and participatory ways” (Knobel & Kalman, 2016, p. 8). New Literacies and Teacher
Learning (Knobel & Kalman, 2016) outlines multiple case studies of how professional learning will not improve without opportunities for teachers to participate in social activities where their input is valued and to critically think about the range of meaning and ways through which digital media has changed the educational landscape. Further, teachers require not only training, but also leadership from their site administrator (Dawson & Rakes, 2003). Fullan (2007) indicated that, without leadership, innovations have little chance of success, even when practitioners are highly committed to the initiative. It is the responsibility of school leaders to explore not only the affordances of technology, but also the constraints caused by technology. That is, the policies and/or guidelines created by administrators often fail to address the conflicts between technology and classroom practices. This means that the innovation school leaders consistently espouse wanting to see in the classroom is often hindered by working conditions and lack of pedagogical knowledge (Knobel & Kalman, 2016).

If school leaders and policy makers want to see quality teaching and effective professional development with digital technologies, we must acknowledge that it is not about the digital technologies alone. Professional learning must have supportive and sustained collaboration on meaningful projects, where teachers feel connected, feel that their contributions are valued, and engage in social practice (Knobel & Kalman, 2016).

**Technological Frameworks**

Significant challenges surface when integrating digital literacies into the curriculum. While professional development is clearly one way in which we can support teachers’ technology integration, institutions can provide further help through the
adoption of technological frameworks. A teaching framework is typically designed to serve as a way of planning or guiding teachers regarding topics within an academic subject, including how to think about or approach that subject. Further, teachers can use these frameworks to build on or expand their knowledge or pedagogical skills. A technological framework can be particularly useful for teachers who may be new to integrating digital literacies as a part of their curriculum. However, if the framework is used prescriptively or as a mandate, it is dangerous. Teaching is complex; the most beneficial frameworks support teachers in designing curriculum or lessons and allow them to strategically address content, all while considering varying perspectives. Therefore, the IBO encourages the use of frameworks to support technology integration. They propose that a technology framework be viewed as “lens” to review the curriculum. The IBO also recommends that the value of the frameworks be regularly evaluated. They further suggest that, since most frameworks are developed for specific contexts, one framework may not be sufficient. Accordingly, they offer several frameworks for IB educators to examine.

**Agency, Information, and Design (AID)**

Agency, Information, and Design (AID) is a technological framework designed exclusively for IB schools. AID was designed to help IB educators “view the IB curriculum with technology-minded lenses” (International Baccalaureate Organization, Figure 2. Agency, Information, and Design (AID) lens.)
AID is a cycle that teachers can use to plan curriculum or to think about technology. It is built on three basic principles: **Agency: ways of being**; **Information: ways of knowing**; and **Design: ways of doing**. Agency refers to the mindset that teachers and students can adopt as they discover how technology enhances various subject areas. It also refers to technology-related skills and concepts that both teachers and students can acquire as they extend their technological abilities. Examples of such abilities might include becoming an effective digital citizen or learning to code. Information supports teachers with regard to helping students effectively research, evaluate, and synthesize the information that is available to them across expanding information technology contexts. The design outlines how students can move from being consumers to creators through activities such as gaming, multimedia design, and product design. The IBO suggests that schools also begin to think about how technology can be developed as a subject to enhance our understanding of digital literacy, as well as how it can be connected with Science, Technology, Engineering, and Mathematics (the STEM movement). The IBO views AID as both conceptual and practical. Teachers are encouraged to use it as a tool for unit planning, while administrators are encouraged to use it to facilitate thinking about how technology integration and digital literacies are being used within the IB contexts (International Baccalaureate Organization, n.d.).

The TPCK framework focuses on increasing teacher professional development and attempts to “capture some of the essential qualities that teachers require for technology integration in teaching, while addressing the complex, multifaceted, and situated nature of this knowledge” (Mishra & Koehler, 2006, p. 1). Mishra and Koehler (2006), in their descriptions of technology, included analog technologies, such as the pens, paper and chalkboard typical of traditional literacy, along with the digital technologies, such as computers, the Internet, and interactive whiteboards typical of digital literacy. Mishra and Koehler’s (2006) definition of technology also includes the knowledge, skills, techniques, and practices that teachers must possess to effectively teach in a digital landscape (Mishra & Koehler, 2006).
The TPCK framework focuses on three key elements: (1) the teacher must understand what technology integration and digital literacy are; (2) the teacher must know how to implement strategies to accomplish specific tasks in the classroom; and (3) the teacher must recognize when using technology is appropriate and when it is not. In other words, TPCK is a way of thinking strategically about how to plan, organize, and synthesize the use of technology integration and digital literacies in specific subject areas to support student learning. The challenge is that most teachers learned this content before the advent of technology. Teachers will not be able to teach the way they were taught. Teaching with technology will require them to change their teaching perspectives and strategies. The TPCK framework is thus dedicated to developing this shift in mindset for our teachers. TPCK encourages dialogue surrounding educational technology, including the consideration of pedagogical design and strategies, all while viewing the integration of technology through an analytical lens. If our educators are to prepare our students for the future, they must begin to rethink, relearn, and redesign curriculum and instruction so that our students are ready for this expanded form of literacy.

Teacher Attitudes and Beliefs

There is growing research to indicate that teacher beliefs are linked to their personal experience (e.g., professional development), values, and how they see themselves positioned in the world (Xu, 2012). Loucks-Horsley (1998) defined teacher beliefs as “ideas people are committed to—sometimes called core values…They shape goals, drive decisions, create discomfort when violated, and stimulate on-going critique” (p. 18). Loucks-Horsley’s (1998) definition suggests that the strategies teachers use are...
closely related to their pedagogical beliefs. Therefore, these ideologies have the potential to shape student learning environments and influence student motivation and achievement. That is, teachers may resort to their own belief systems, particularly when delivering instruction where formal knowledge is uncertain.

Pajares (1992) expounded on these ideas. He concluded that understanding teacher beliefs can inform educational practice: “Few would argue that the beliefs teachers hold influence their perception and judgments, which, in turn, affect their behavior in the classroom” (p. 307). Further, he acknowledged that much of the difficulty in teacher beliefs rests with the varying definitions—that is, that beliefs are “messy” (Pajares, 1992). He also posited that when these beliefs are “clearly conceptualized, carefully examined and consistent in understanding,” teacher beliefs are the single most important factor in the educational arena (Pajares, 1992, p. 307).

Lumpe and Chambers (2001) examined teacher “context beliefs,” particularly how these beliefs influenced the integration of technology in the classroom. They define “context beliefs” as “The ability of external factors or people to enable a person to reach their goal” (p. 95). Their study focused on determining a teacher’s core beliefs, such as what curricular issues were most important to the teacher or what significance they placed on integrating technology. Their study also examined how teachers’ core beliefs were affected by their “self-efficacy beliefs,” such as how well teachers believed they could succeed at integrating technology (Jakopovic, 2010).

Lumpe and Chambers (2001) concluded that teachers believe that technology integration was essential for their instruction. However, the factors affecting their use of
technology are highly dependent on the availability of hardware, software, and Internet connections, as well as on professional development opportunities, time constraints, and locations where they could utilize technology, such as computer labs. Lumpe and Chambers (2001) also suggested that if teacher beliefs do lead toward action or inaction, it is essential that careful consideration be given to how to assess those beliefs. That is to say, when teachers are not provided with positive circumstances, such as when they do not have access to ample equipment or proper training, negative beliefs about technology are reinforced. Therefore, teachers will only pursue technology integration when they perceive they have the means or opportunities to do so.

According to Earle (2002), barriers to the integration of technology in the classroom include extrinsic forces such as “access, time, support, resources, and training,” and intrinsic forces such as “attitudes, beliefs, and practices” (p. 11-12). Attitudes refer to an individual’s response to a purpose, whether favorable or unfavorable (Panagiotis, George, Nikos, & Ioannis, 2005). Teacher attitudes toward computers then determine their responses and purposes regarding the utilization of computers in their own teaching practices. Addressing teacher attitudes is thus essential, because teachers take on a major role in deciding the extent to which technology is used in the classroom.

Teo (2008) surveyed 139 pre-service teachers and contended that teachers have the potential to pass their own beliefs on to students, and, by extension, affect students’ attitudes towards instructional technology. This may potentially result in students’ missing out on key informational literacy and technological development in areas such as critical literacy, critical assessment of information sources, and research skills. Teo
(2008) suggested that there is a direct correlation between teachers’ background knowledge of technology hardware and software and their attitudes toward instructional technology. That is, when teachers possess effective computer-related skills and knowledge about instructional technology, they exhibit a positive attitude toward implementing technology in the classroom. Teo (2008) concluded that if any success was to be expected from technology integration into the classroom, teachers’ negative attitudes must be identified and amended. In other words, the more positive attitudes teachers have toward technology, the more likely they are to use technology in the classroom.

Albion and Ertmer (2002) suggest that teachers are not motivated to alter their beliefs about technology integration unless they understand how it will improve teaching and learning. This implies that difficulties in incorporating technology within the classroom stem from intrinsic forces such as teachers’ attitudes, beliefs, and practices. Ertmer (2005) expounds on this idea by indicating that to change teacher beliefs, schools must communicate positive values regarding technology integration. Therefore, schools should provide opportunities for teachers to engage in peer observations and to have access to technological experts as they try to incorporate technology in their instruction (Albion & Ertmer, 2002).

**Practitioner Research**

Historically, the role of the principal has been a varied and complex one—an implementer of educational policy, building manager, advocate for school change, employer, evaluator, and leader of student learning—even as the position has become
increasingly disconnected from the classroom. This has often meant working in isolation and implementing a top-down approach so that schools improve their state assessments in this era of accountability. However, Schmoker (2006) claimed that in order for a school to make real change, there must be a shift in the role of the school principal, from that of an instructional leader to that of a “learning leader” (p. 125). He suggested that leadership practices, such as shared vision and autonomy, are critical for improving teaching and learning. Further, he contended that principals needed to work collaboratively with teachers by creating an environment of exploration and creation. To do this, principals must unravel the complexities of their job and work on transforming “teaching, learning, leading, and schooling in accordance with democratic principles and social justice goals” (Cochran-Smith & Lytle, 2009, p. 118).

Practitioner research and administrator inquiry (Dana, 2009) represent two interrelated tools that administrators can utilize to take charge of their professional development, to facilitate this development within their institutional and practice contexts, and to become change agents and decision-makers. Dana (2009) suggested that this notion of administrator inquiry was built on the foundation of teacher action research (Dana & Yendol-Hoppey, 2009; Cochran-Smith & Lytle, 2009). Therefore, it holds promise for principals toward identifying specific areas of concern in their schools and gaining deeper insight into their administrative practice, particularly their role as a leader in school improvement.

Cochran-Smith and Lytle (2009) advanced a practitioner research framework of “inquiry as stance” (p. 118). When taking up an inquiry stance, educators not only
explore how things get done, but also focus on their own practice contexts and positionalities, asking questions such as who makes institutional decisions, who decides what needs to be accomplished and why, and, most importantly, whose framing of social and political contexts informs the ways in which student and stakeholder interests are understood and served. Hong and Lawrence (2011) also suggested that this inquiry perspective encompasses a comprehensive evaluation of teaching and learning, inclusive of principals analyzing their own practices and reflecting on how their decision-making affects learning outcomes.

Administrator inquiry differs from traditional educational research. Throughout the past several decades, two paradigms have dominated educational research. In one paradigm, known as process product research (Shulman, 1987), principals implement the findings of an “outside” expert (Dana, 2009, p. 6). That is, administrators as practitioners do not have the opportunity to inquire or problem solve. Instead, they simply moderate those dilemmas framed by the outside experts and implement the recommended curriculum or strategies (Dana, 2009). The second paradigm is known as “qualitative” or “interpretive work” (Dana, 2009 p. 6). Much of this paradigm is oriented toward university-based academics. While this research provides insight between theory and practice, the practitioners themselves still play limited roles. Moreover, knowledge of teaching and learning is still generated from the “outsider’s” perspective (p. 5).

Recently, a third paradigm of practitioner inquiry and/or practitioner research has emerged. This research engages the practitioners in the “design, data collection, and interpretation of data that centers around their question” (Dana, 2009, p. 5). Because this
paradigm positions administrators as playing a part in their own research process, administrators are more likely to facilitate changes based on the knowledge they generate. In 2000, Anderson and Jones conducted a study on how to improve the research-based knowledge for educational administration. The study explored the various methods administrators used, as well as the “practical epistemological and political dilemmas they encountered” (p. 428). They wrote:

We do believe, however, that intentional, systematic and disciplined inquiry on educational practice by “insiders,” although fraught with unique epistemological, methodological, political and ethical dilemmas, has great potential for challenging, confirming and extending current theory and for identifying new dimensions of administrative practice for study. (p. 430)

They also suggested that we ignore the knowledge generated by insiders all too often, thus giving academics outside individual practice contexts the “permission to ignore action research” (Anderson & Jones, 2000, p. 430) and discount it as formal knowledge.

Cochran-Smith and Lytle (2009) suggested that practitioner research and practitioner inquiry are umbrellas that “refer to a wide array of educational research modes, forms, genres and purposes” (p. 38). They further argued that, when practitioners took on the role of the researcher within their professional context and there was collaboration among researchers and learners, the participants could become “knowers, learners, and researchers” (Cochran-Smith & Lytle, 2009, p. 42).

This new change in inquiry-driven leadership will not occur on school campuses until principals begin to “drive transparent, collaborative reflection,” continually assessing “what is working” as well as learning from those things that do not work (Fullan & Langworthy, 2014, p. 8). Sound decisions must be based on high-quality
information. Principals will be sufficiently equipped to make changes and foster improvements within the educational landscape only when inquiry is at the center and they have the opportunity to conduct research, be reflective, formulate strategies for improving a given situation, clarify such situations in ways that yield new understanding of the problem, and collaborate (Robinson & Lai, 2006; Cochran-Smith & Lytle, 2009; Dana, 2009).

**Summary**

Research (Street, 2003a; Gee, 2007; Heath, 1982) has suggested that digital literacy offers students new ways to learn and teachers new ways to teach. Literacy is the key to ensuring that we are meeting the needs of our twenty-first century learners. Teachers must provide a broad range of practices that allow students to research, create, collaborate, and communicate effectively (Hague & Payton, 2010). Through an effective implementation of digital literacies and technology integration, teachers have an opportunity to critically engage our students and increase their social awareness of how technology conveys meaning.

This cannot happen without understanding teachers’ pedagogical beliefs regarding issues such as technology, strategic professional development, access to resources, and continuous engagement in activities where they can share, feel valued for their contributions, and effect leaders committed to making a change with emerging technologies. Changing teachers’ traditional teaching techniques and increasing their use of technology will involve time, training, preparation, and changes within their school environments. Research has also clearly demonstrated that traditional professional
development workshops are often “short term, devoid of adequate follow up, and do not
address specific school context” (Jones, 2001, p. 36).

Finally, effective leadership cannot be overlooked. If administrators are going to
make gains in this area, they must become change agents. They cannot achieve this
without examining how to become a “learning leader” (Schmoker, 2006, p. 125) in
collaboration with teachers and parents.
Chapter 3

METHODOLOGY

The purpose of this study is to examine how teachers are integrating digital literacies within IB programmes and to understand what influences the depth of digital literacies implementation. Importantly, this study was designed to inform my practice as a school leader, specifically with regard to supporting my work with faculty to co-create a healthy digital ecology in an International Baccalaureate (IB) programme that advances teaching and learning.

This chapter is divided into six sections. The first section provides an overview of this study. The second section provides a description of the constructivist research paradigm that informed the case study research design component and the methodologies employed. The third section provides a description and rationale for research site choice, including a description of the participants. The fourth section describes data collection methods, types, and researcher positionality. The fifth section describes data analysis, validity measures such as triangulation, and study limitations. The final section outlines the trustworthiness of the study.

Research Design Overview

This study draws on a constructivist paradigm, described in Section II. A case study methodology was employed as the primary methodological approach to explore the forces, contexts, and situations influencing the current perspective of digital literacies in an IB school. The decision to use a case study inquiry was geared toward examination of
teachers’ attitudes, beliefs, experiences, and influences regarding their implementation of digital literacies. It also specifically addressed the conceptualization of teacher beliefs as, in essence, core values that have a direct impact on the type of instruction teachers choose to deliver. Further, the use of a case study allowed investigation of teachers’ use of digital literacies as situated within their own professional contexts.

This study was conducted over a six-month period, from June 2015 to November 2015, in a Junior Pre-Kindergarten through Grade 12 independent IB school located in Nassau, The Bahamas. Four teachers participated in the study. All participants are women; they teach in different areas of the school and possess varying teaching experience and backgrounds. One semi-structured interview was conducted with each teacher, followed by three classroom observations. The main purpose of the observations was to see how teachers were implementing digital literacies and technology integration within their instruction.

While most of this study’s findings are derived from qualitative data, quantitative methods were also employed. A survey was created to gather information from a larger sample of teachers and to examine trends regarding teachers’ attitudes and beliefs about the implementation of digital literacies. Following initial analysis of the survey data, two focus groups were formed. The focus groups allowed the participants the opportunity to discuss four main questions:

1. What do teachers perceive as technological competency?
2. How are digital literacies defined?
3. Are there students who benefit the most from technology integration?
4. Do barriers for implementing digital literacies still prevail?

Data analysis was conducted through a recursive process (Hancock & Algozzine, 2011). The data was first organized by assigning codes. After several readings, the codes were refined, assigned definitions, and then examined to see whether the codes fit the expected categories. Next, key themes were identified in alignment with the research questions. Lastly, a theory was constructed by verifying emergent relationships between each case using replication logic.

Three research questions guided this study:

1. How have teachers’ attitudes, beliefs, or personal experiences with technology shaped their instructional practices?

2. How have teachers interpreted “technology integration” within the IB programme, and how has the programme influenced their teaching of digital literacies practices and technology?

3. What happens when I, as a school administrator, begin to explore how the school’s vision of technology integration is influencing the implementation of digital literacies within the IB programme? How does what I learn influence my work as a school leader?

**Research Paradigm**

This study’s research framework was primarily informed by constructivist epistemology. Creswell (2009) proposes that constructivists examine the theory of knowledge and focus on how we acquire knowledge. Constructivists’ knowledge is not
discovered but built, or constructed, through experience. They reject the notion that there is one definitive truth. Instead, constructivist research methodologies suggest new ways of thinking about issues; in this study, I am specifically referring to literacies and learning issues, problems, and hypotheses. The researcher or learner is often an active participant, not a passive observer (Creswell, 2009). Researchers who work within constructivist frameworks “seek to understand the context or setting of the participants through visiting this context and gathering information personally” (Creswell, 2009, p. 8).

This study employs a practitioner research “inquiry stance” and, more specifically, engages in administrator inquiry. An administrator inquiry stance refers “the process of the principal engaging in systemic, intentional study of his/her own administrative practice and taking action for change based on what he/she learns as a result of the inquiry” (Dana, 2009, p. 2). Administrator inquiry is based on the Cochran-Smith and Lytle (2009) idea of “inquiry as stance.” Cochran-Smith and Lytle (2009) assert that practitioner research enables educators to question the basic assumptions about teaching and learning by intentionally studying one’s own professional practice. Developing professionally, legitimizing what they do, and getting their voices heard are critical for educators to become change agents in the design, implementation, and evaluation of educational reforms. We must understand how to effectively use appropriate tools that foster student learning. As Cochran-Smith and Lytle (2009) write, “more and more practitioners are now expected to be the gatherers and interpreters of school and classroom data as part of larger initiatives to improve school achievement” (p. 1).
Qualitative Research

This primarily qualitative study employs descriptive case study methodology. Merriam (2009) posits that qualitative researchers examine how individuals construct meaning. That is, they explore the experiences, reasons, opinions, and motivations for “how people make sense of their world and the experiences they have in the world” (Merriam, 2009, p. 13). Case study research can be defined as “a research strategy that focuses on understanding the dynamics present within single settings” (Eisenhardt, 1989, p. 534). A case study is most appropriate when one is studying how and why questions, and when there is a contemporary phenomenon where “behavior cannot be manipulated” (Yin, 2003, p. 12). This study therefore employs a multiple case study to generate a more comprehensive study via which to explore differences within and among the four individuals participating in the research. The focus of this study’s cases is how and what teachers experience as they implement digital literacies within the IB programme. The goal of these cases is to replicate, which means that if two or more of the cases have the same theory, replication logic can be claimed. When coupled with cross-validation at various times and under various conditions, this can confirm the validity of a theory with confidence (Yin, 2003). Yin (2003) describes multiple types of case studies:

1. Explanatory: usually used to explain how or why a sequence of events has occurred; that is, investing in causality.
2. Exploratory: often conducted to define research questions and hypotheses.
3. Descriptive: often used to describe events that take place in a specific context.
This study made use of a descriptive case study method. It uncovered, described, and analyzed the belief systems and personal experiences of participating teachers, with emphasis on how these teachers have interpreted the meaning of digital literacies and technology integration and how their belief systems have affected their instructional practices. This study also generated a description of how the school’s technology vision affects teachers’ use of digital literacies. Lastly, data was used to explore and expand the vision of what it means to be a technology leader; that is, how digital literacies and technology can be used to enhance teaching and learning.

This case study research is grounded in practitioner research. Practitioner research is particularly relevant to facilitating this study within my own site of practice, with special focus on issues related to my own work as an instructional leader (Cochran-Smith & Lytle, 2009). As both principal and researcher, this study’s findings regarding literacy and technology will inform policy at this site, such as working with teachers to introduce new pedagogies that enable students to construct deep meaning and directly prepare the students for the future (Fullan & Langworthy, 2014). As new literacies and technology are an integral component of the IB programme, there is clear value in identifying the barriers to successfully implementing technology in our school.

This study was also examined through the lens of an administrator inquiry based stance (Cochran-Smith and Lytle, 2009). The IB programme states “the school community should be engaged in a dialogue to ensure a positive educational experience by understanding how to use the Internet and web-based devices safely, responsibly, and smartly (International Baccalaureate Organization, 2011, para. 3). In fact, the school is
evaluated on this metric in order to continue its accreditation. In response to these goals and metrics, this study’s findings include a description of how teachers interpret this mandate, how teachers are using digital literacies and technology to support teaching and learning, and what is happening in their classrooms. With regard to the IB’s directive to support students in becoming digitally literate, it is critical that school leaders have a clear understanding of both what this directive means to faculty and how they are taking up and/or resisting digital literacies.

**Quantitative Research**

Quantitative research employs methods such as experiments and surveys, which typically yield numerical data based on responses to predetermined questions (Creswell, 2003). This study employed a survey to generate quantitative data. Surveys are “fundamentally a matter of asking a sample of people from a population a set of questions and using the answers to describe the population” (Fowler, 2009, p. 2). Mertens (2009) outlined three types of surveys: descriptive, cross-sectional, and longitudinal. Cross-sectional surveys examine how different groups respond to survey questions about a specific topic. Longitudinal surveys follow one group over a significant period of time, usually years. Descriptive surveys take “a snapshot in time of the variables being studied” (Mertens, 2009, p. 191). A descriptive survey was most appropriate for the purposes of this study because a static “snapshot” of the site’s environment generated quantitative information to support the examination of multiple teaching variables, such as (a) the diversity of teachers’ attitudes and beliefs about digital literacies and technology integration; (b) teachers’ knowledge levels pertaining to technology; (c) teachers’
practices related to digital literacies; and (d) the factors influencing teaching practices within the school culture.

A survey can provide four advantages over interviewing:

1. Questions can be created to elicit long or complex responses and reach more individuals in a shorter time span.

2. Surveys can be carried out by the researcher with limited effects on reliability and validity.

3. Survey results can typically be quickly and easily quantified.

4. The anonymous nature of the survey increases the likelihood that respondents will share sensitive information, thus making the data more valid (Fowler, 2009, p. 72).

Fowler (2009) cautioned that a self-administered survey requires carefully designed questions and that open-ended questions are not always useful, as there is no quality control over the responses received.

This study’s survey was designed to generate more understanding about the LCIS faculty’s attitudes, beliefs, and perceptions as they relate to “technology integration” and digital literacies. Within the context of my role as school leader, an anonymous survey appeared to be the most advantageous way to learn more about the staff at large and to increase the likelihood of gaining genuine information. The survey (Appendix E) was developed specifically for this study and comprised 16 questions, including 11 closed-
ended and 5 open-ended. Open-ended survey questions extended more opportunity for participating teachers to discuss their perspectives on technology integration and digital literacies. It also provided opportunities to elicit unanticipated responses. The survey was divided into four sections: (a) Questions 1-3 addressed teachers’ backgrounds; (b) Questions 5-6 addressed personal technology practices, that is, how they use technology in their personal lives; (c) Questions 6-13 addressed influences on participants’ existing pedagogical practices with technology; and (d) Questions 14-16 addressed teachers’ attitudes and beliefs.

**Description and Rationale of the Research Site**

LCIS is an accredited, independent IB school. Due to limited classroom space, the current enrollment cap is 350 students across Junior Pre-Kindergarten through Grade 12. The student body is 38% Bahamian and 62% international, with the majority of foreign students coming from the United States, Canada, and the United Kingdom. More than 11 languages are spoken among the student body and teaching staff. The majority of our students come from highly affluent families, and less than 4% of families take advantage of the school's robust financial aid program. The recent influx of international families who can pay the full tuition contributes to the low use of financial aid. All of our Grade 12 students matriculate to college, 38% of whom attend colleges labeled “first tier,” (“National Universities Ranking,” 2016).

The average length of employment at LCIS is six years, and the average age of the faculty is 40 years old. There are 41 female teachers and nine male teachers. Currently, 54% of the faculty hold advanced degrees. Consistent faculty turnover, owing
in part to the number of expatriate teachers, results in a lack of continuity and consistency in instruction.

Stake (2011) proposes that one’s ability to fully understand a specific phenomenon depends on choosing the research case well. As he explains, “The case to be studied is a complex entity located in a milieu or situation embedded in a number of contexts or backgrounds” (p. 127). My choice to use my own school site was guided by multiple factors. First, LCIS teaches the full continuum of the International Baccalaureate programmes, all of which espouse global citizenship, a status that largely depends upon the connections that technology provides. Therefore, I had a mandate to examine the integration of digital literacies within the curriculum, as well as the luxury of analyzing its implementation across a wide age group, from preschool to high school, in a manageable setting of only 350 students and 50 teachers. Furthermore, LCIS is an educational leader in the Caribbean. As a result, I expect this study will be useful to other independent international schools in the region that are contending with similar issues, most specifically integrating technology in instruction.

Second, LCIS has strong a technology-based infrastructure, largely funded by donor contributions. This substantial investment, coupled with the fact that the majority of our parents are technologically savvy and rely on technology in their businesses, contributes to the school community’s expectation that our students will successfully develop digital literacies. While there were some productive and exciting uses of technology prior to this study, a significant portion of the teaching and learning practices were not taking advantage of the resources at hand. Part of the problem stems from the
challenges The Bahamas faces as it tries to keep pace with technological progress. For example, all students either own or have access to Apple Mac computers (Grades 6-12) or iPads (Junior Pre-Kindergarten-Grade 5), yet there is a limited supply of vendors on the island who are able to service the hardware.

A primary goal within our strategic planning regarding technology is not simply the use of technology, but also its innovative use. Stake (2011) asserts that case studies are supposed to represent the population being studied. As the literature attests, (Sandholtz, Ringstaff & Dwyer, 1997; Project Tomorrow, 2008; Ertmer & Ottenbreit-Leftwich, 2010), resistance to using technology to advance digital literacies is found in many educational environments. Therefore, such a study is both necessary and valuable in evaluating the attitudes, perceptions, and beliefs about technology integration that may impede the process. However, at LCIS, we are faced with an additional challenge as an international school situated in The Bahamas. A former British colony that gained its independence relatively recently, the Bahamian people harbor stiff resistance to foreign entities, resulting in distrust and enmity. At times, cultural predispositions have seemed responsible for rigid opposition not only to foreigners (46% of LCIS staff is expatriate), but also to changes in the curriculum, teaching approaches, and day-to-day operations. Thus, conducting the research at LCIS offered an opportunity to better understand our Bahamian teachers and to work on breaking down barriers that have prevented a cohesive and collegial environment.
Selection of the Participants

Using purposive sampling, I conducted the majority of this research study with four teachers, including one from each division of the school and one of the technology teachers. Specifically, I used critical case sampling, a type of purposive sampling that is particularly useful in exploratory qualitative research. Patton (1990) notes, “the logic and power in purposive sampling lies in selecting information rich cases for studying in-depth” (p. 169). Patton (2002) recommends a small number of subjects when conducting a critical case sampling, as small case samplings are more likely to "yield the most information and have the greatest impact on the development of knowledge" (p. 236). Therefore, four participants were appropriate for this study. Further, working with one teacher from each division allowed me to explore all areas of the IB programmes, including the Primary Years Programme (PYP), Middle Years Programme (MYP), and Diploma Programme (DP), as well as to capture a wide range of perspectives.

Purposive sampling was also employed to select focus group participants. A total of eight teachers were selected. Two groups were formed: one that included four teachers from the ELC and ELM schools, and one that included four teachers from the Secondary School. The participants for both the case studies and focus groups were selected based on the following criteria:

- All were women. As 82% of the teachers at LCIS are women, limiting participation to women resulted in the most representative sample of the teaching staff.
• There was a range of technology knowledge and expertise within this group of participants. They have different levels of knowledge about technology and how to implement digital literacies in their practice.

• All participants were from different cultural backgrounds and represent varied teaching experience.

• The participants represented all three schools: Early Learning Center (ELC), Elementary (ELM) and Secondary School (SS). The technology teacher teaches across all three schools.

• These teachers are required, as mandated by the IB programme, to use digital literacies to enhance technology integration the students.

• These teachers volunteered to participate because they felt they had something to say about digital literacies.

By using maximum variability (Patton, 2015), I had the opportunity to deepen my understanding of how the digital literacies are being utilized across the three schools—ELC, ELM, and SS, as well as across the three IB programmes—PYP, MYP, and DP. When using a maximum variation, the researcher’s sampling method is often small. Following only four teachers was, therefore, methodologically appropriate.

**Data Collection**

I began my data collection by conducting four semi-structured interviews, followed by three observations of each participant. Following the interviews, it was evident that I needed a larger baseline representing the whole staff. Therefore, I designed and administered a survey to all LCIS teachers. After analyzing the survey results, I
conducted the two focus groups. The focus groups elaborated on information originally yielded by the survey results. In an effort to document how the study informed my practice as a leader, I kept a reflective journal. The reflective journal allowed me to document and examine my practice as I was collecting the data. I also used field notes, which enabled me to detail the events and activities in the participants’ classrooms. I wrote six analytic research memos to capture my thoughts and ideas following the completion of observations. Additional data collection included three lesson plans from each participant and postings from each teacher’s Facebook account. These additional data points provided a background on the participants that they might have neglected to share (Mertens, 2009). Table 1 summarizes the data collection methodologies in alignment with the research questions.

Table 5

*Summary of Methodologies*

<table>
<thead>
<tr>
<th>Instrument Type</th>
<th>Participants</th>
<th>Number Participants</th>
<th>Number of Sessions</th>
<th>Date Administered</th>
</tr>
</thead>
<tbody>
<tr>
<td>Semi-Structured Interviews</td>
<td>One teacher from each area of the school (ELC, ELM, SS, and one who works across all three school)</td>
<td>4</td>
<td>4</td>
<td>July 2015</td>
</tr>
<tr>
<td>Survey</td>
<td>Teachers</td>
<td>45</td>
<td>1</td>
<td>September 2015</td>
</tr>
<tr>
<td>Observations</td>
<td>Teachers</td>
<td>3</td>
<td>12</td>
<td>Completed between June 2015-November 2015</td>
</tr>
</tbody>
</table>


<table>
<thead>
<tr>
<th>Reflective Journaling</th>
<th>Researcher</th>
<th>0</th>
<th>Weekly</th>
<th>Weekly reflection every Friday for eight weeks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research Memos</td>
<td>Researcher</td>
<td>0</td>
<td>4</td>
<td>Six memos</td>
</tr>
</tbody>
</table>

**Researcher Positionality**

It is important to consider the relational dynamic between researcher and participants, or *positionality*. This consideration enables a researcher to identify the lens through which he or she interprets the social world (Beverly, 2011). Maher and Tetreault (2001) write, “knowledge [is] valid when it takes into account the knower’s specific position in any context, a position always defined by gender, race, class and other socially significant dimensions” (p. 22). As principal, I am the primary decision maker regarding technology purchased for the school, and I clearly have a strong bias towards the integration of technology and digital literacies in the classroom. Qualitative research is guided by the specific perspective of investigator (Creswell, 2007). It was my assumption that digital literacies are not only optimal for enhancing instruction but are a requirement for improving education and preparing our students for the future world. And, of course, it is a requirement of our IB programme.

LCIS has been implementing some form of technology for more than seven years. Feedback from our evaluating bodies, and the struggles teachers have encountered with the nexus of teaching *digital literacies* and technology integration, led me to explore this research. My prior knowledge about the school environment influenced the methodologies I used, my assumptions about the research, and the questions I posed. As Denzin (1986) notes, "interpretive research begins and ends with the biography and self
of the researcher” (p. 12). Bias provides information about the researcher's position and intentionality as it relates to the research question (Shenton, 2004).

This concept should not be confused with prejudice, baseless results, or out-of-context perceptions. As the researcher, I have critically uncovered my bias through self-analysis and reflection so that it did not corrupt nor invalidate the results. Wolcott (1995) explains that “bias should stimulate inquiry without interfering in the investigation” (p. 165). That is, as a researcher, one is not searching for total objectivity, but rather how bias can be made explicit. If both the purpose and assumptions of research are clear, then bias can become a meaningful component of the study (Jones, 2001).

To address the issue of positionality, I used the reflective journal methodology. The use of a critical friend was also instrumental in this process. This notion of a “critical friend,” recommended by Stenhouse (1975), suggests that a critical friend is a collaborator who can provide feedback and give advice when an educator is conducting action research. Elliott (1985) expands on the role of a critical friend. He posits that a critical friend role is one of facilitator, of outsider. As the outsider, the critical friend is conducting “second order action research” (Elliott, 1985). In this case, the critical friend would help teachers to reflect deeply on how students create and consume digital technology, what skills the teachers need to develop to teach digital technology, and what it means to be technologically component. My role as the researcher was to conduct “first order action research” (Kember, Ha, Lam, Lee, Ng, Yan, & Yum, 1997). That is, I was focused on improving teaching and learning at the school in general, rather than on individual teachers. The use of the collective reflective process allowed me to identify
issues and evaluate pedagogical goals. It also supported in constructing my knowledge as it related to my leadership practices. Additionally, frequent debriefing sessions with my chair and committee members allowed me to widen my viewpoints and notions about a particular event.

Validity of the findings can be jeopardized or enhanced depending on the relationship between the participants of the study and the researcher (Jones, 2001). Hall and Stevens (1991) recommended establishing trust, creating a positive environmental setting, and being attuned to the participants’ language and setting, as well as developing a strong rapport and frequent interactions to address these concerns.

As the principal, I am also the evaluator of each participant in the study. Therefore, I was concerned that participants might over-report practices and actions that were compatible with values deemed “socially acceptable” and might under-report those deemed undesirable. This is known as “social desirability” bias (Neely & Cronley, 2004, p. 432). As such, participants may have been afraid to share their thoughts openly with me and may have responded in accordance with what they felt I would like to hear. Finally, given the pressure of being an IB school, I did not want to overestimate the power of technology. However, the purposive sampling was designed to address this issue. By identifying those teachers who had something to say about this issue, I tried to ensure that my subjects were not afraid to express their opinions. To further address this concern, I developed a strong rapport with each individual and consistently reminded the participants that they could contribute ideas and talk about their experiences without fear of retribution or losing their job.
Interviews

For the purpose of this study, I began my data collection with one semi-structured interview that consisted of open-ended questions. Interviews provide detailed information about participants’ experiences and viewpoints on a particular topic (Turner, 2010) and are believed to provide a “deeper” understanding of the topic (Gill, Stewart, Treasure, & Chadwick, 2008). Each of the participants was interviewed for about 45 minutes. Each interview was recorded and later transcribed. The semi-structured interview format afforded me an opportunity to gather information about teachers’ backgrounds, personal experiences with digital literacies and technology integration, and perspectives on the influence of the school’s vision of technology on their instructional practice. The use of the semi-structured interview format also allowed me to be flexible with my questioning and investigate more deeply. Additionally, it allowed the participants to share their individual views about what they believe needs to be put in place and how to increase the use of digital literacies within the IB programme. Finally, during the conclusion of the interview, the teachers had the opportunity to add additional information that did not come up during the interview session.

Observations

Once the interviews were completed, I began the observations. I used participant observation, a process where the researcher reports and examines daily activities to make sense of them (Stokrocki, 1997). I conducted three observations in each participant’s classroom, for a minimum of 45 minutes per observation. The observations took place between September and November 2015. I wanted to understand how the teachers
incorporated these “digital literacies” specifically during literacy instruction across content areas. As principal, I often engage with the students when I am conducting observations. Students can offer valuable comments about what they are learning as it relates to technology. I thus interacted with the students when appropriate and recorded my interactions in field notes.

The use of participant observation provided a context for understanding the data I collected such as definitions and terms that participants may have used in interviews. This allowed me the opportunity to observe events that participants were unable or unwilling to share during their interviews as well as situations that participants described in their interviews, thereby discovering any inaccuracies. In other words, I was able to observe the four participants’ cultural and social contexts, including their relationships with their students, and to document events, behaviors and activities—what they do, how frequently, and with whom (Mack, Woodsong, MacQueen, Guest, & Namey, 2005). Further, using participant observations also increased the potential validity of the study, as participant observation has been shown to provide a better understanding of the context and phenomena one is studying (DeWalt & DeWalt, 2002).

Table 6

<table>
<thead>
<tr>
<th>Participants (Pseudonyms)</th>
<th>Nationality</th>
<th>Years of Teaching Experience</th>
<th>Years at LCIS</th>
<th>Grade level</th>
<th>Age</th>
<th>Taught Abroad</th>
<th>Degree(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rachel</td>
<td>Bahamian</td>
<td>10</td>
<td>9</td>
<td>Junior Pre-K</td>
<td>42</td>
<td>No</td>
<td>B.Ed.</td>
</tr>
</tbody>
</table>
Focus Groups

Two 60-minute focus groups were conducted following a preliminary analysis of the survey results. This offered an opportunity to explore the survey responses in greater depth with a representative sample from the target population. Focus groups include only a small number of people who discuss a highly focused topic in depth (Patton, 2002). Because a focus group can be used to document how group members respond to each other’s perspectives and beliefs (Bryman, 2008), the creation of the focus groups afforded me an opportunity to elicit the diversity of views within this study’s group of participating teachers, with particular insight into the beliefs underpinning their dialogue.

The participants were purposefully selected using the same criteria as for the case studies. Six open-ended questions were formed with the purpose of expanding on the participants’ definition of digital literacies, explaining how digital literacies enhance their instructional practice, and understanding who benefits from the integration of digital literacies. Interviews were conducted by the “critical friend” who would help the teachers think more deeply about what it means to be a digitally competent teacher, what influences teachers’ use of digital literacies, and what obstacles prevent them from using technology. Focus groups offer participants the opportunity to hear each other's responses
so that they can expand upon or alter their original statements (Patton, 2002). Focus
groups are not undertaken to achieve consensus, nor are they a platform for vocal
participants to dominate with their views. Instead, focus groups are “collective
conversations” where the primary aim is “to describe and understand meanings and
interpretations of a select group of people to gain an understanding of a specific issue
from the perspective of the participants of the group” (Liamputtong, 2011, p. 3). The
focus groups also allowed for the collection of a wide range of responses (Watts &
Ebbutt, 1987).

My third research question—What happens when I, as a school administrator,
begin to explore how the school’s vision of technology integration is influencing the
implementation of digital literacies within the IB programme? How does what I learn
influence my work as a school leader?—addressed what I am personally learning as a
leader and how that learning influences my work as a principal. Kember, McKay,
Sinclair, and Wong (2008) posited that change occurs out of critical reflection. As the
researcher, my actions can be influenced by unconscious assumptions or constraints. The
focus groups were an ideal opportunity to unleash those constraints.

Table 7

Focus Group Participant Demographics and Characteristics

<table>
<thead>
<tr>
<th>Name</th>
<th>Nationality</th>
<th>Number of Years in Education</th>
<th>Number of Years at LCIS</th>
<th>Grade Level(s) They Are Teaching</th>
<th>Age</th>
<th>IB Programme</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hope</td>
<td>American</td>
<td>13</td>
<td>8</td>
<td>7, 8, 9 English</td>
<td>49</td>
<td>MYP</td>
</tr>
<tr>
<td>Asia</td>
<td>Bahamian</td>
<td>8</td>
<td>1</td>
<td>8, 9, 11, 12 Science and Biology</td>
<td>29</td>
<td>MYP/ DP</td>
</tr>
<tr>
<td>Name</td>
<td>Nationality</td>
<td>Grade</td>
<td>Subjects</td>
<td>Age</td>
<td>Program</td>
<td></td>
</tr>
<tr>
<td>------------</td>
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<td>-------</td>
<td>----------</td>
<td>-----</td>
<td>-----------</td>
<td></td>
</tr>
<tr>
<td>Catalina</td>
<td>Bahamian</td>
<td>39</td>
<td>7, 9 Math</td>
<td>61</td>
<td>MYP</td>
<td></td>
</tr>
<tr>
<td>Faith</td>
<td>British</td>
<td>4</td>
<td>2, 7, 8, 9, 11 Spanish</td>
<td>31</td>
<td>MYP/DP</td>
<td></td>
</tr>
<tr>
<td>Whitney</td>
<td>Bahamian</td>
<td>19</td>
<td>6, Junior Pre-K</td>
<td>45</td>
<td>PYP</td>
<td></td>
</tr>
<tr>
<td>Diana</td>
<td>American</td>
<td>10</td>
<td>2, 1</td>
<td>45</td>
<td>PYP</td>
<td></td>
</tr>
<tr>
<td>Zoey</td>
<td>Bahamian</td>
<td>20</td>
<td>4, 4</td>
<td>44</td>
<td>PYP</td>
<td></td>
</tr>
<tr>
<td>Macy</td>
<td>American</td>
<td>13</td>
<td>1, 5</td>
<td>36</td>
<td>PYP</td>
<td></td>
</tr>
</tbody>
</table>

**Reflective Journaling**

It was my intent to learn from this study and to use its data to inform future actions. To accomplish this, I systematically documented my interactions with school staff during my meetings with my leadership team and during the teachers’ professional learning community meetings, with emphasis on discussions and contexts related to embedding digital literacies in the classroom. As a part of this study, I also engaged in dialogic reflection. Hatton and Smith (1995) described four types of reflective journaling:

- Descriptive writing—simply describing events as they occur without any reflection.
- Descriptive reflection—beginning to construct meaning about how and why individuals do things.
- Dialogic reflection—reflecting at a deeper level. The researcher removes him/herself from an event or practices and begins to consider alternative viewpoints on how and why events are occurring.
- Critical reflection—examining both the social and historical perspectives of an event (Hatton & Smith, 1995).
I reflected on teaching strategies that I had observed in the participants’ classrooms, as well as on barriers teachers were experiencing with the implementation of digital literacies (e.g., developing students’ research skills, communicating digital content, and collaborating among themselves more). Journaling is an excellent methodology to sort things out, to “clarify, organize...thoughts, connect old knowledge to new, and, in the process, personalize the content” (Hughes, Kooy, & Kanevsky, 1997, p. 187). Consequently, dialogic reflection enabled me to tap into the knowledge that I gained through experience of conducting this study. I tried to make sense of varying perspectives by considering multiple viewpoints that were being shared in the interviews, focus groups, survey, and conversations with my leadership team and teachers. Once the ideas were documented, they were hard to ignore and begged to be either considered, rationalized, or discarded (Jasper, 2005).

**Research Memo**

Research memos were used to substantiate my findings throughout the data collection process. Patton (2002) said, “recording and tracking analytical insights that occur during data collection are part of fieldwork and the beginning of qualitative analysis” (p. 436). Memos were written following the interviews, survey administration, observations, and two focus groups. The memos enabled me to examine my positionality, begin some proposed coding, and identify some conceptual ideas regarding my results. Most importantly, the research memos allowed me to revisit what I was thinking at a given point in my data collection process.
Data Analysis

A key reason for conducting case study research is “summarizing and interpreting information as a basis for understanding the topic being investigated” (Hancock & Algozzine, 2011, chapter 9, para. 3). Data from the case studies was collected recursively (Hancock & Algozzine, 2011). That is, I constantly interacted with the data throughout the research process, rather than reviewing it at the end of the process, as is done in other forms of research. With this in mind, the inductive process of searching for patterns and theories was the best approach for this study (Bernard, 2011).

I began my analysis with the interview transcripts. My first step was pre-coding, reading the transcripts and underlining any words or phrases that emerged as “codeable moments”—passages that struck me as worth analyzing. During the pre-coding, I also used the jotting strategy—writing key words or phrases that represent various passages (Saldaña, 2013). I was looking for key concepts that related back to my research questions. This type of coding is known as in vivo coding (Miles, Huberman, & Saldaña, 2014). In vivo coding is most appropriate for novice researchers and is the most widely used coding in qualitative research (Miles, Huberman, & Saldaña, 2014).

Next, I began to search for patterns within the coded data. I looked for similarities, differences, and frequency of codes. Initial codes and their meanings were recorded in Dedoose, a web-based data analysis platform. Table 4 outlines the initial coding system I developed after reading the four interviews several times.

Table 8

Coding System Categories, Titles, and Descriptions
### Pedagogical Practices with Technology and Digital Literacies:
*How teachers use technology in the classroom*

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Examples of Teachers’ Technology Use</td>
<td>Sections where teachers describe specific technological use.</td>
</tr>
<tr>
<td>1</td>
<td>Factors Influencing Technology Use in the Classroom</td>
<td>Factors that support/hinder teachers in using technology within their classrooms.</td>
</tr>
<tr>
<td>3</td>
<td>Pedagogical</td>
<td>Teachers’ decisions regarding the best technology-specific pedagogical approach.</td>
</tr>
<tr>
<td>3</td>
<td>Specific Resources</td>
<td>School technology resources that teachers implement in their classrooms.</td>
</tr>
<tr>
<td>3</td>
<td>Personal Style</td>
<td>Teachers’ personal reasons for implementing technology.</td>
</tr>
</tbody>
</table>

### Teachers’ Personal Technological Practices:
*How teachers use technology in their personal lives*

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>Individual Use</td>
<td><em>How they use technology on a daily basis.</em></td>
</tr>
<tr>
<td>7</td>
<td>Individual Knowledge</td>
<td><em>How they rate their technological skill set.</em></td>
</tr>
</tbody>
</table>

### Views: How teachers think and feel about technology

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>Teacher Beliefs</td>
<td><em>Ideas that are linked to teachers’ personal experiences.</em></td>
</tr>
<tr>
<td>11</td>
<td>Value</td>
<td><em>They are committed to their core values.</em></td>
</tr>
<tr>
<td>10</td>
<td>Teacher Attitude</td>
<td><em>An individual response, either favorable or unfavorable, to a purpose.</em></td>
</tr>
<tr>
<td>13</td>
<td>Balance</td>
<td><em>Teachers conclude that they need both traditional and digital literacies.</em></td>
</tr>
<tr>
<td>13</td>
<td>Necessary</td>
<td><em>Digital literacies are required for future student success.</em></td>
</tr>
<tr>
<td>13</td>
<td>Happiness</td>
<td><em>Students and teachers do enjoy using digital literacies and technology.</em></td>
</tr>
<tr>
<td>10</td>
<td>Teacher Perspective</td>
<td><em>A teacher’s point of view relating to technology.</em></td>
</tr>
</tbody>
</table>

Survey results were used as a baseline to inform the qualitative data. Since the survey was administered electronically, I was able to examine the results immediately.
Descriptive analysis was used to examine survey data. Descriptive analysis is a method of examining data that allows for visualization of emergent patterns. When using descriptive statistics, the researcher does not draw conclusions beyond the data itself nor reach conclusions about a theory (“Descriptive and Inferential Statistics,” n.d.). The survey data were analyzed for themes and patterns in reference to my three research questions. The open-ended questions were analyzed for emerging patterns and compared to the data from the interviews. Early into the review of the data, it became clear that it would be valuable to gather more in-depth analysis about teachers’ understanding of digital literacies, their definition of what it means for a teacher to be technologically competent, and how the school’s vision was influencing their implementation of digital literacy and technology integration. When the majority of the data gathered elicits new questions, those detailed analyses are adjusted by the researcher throughout the study, potentially resulting in new routines and procedures (Hancock & Algozzine, 2011). As a result of this early analysis, two focus groups were created. Focus groups allowed me to make more sense of the data and to get answers to the questions the survey left unanswered.

The observations were conducted to confirm the information shared by participants during the interview process. During the three observations, field notes were taken and the data was transcribed according to an observation protocol (Appendix D). The same cross-case strategies used for the interviews, reflective journal, and focus groups were also applied to the observation field notes and protocol.

Next, I employed a cross-case analysis. According to Eisenhardt (1989), when using cross-case studies, the researcher should “select categories or dimensions, and then
to look for within-group similarities coupled with intergroup differences” (p. 540).

Consequently, the semi-structured interviews and focus groups transcripts, as well as the open-ended survey questions, observations, and my reflective journal, were reviewed repeatedly for significant commonalities and differences. At the end of the cross analysis, I created a diagram (Appendix F) to summarize my findings. This diagram is organized into the following categories: essential codes, categories and themes.

Finally, as a part of this process, data was collected and analyzed, and a theory arose from that analysis. This approach is known as grounded theory. It is a research approach for “constructing theory grounded in data” (Corbin & Strauss, 2015, p. 6). Using this method allowed me to gain new insights into problems such as teachers’ issues with classroom management when using technological devices, allocation of time on the creation of digital content, and student distraction when using digital literacies and technology integration. Understanding these new insights can lead to improvements in teacher knowledge and skills as well as to improvements in students’ effective communication of digital content.

**Triangulation**

According to Maxwell (1996), “Although methods and procedures do not guarantee validity, they are, nonetheless, essential to the process of ruling out validity threats and increasing the credibility of your conclusions” (p. 125). One such method is triangulation. Data triangulation involves "using different sources of information in order to increase the validity of a study (Guion, Deihl, & McDonald, 2011, p. 1). The goal of triangulating methods is to strengthen the validity of the overall findings.
For this study, I employed methodological triangulation. I used multiple qualitative and quantitative methods to study teachers’ beliefs about digital literacies and technology integration. Results from the survey, interviews, observations, focus groups, and other data were compared to determine whether results were similar. Validity is established when results are similar across varying methods. However, according to Patton (2002), it is a fallacy that triangulation should have consistency across data sources or approaches. Patton (2002) concluded that inconsistencies should not be viewed as weakening the evidence, but instead as an opportunity to uncover deeper meaning in the data collected.

**Trustworthiness**

Good research requires rigor. Without it, research loses its usefulness. Therefore, reliability and validity are critical components in all research methods. Lincoln and Guba (1985) identify reliability and validity as “trustworthiness” and establish criteria within the qualitative paradigm to ensure “trustworthiness” via the constructs of credibility, transferability, dependability, and confirmability (Lincoln & Guba, 1985).

According to Lincoln and Guba (1985), credibility involves the truthfulness of the study. Credibility is an essential element in establishing trustworthiness. By utilizing a survey, interviews, focus groups, observations, reflective journal, and research memo, I sought to accurately portray, depict, and capture the experiences of participants as they describe them (Hammersley, 1992). Corbin and Strauss (2015), in their characterization of grounded theory, posit that researchers have a responsibility to stay true to the method and to add to the knowledge of the subject they are studying.
Transferability allows the results of the study to be applied to other contexts (Shenton, 2004). Detailed descriptions of the data in context, coupled with reporting data in detail, will provide the readers with enough information to determine for themselves whether the findings are transferable to their contexts.

**Limitations**

A crucial aspect of research findings is dependability, which requires the researcher to demonstrate that the findings are consistent. The data collected for this study occurred over an 18-week period. Results will begin to answer how teachers interpreted “technology integration” within the IB programme and how the programme influenced their teaching of digital literacies practices and technology. It will also provide some insight for other IB heads. However, the results cannot be applied on a wide scale. Firstly, the study was conducted at only one IB school site. While all IB schools are required to integrate technology at some level, there may be differences in the number of resources and access to resources among IB schools around the world. Secondly, as the researcher and leader of the school site, my familiarity with all of the participants may constitute a certain bias. However, the use of an outside reader, an objective moderator for the focus groups, and multiple forms of data collection reduced the potential biases and increased the truthfulness of my results.
Chapter 4

QUANTITATIVE FINDINGS

The purpose of this study was to explore how teachers incorporate digital literacies within the International Baccalaureate (IB) programmes at LCIS, and to examine the extent to which digital literacies are taken up or resisted. This study was also intended to inform my practice as a school leader and support my collaboration with the faculty to co-create a thriving digital environment to advance teaching and learning in an IB programme.

The following research questions guided this study:

1. How have teachers’ attitudes, beliefs, or personal experiences with technology shaped their instructional practices?

2. How have teachers interpreted “technology integration” within the IB programme, and how has the programme influenced their teaching of digital literacies practices and technology?

3. What happens when I, as a school administrator, begin to explore how the school’s vision of technology integration is influencing the implementation of digital literacies within the IB programme? How does what I learn influence my work as a school leader?

In order to answer these questions, both quantitative and qualitative data were collected. This chapter reports on quantitative findings and includes the following two sections: (1) A summary of this study’s survey data, which served as a baseline to
generate data about the larger population of LCIS teachers’ beliefs and attitudes about technology integration and digital literacies in an IB setting; and (2) A description of the focus group data and its emergent themes.

**Survey Results**

An electronic survey was administered as a baseline for the larger teacher population. All 52 LCIS teachers were invited to participate in the survey; 45 responded. The survey was introduced to teachers at a staff meeting, after explaining the goals of the overall study. During this explanation, it was emphasized that survey participation was both anonymous and voluntary. Following the presentation, an email with a link to the electronic survey was sent to all teachers.

The survey (Appendix E) was created and administered via SurveyMonkey.com. The use of an electronic tool for data collection significantly reduced the time needed for implementation while increasing cost effectiveness. Additionally, I was able to continuously track response rates and, once completed, view results immediately. The survey consisted of four sections, each one designed in alignment with this study’s three research questions (RQ): (1) background information; (2) teachers’ personal experiences with technology (RQ1); (3) how teachers are utilizing digital literacies in their classrooms (RQ2); and (4) teachers’ attitudes and beliefs about technology integration and the school’s vision (RQ1, RQ2, and RQ3). It should be noted that I failed to prevent participants from skipping questions and, as a result, not all 45 participants answered each question. Appendix H summarizes how many participants answered each question.
The following sub-sections summarize key themes in alignment with the study’s research questions.

**Attitudes, Beliefs, or Personal Experiences With Technology**

Of the 52 teachers, 45 completed the survey. The participant demographics are as follows: 36 (80%) were women and nine (20%) were men. Nine (20%) were between the ages of 21-30, nine (20%) were between the ages 31-40, 20 (44%) were between the ages of 41-50, and seven (16%) were over the age of 50. While not a question on the survey, it should also be noted that nine (18%) of the teachers are enrolled in a university program to complete either their Masters or Doctoral degree.

The greatest fraction of participants, or 26 teachers (58%), has taught in high school (Grades 10-12) at some point in their educational career. The smallest fraction, 10 teachers (22%), has taught in the early grades, Junior Pre-Kindergarten through Kindergarten. The large number of participants who have taught high school is of particular value, because I wanted to understand whether the students in Grades 6-12, who are involved in our one-to-one laptop program, were more likely to create and consume digital content.

The survey revealed the degree to which digital technologies are prevalent in the personal lives of participating LCIS teachers. One hundred percent of the teachers use email and digital collaborative tools (e.g., Microsoft Office and Google Docs) and modes of communication (e.g., Skype and Whatsapp) both personally and professionally. A much smaller number of teachers, seven (15%), cited use of more advanced technologies...
such as data virtualization, music and filming software, and programming software. Finally, more than 40 (88%) indicated that they engage in some type of social media.

All 45 LCIS teachers (100%) reported using computers, outpacing total adult usage in the U.S. by 39% (Purcell, Heaps, Buchanan, & Friedrich, 2013). One hundred percent (45) also cited the use of laptop computers for teaching. With regard to smartphones, 40 (88%) teachers use them in their personal life and 18 (40%) use them for teaching. 43 (96%) teachers use tablets primarily in their personal life, again exceeding total adult usage in the U.S. (96% of LCIS teachers vs. 24% of adults in the U.S.). However, only 23 (51%) use tablets for teaching. This was not a shocking discovery; with the one-to-one iPad program in Junior Pre-Kindergarten through Kindergarten, there are fewer iPads available for whole class use in Grades 1-12. Fewer than 6 (13%) teachers claimed to use other forms of hardware, such as Kindles or GoPro cameras, as a part of their teaching, networking, or for their own higher education. However, 26 (57%) use these tools in their personal life.

When asked whether they believe that implementing technology into the curriculum is important for student success, 28 of the 32 teachers (87%) responded that technology is critical to student success. The following response excerpts illustrate the range of participant views regarding this question:

- “Yes, because technology has become an essential part of our daily lives and brings the opportunity to motivate students and relate the academic curriculum to their interests and needs.”
• “It is important because it helps to connect students to the technological world around them.”
• “In a society that utilizes technology, students should be exposed to working with technology from as early as possible.”
• “Yes, I do, because technology forms part of our everyday life and it will be an intrinsic part of their working and social life in the future.”

These responses show how teachers are clearly affirming the value of technology integration and the use of digital literacies for our students’ futures. However, they also described conflicts between teaching with digital tools and teaching without. One teacher wrote, “Yes, [it is important] but there should certainly be a balance of technology and off-screen time.” Another stated: “I believe that it is important to have a balance between technology and other strategies.” Here, teachers made it clear that there is a difference between teaching and learning with and without technology integration and digital literacies. They suggested that there should be a balance between the teaching of traditional literacy—using traditional tools, such as pen, paper, books, and specific technical skills, and the teaching of digital literacies—using emerging technologies and literacy as a social practice. The teachers’ responses also suggest emphasis on the use of the digital tools as opposed to a set of multimodal skills.

**Digital Literacies and Technology Integration Within the IB Programme**

Survey responses indicated that teachers expressed a reasonable level of comfort with technology use. More than 30 (66%) categorized themselves as either competent or proficient users of technology, while 11 (25%) rated themselves as advanced users. At
the same time, only 6 (14%) claimed to use the Science, Technology, Engineering, Arts, and Math (STEAM) resources, which were expressly designed to increase the use of digital literacies skills. STEAM resources help teachers bring real world experiences to student work by supporting them in designing and sharing digital content and making connections to the global world we live in. For the past year and half, LCIS teachers have received professional development related to the use of STEAM resources. One would assume that the teachers who are advanced users of technology would make more use of the technological resources that the STEAM program offers. The disconnect between teachers’ self-assessed proficiency with technology and their lack of self-declared use of STEAM resources seems contradictory.

Teachers indicated their own personal use of technology as the top reason for implementing digital literacies in their classrooms, followed by inspiration from the Internet and student activities. One teacher wrote, “I already know a lot about technology from my own use. It is naturally the most influential choice.” Another said, “Student use inspires me to use more tech during teaching to appeal to students.”

When asked to provide a specific example of activities used when implementing digital literacies, 15 of the 30 (50%) respondents cited using specific tools to support the use of digital literacies. They shared examples such as, “I use iPads, the Internet, and the computer on the class projector,” “Use of on-screen assessments,” and “I have used YouTube videos in class to start discussions with students on issues that they are passionate about. I have also utilized laptops and iPads to teach concepts in class that were traditionally done using only pencil and paper.” Seven of the 30 (23%) reported that
they used digital tools to support research within their classes. The last eight (26%) reported that they use digital literacies tools to help students create and collaborate. When asked specifically about the tasks that support creation, collaboration, and research, teachers reported the following:

- 77% (27) created tasks that support students’ collaborative work.
- 57% (20) engaged students in evaluating Internet content.
- 85% (30) used tools such as YouTube, video streaming, and TED talks to enhance tasks.

The least cited reasons for implementation of digital literacies were participation at conferences outside of LCIS, the school’s mission and vision, and the IB programme. Once teacher commented: “I went to the LCIS website to check the vision/mission statement but couldn't find it.” Another wrote, “Many times the workshops, although interesting, do not apply directly to my classroom setting.” Yet another commented, “Not sure how it [IB] relates to my technology teaching in terms of understanding what to do. I do use the units of inquiry to drive my technology use though.” While this teacher clearly gets the importance of teaching and learning and technology integration, her struggle seems to be with a lack of clarity from the IBO. The IBO does provide a website on how technology should be integrated within the larger programme. However, it fails to provide clear direction on how technology integration and digital literacies intersect with the IB programmes. The IBO’s many suggested frameworks may be creating confusion and uncertainty among the teachers. The above evidence suggests that: (1) Teachers believe that the IBO professional development sessions offer little in the way of how to
integrate digital literacies skills within their classrooms; (2) Teachers do not perceive the correlation between their professional development regarding integrating digital literacies and the subjects they teach; and (3) Teachers are not clear on when and how the IBO expects them to integrate technology within their units of inquiry.

School's Influence on the Integration of Digital Literacies

When asked to describe what prevents teachers from implementing digital literacies, 8 of 29 (27%) teachers cited unreliability of technology, specifically issues such as power outages, spotty wireless connectivity, and technology that does not work. Four of the 29 (13%) mentioned a lack of user support and that the technology itself is distracting to students. One teacher wrote that, when using the computer in class, “Students tend to use other applications instead of focusing on the task.” The remaining responses were centered around this tension between the use of digital literacies and traditional literacies. For example, one teacher wrote, “When learning language, especially at the beginning, it's important for students to write. You remember what you write by hand more than what you type.” Another stated, “[Technology] is less concrete-based and lessens social interaction.” The first comment demonstrates the teacher’s belief that writing with a pen represents different cognitive processes than does writing with a keyboard. To achieve the “balance” they seek, teachers believe that students must begin to master traditional literacies skills—that is, specific skill sets such as reading, writing
listening and speaking—before they can begin to tackle digital literacies skills. It also implies that the teachers do not have a full understanding of what digital literacies skills entail. Digital literacy is part of the “new literacies” phenomena. New literacies advocate that literacy is not only a social practice, but that students must also build on traditional literacy skills in order to acquire digital literacies skills (New South Wales, 2010). The second comment implies that teachers fear that the increased presence of technology within our school has created students who are unable to develop the social skills they need to effectively handle interpersonal relationships.

In summary, the results of the survey demonstrated that the LCIS teachers believe that digital literacies and technological integration are vital to our students’ future. Results also show that the teachers are integrating digital practices in their personal lives. Furthermore, the results illustrate how teachers are working to foster the creation and sharing of digital content with their classrooms. Seventeen teachers (47%) reported using some form of digital literacy skills on a daily basis within the classroom. Most report believing that there must be an element of balance between traditional and digital literacies. That is, they believe that students need a full repertoire of skills that encompass both traditional and digital notions of literacy. One teacher wrote, “Moderation [is] very important,” while another stated, “Technology does not replace good teaching. Flashy and new does not always mean better.” As further demonstration of their belief in the importance of “balance,” 14 teachers (39%) noted that they use digital tools only when appropriate and when they add value to the lesson. That is, while the school has a plethora of digital resources available, teachers do not simply use technology for
technology's sake. The survey data further suggests that some teachers believe that technology was replacing traditional ways of teaching literacy areas such as reading, writing, speaking, and listening. It appears that teachers do not understand the connection between traditional literacies skills and these new digital literacy skills. That is, they may not believe that this new array of skills will help students navigate this complex world of information. Further, they may view the implementation of these new skills into their teaching as representing yet one more thing they have to do, on top of all their other professional obligations.

Finally, based on my observations, there appears to be a disconnect between how teachers rate their digital competency and what they report as occurring in their classrooms. I wanted to understand more deeply how LCIS teachers define technological competency, specifically whether they really understand digital literacies and what kind of “balance” they seek. To address these questions, I formed two focus groups. The details are outlined in the next section.

**Focus Groups**

Focus groups were formed following analysis of the survey results. Eight teachers from across the three schools were selected using purposeful sampling, based on the same selection criteria used for the case studies’ participants. The first group, called the secondary focus group, included four teachers, all women, who taught in the Middle Years Programme (MYP), the Diploma Programme (DP), or both. Two teachers were Bahamian, one American, and one British. The second group, called the elementary focus group, also consisted of four women, including one Early Learning Center teacher who
taught Junior Pre-Kindergarten, and three from the Elementary School who taught Grades, 1, 4, and 5. Two teachers were Bahamian and two American. All teachers in this group teach the Primary Years Programme (PYP) in a self-contained class, with three main subjects per day: Language Arts, Math, and Unit of Inquiry, which encompasses both Science and Social Studies.

The focus group findings revealed four key themes: (1) Appropriate users of digital literacies; (2) digital literacies reach multiple learners; (3) digital natives vs. digital immigrants; and (4) tension between traditional and digital literacies. These themes have been organized in accordance with this study’s research questions.

**Attitudes, Beliefs, or Personal Experiences With Technology**

**Appropriate users of digital literacies.** Teachers in both groups concluded that in order to develop students’ digital literacies practices, they first must improve students’ critical thinking skills. Without critical thinking skills, students are incapable of effectively using tools or evaluating content. They are not properly armed to navigate the Web, select relevant content from a sea of results, create and share digital content, and ultimately, become effective digital citizens.

**What does it mean to be digitally literate?** Both focus groups were asked to respond to the following definition of digital literacies: “Digital literacy means not rote learning but experimentation, process, creativity; not just technology but multimedia imagination, expression—and principles, too. It means learning why we don't have to just be consumers of technology but also active participants in its flourishing. Digital literacy
helps us to believe in and fight for the Web” (Davidson, 2011, p. 13). The participants generally agreed with this definition, and added that a focus on the appropriate use of digital content is more important than students creatively expressing themselves. Students often delve into digital content without embracing the key digital literacies skills needed to fully understand the potential implications and consequences of the World Wide Web. That is, students need to be good digital citizens who are critical and reflective of digital content as well as competent users of various operations. Students today face issues of cyberbullying, plagiarism, and online privacy and etiquette. Asia, a Science MYP teacher in the secondary focus group, indicated:

We definitely need to fight for proper use of the web, especially when it relates to digital literacy skills being implemented in a classroom. When it is applied to a classroom setting, certain mechanisms need to be put in place regarding the school’s network and students’ ability to access information from the internet. Teachers need to control what information students have access to...Because at times students stray off topic and delve into areas of the web that could actually be more harmful rather than beneficial.

Asia’s comment pointed to the need to support students in becoming good digital citizens. Her comment demonstrated some frustration that, while students are developing this skill set, the teachers have little means of monitoring them and providing teachable moments. Concern over lack of monitoring is particularly relevant at LCIS, where students use their own laptops instead of ones provided by the school, which makes daily monitoring of technology extremely difficult. Teachers were anxious, therefore, about how to effectively help students to be responsible and develop a sense of ownership about the decisions they make online without having the proper tool kit to “control” what students are doing in their classrooms.
Creators and consumers of digital content. A few teachers concluded that one key component of digital literacies is that students need to experiment to create new digital content. Faith, an MYP and DP Spanish teacher in the secondary group, stated:

Experimentation [is] how I’ve acquired most of my personal digital literacy skills, through experimenting and the process of elimination. If something works, it works, if it doesn’t, it doesn’t. Researching on the web, watching YouTube videos, that kind of thing, so I think the experimentation part is definitely true.

Macy, a Grade 5 PYP teacher in the elementary group, shared, “I think it's important for them to be able to use technology to better express themselves and to use it creatively.

When it [the definition] says, ‘It means learning why we don't have to just be consumers of technology but also active participants in its flourishing,’ it's something I think is important.” As educators we want our future students to ask questions like “How can I effect change?” “What do I need to build?” To do this, they must be innovators and risk-takers, and they must embrace failure. Macy expressed a desire to develop digital pedagogies so that our students can unleash their creativity on the world and address the challenges that they are most passionate about.

Evaluation of content. Teachers were also concerned about the impact of the Internet on students’ expectations of instantaneous information. That is, teachers believe that students lack the patience to locate information needed for research, and, more importantly, that they are unable to evaluate websites and other electronic resources for quality and reliability. Macy, a PYP teacher, shared, “I think it is important for students to be able to discern the quality of digital resources. Just because it exists, it doesn't mean you have to use it.” Zoey, a Grade 4 PYP teacher, stated, “Things [new information] just keep coming at us [teachers and students] all the time. Students have to be able to
decipher what they need and teachers need to determine what is relevant to what we are teaching.” Acknowledging the rapid changes in digital tools, Zoey, a PYP teacher, demonstrated concern for how we as teachers support students in developing the appropriate skill set for judging the quality of online information, particularly when those skills are difficult for teachers as well.

Both focus groups emphasized that teachers must provide students with specific practices for searching for relevant research materials. Teachers agreed that digital tools have created increased complexity for teachers when they teach literacy skills. For instance, it is easier than ever for students to plagiarize, so teacher vigilance has to increase. There are a growing number of digital tools designed to address such issues; they support plagiarism prevention and detection, reference management, and proper citation. At the same time, teachers reported a decline in students’ basic academic skills. Knowledge of grammar rules or how to write a basic essay has been lost. Students have more information than ever at their disposal, but they do not know what to do with it. Hope, the MYP English teacher, stated, “They know what to do to go on but they require more complex understanding of exactly what is at their fingertips and how to use it responsibly. It’s not necessarily control but teaching them to be responsible.” Hope identified the struggle the teachers face in trying to support students in developing research skill sets while also reminding them how to be good digital citizens.

**Digital distraction.** Teachers in the secondary focus group suggested that students’ ability to think critically and use technological tools is hampered because proper controls for teachers were not in place. However, the primary concern of the
A secondary focus group was digital distraction. When students read a textbook, while they are engaging with the printed word and meaning of the text, the act of reading the printed word is a static process. That is, students can only read in one way, front to back. A book’s borders provide an opportunity for students to focus on a single page of the book without losing sight of the whole text. However, when using digital tools, students are not only actively engaged with the printed word, but they are also engaged in making choices about how to understand digital content. For example, a digital reader often provides students with hyperlinks leading to additional content, which can sometimes draw their attention away from their original task. Catalina, a MYP Math teacher, shared:

We need to put more controls in place for digital learning in the classroom. For instance, sometimes during a class assignment, you are walking around monitoring the students and two or three of them are in chat boxes … they are trying to trick teachers into thinking that they are doing what they need to be doing in class. If we are going to move forward, controls need to be in place.

Catalina recognized that the digital environment presents tempting and potentially easily disguised distractions for students. She also recognized the burden placed on teachers to counteract such distractions, including the consequences of failing. Catalina confirmed this later: “We need to keep them, students, focused on where they should be, rather than going off down ‘little dark alleys.’ Typically, at the end of most lessons, more than 70% of the class can give you a really good piece of work. However, there is another 30% that gives you a lot of excuses. I think the other 30% we’re losing somewhere on the Web.”

Secondary teachers suggested that they needed either a tool to monitor student computers or the ability to more deeply imbue each student with the IB learner attribute.
of “being principled,” or, in other words, a good digital citizen. Catalina further suggested:

Students need to be principled, even when nobody’s looking. Students need to understand that they need to be principled, if no teacher is policing you, if no parents are questioning you, when nobody's looking over your shoulder, be a principled person.

Participating teachers expressed wanting their students to develop a skill set for using technology appropriately, responsibly, and safely. For instance, today’s students are highly engaged in social media, the norms of which change rapidly. Teachers want to provide students with more support, so they can minimize the risks they may encounter online. However, while this is a valid concern, their desire for more “control” and to be the “expert” is contradictory to the inquiry approach of the IB philosophy.

Digital Literacies and Technology Integration Within the IB Programme

Digital literacies reach multiple learners. Both focus groups agreed that the use of digital literacies allowed teachers to enhance the delivery of their lessons. This enhancement keeps students engaged, provides teachers with the opportunity to help students learn how to analyze media and construct their own meanings, and, ultimately, enables teachers to reach students’ diverse learning styles. Asia, the MYP Science teacher, shared:

It’s easier to reach higher levels of Bloom’s taxonomy when using digital literacies. The students are able to test how well they’re able to apply what they’ve learned. Also, they’re able to synthesize or create anything really, depending on what subject it is. Like in science, it allows us to really make the subject as authentic as possible for the students. The student experience is enhanced by all of the technology that we have available to us. At the previous
schools where I’ve taught, it was very difficult reaching the higher levels of Bloom’s taxonomy in the classroom.

Diana, a PYP Grade 1 teacher, stated: “I think [digital literacies tools are] effective and I think you reach more children, their interests, because it's not just one way of teaching.”

Whitney, a PYP Junior Pre-Kindergarten teacher, recounted how transfixed students have been when she integrated technology. She said,

“Certainly, you're getting their attention when there is something on the Promethean board (Interactive Whiteboard). For example, when we're doing either the letter or the number of the week, everyone’s eyes are zoned in, even the ones who may not even be able to pronounce ‘four’, they're hearing it. That's enhanced for them, and they're seeing it, and then we're stomping our feet four times.”

Teachers highlighted the notion of a participatory culture among students. Jenkins, Purushotma, Weigel, Clinton, and Robinson, (2009) pointed out that there is a direct correlation between the type of communication tools used by students and the levels of collaboration they engage in. The implementation of activities such as blogging or creating movies or advertisements allows the students to create, collaborate, and share their information in multiple circles. Hope, an MYP English teacher, suggested:

Within the classroom, I know I have done a lot of sharing of Google documents or having students communicating with one another. Those are skills that we need to work on. A few years ago when I was teaching folktales, we were able to collaborate with students from around the world.

Macy, the PYP teacher, described an example of how technology fosters collaboration in inspiring ways. Her Grade 5 class had an opportunity to conduct a Skype call with a group of scientists who were in the middle of the Pacific Ocean exploring the world’s largest underwater volcano, Tamu Massif. She stated:
They said to us, "Aside from the people on this ship, you are the only people who've ever seen this depth." We were just like, "That was amazing for us." It was real. We're studying natural disasters. It was real-life application. We have been talking about jobs, and we realized somebody was the tech guy on that ship or somebody was the chef on that ship. It was allowing them to be open-minded and seeing these people who are risk-takers, who are out in the ocean, and doing math, and just making everything transdisciplinary.

Students in that Grade 5 class experienced a real-life application of the power of social media. Talking, sharing, playing, learning, and working with others, even those on the other side of the world, can be a powerful and transformative learning experience.

**Tension between traditional and digital literacies.** Both focus groups addressed a tension between digital and traditional literacies. Teachers clearly believed that there was a need for both. However, they did not agree on the reasons. Faith, the MYP and DP Spanish teacher, stated, “Your classroom can be exciting without having any technology in it whatsoever. Quite often I’m like, we are not using the computers today. We’re going to do some work using pen and paper.” Faith’s statement revealed her belief that a pen, paper, and a real book were still appealing to students and still has an important place in the classroom. The participant’s focus here is on the digital tools, not how the digital tools are impacting her lessons. Further, the participant is implying that traditional literacy, operationally defined here as a set of technical skills that students need to acquire, has a more important role in teaching and learning than does digital literacy. This made me ponder whether the participant understands digital literacies and how they should be implemented within their classroom.

For teachers, some of the appeal of the “balance” between traditional and digital literacies seemed connected to teachers’ general comfort with traditional technical
instructional practices. In particular, they understand their value and their outcomes.

Diana, a PYP Grade 1 teacher, suggested:

I think sometimes teachers go back to their comfort zone. Sometimes it's easier to just do it the way that you feel comfortable doing it. You do have to, like I said earlier, step out of your box and do it differently. Because one day, that will be your comfort zone where you do both easily. You integrate it as you can, and you learn. You use your resources in the school, there are plenty, and you just find the balance between the two [digital and traditional literacies].

Diana’s comments indicated that some teachers seemed to highly value traditional literacies because they are easy and familiar. However, her comment also suggested that there is a place for both digital and traditional literacies in the modern classroom. Yet implementing both requires teachers to devote additional effort to learn a new way teaching. Under traditional literacy frameworks, students are seen as “passive recipients” (Cope & Kalantzis, 2000, p. 10). That is, students are typically understood as receiving and reproducing representational forms. Traditional literacy pedagogy was aimed at acquiring specific skills and competence to effectively obtain information in books and other printed forms created with the advent of emerging technologies. In contrast, when thinking about digital literacy pedagogy, it is necessary to consider how recent emerging technologies have changed what is now regarded as literacy. In other words, literacy is now viewed as a social practice. Asselin and Moayeri (2011) recommend that educators must expand their mindset about literacy to include applications that are “participatory, collaborative, multimodal, democratic and distributive” (p. iv). This means that digital literacy must not only include elements of phonics, but also writing in multimodal forms, visual interpretation, site navigation, media manipulation, and understanding how media has altered the meaning of words. It is this expanded framework for communication and
expression that requires teachers to search for new pedagogical approaches in order to prepare our students for the future.

Some teachers’ use of traditional or digital literacy practices appeared to be dependent upon their pedagogical beliefs. For example, Faith, the MYP and DP Spanish teacher, stated, “Sometimes I’ll display text [Spanish words] around the school, just to get them outside. Also looking at the screen the whole time, is so bad for them and their concentration levels.” Faith expressed the belief that students benefit from less screen time because too much of it affects their ability to concentrate and to think deeply about topics. Thus, assigning activities without digital tools that also get students moving around outside the classroom was consistent with her pedagogical belief. Macy, the PYP teacher stated, “I don't think you have to choose one or the other [digital or traditional literacy], but you do have to teach that balance. It's fine if you want to read that little picture book, and sometimes it's fine if you want to take your Kindle.” It appeared that some teachers are afraid that, with the increased use of digital tools, students engage in passive viewing rather than actively engaging with the printed word, thereby resulting in a generation of intellectually lazy students.

School's Influence on the Integration of Digital Literacies.

**Digital natives vs. digital immigrants.** Participating teachers clearly articulated that the increase in new technologies has resulted in new opportunities not only for students, but also for them as teachers. Teachers recognized that they have a responsibility to provide students with a wide range of resources to prepare them for life beyond our school. When the teachers were asked to describe what it means to be
technologically competent, most teachers expressed that it means to have confidence in and knowledge about using digital technologies. However, they also shared that their students often know more than they do. Whitney, a PYP Junior Pre-Kindergarten teacher, asserted that technologically competent meant, “Be open-minded, be vulnerable, and just admit it. I told them [students] that I know the basics, but I just don't know all of it.”

Zoey, a Grade 4 PYP teacher, said:

I think for a lot of teachers, we have to be open-minded towards it. A lot of people are sometimes shy and they're reluctant. Even when I'm introducing a new piece of software to my kids, I would know the basics of it, but I will tell them, "Well, I really don't know all of the components or how it really works, but let's go through it together. Let's try it together. If you learn something new, share it with the class.

All the teachers expressed a desire to effectively blend new ideas and create learning experiences that go beyond the traditional classroom, regardless of their own technological prowess. Hope, the MYP English teacher, stated, 

What I have tried to do is, when I’m giving an assignment or having them do something, I leave it open. I tell them, “I know you know that there’s more ways to do this.” I give them the permission to use what they want and then show me and then they teach me.

In this situation, the teacher is acting as the guide, providing the context and designing instruction. However, students still have the flexibility to explore, create, and produce. On the other hand, a few teachers expressed a sense of anxiety and described feeling inundated. Hope, an MYP teacher, shared:

I want my lessons to be exciting and I want to be on the student's level but I find it overwhelming. I look forward to creating the lesson, but I find all this information coming at me and I don’t know where to start. Sometimes I tell my students that they have to find the program. It’s not due to my lack of desire but it’s just overwhelming and because I’m not a digital native.
Asia, the MYP Science teacher, succinctly defined technological competence: “To me it means having the confidence to implement literacy in the classroom. Then also being able to measure the impact of what you have actually taught.”

Teachers embraced the reality that the educational landscape is rapidly changing. Most of them also acknowledged that they had been not adequately prepared in college to effectively implement digital literacies. Nevertheless, they indicated that they want to keep up with change. They also expressed the belief that doing so requires additional support, especially in terms of support from the administration to take risks, make mistakes, fail, and continue developing.

Summary

The focus groups revealed that participating LCIS teachers believe that students need to understand how to create, interpret, analyze, and share digital content. Most of the teachers concluded that digital literacies are indeed affecting the educational landscape, primarily by helping them reach all types of learners. While they fully understood that the implementation of digital literacies requires a specific set of practices embedded within their lessons, they identified facing daily obstacles to ensuring seamless implementation. These articulated obstacles included their own technological competence in implementing digital tools; the need to be both vulnerable and open-minded; and the realization that they do not have to be the sole source of knowledge in their classroom. Some teachers further expounded on how their pedagogical beliefs influenced when and how they implemented digital content, such as the notion that traditional literacies practices are more important than digital literacy practices. In other words, they have
what Lankshear and Knobel (2011) refer to as “mindset one,” where the teacher is the
main source of knowledge and students are the receivers of their expertise. In this
mindset, digital tools are being used to do the same old things in “technologized” way,
and tasks are accomplished by means routines and longstanding assumptions. This notion
is supported in the study findings, as some teachers expressed the belief that digital
literacy practices have created a generation of distracted students and that constantly
looking at screens has long-term negative effects. Further, they asserted that our students
do not always use digital tools in responsible ways, citing examples such as the
increasing incidence of plagiarism. However, they also agreed that it was our
responsibility as educators to find answers to address such challenges.

While one cannot deny that emerging technologies have created increased
challenges for our teachers, I assert that the digital tools themselves are influencing some
of the teachers’ beliefs, diverting their focus from how students’ learning processes can
fundamentally be changed as a result of emerging technologies. Students must move
from being consumers of information to producers and explorers. Lankshear and Knobel
(2011) refer to this as “mindset two” (p.7): tools are for mediation and relationship
technologies; expertise is distributed; and social relations of emerging digital space are
visible (p.8). If we are to see a shift in mindset, teachers must begin to select tools that
will enable students to engage critically, thoughtfully, collaboratively, and ethically. As
Gee (2010) argues, “It is the study of new digital tools and new forms of convergent
media, production and participation, as well as powerful forms of social organization and
complexity in popular culture, that can teach us how to enhance learning in- and out-of-school and how to transform society and the global world as well” (p. 14).
Chapter 5

QUALITATIVE FINDINGS

This study was designed to explore how teachers are implementing digital literacies within three International Baccalaureate (IB) programmes at Lyford Cay International School (LCIS). This study was also intended to inform my practice as a school leader, especially my collaboration with the faculty to co-create a thriving digital environment to advance teaching and learning in an IB programme.

The following research questions guided this study:

1. How have teachers’ attitudes, beliefs, or personal experiences with technology shaped their instructional practices?

2. How have teachers interpreted “technology integration” within the IB programme, and how has the programme influenced their teaching of digital literacies practices and technology?

3. What happens when I, as a school administrator, begin to explore how the school’s vision of technology integration is influencing the implementation of digital literacies within the IB programme? How does what I learn influence my work as a school leader?

Chapter V discusses the qualitative results of this study. Specifically, I outline a detailed narrative description of the four case studies conducted for this study. Each case encompasses data collected from interviews, observations, and reflective researcher
journals. Additionally, a cross-case analysis was conducted, which identified common themes across all sections of the data.

**Case Studies**

Case studies were conducted to elicit deeper understanding of what influences the teaching of digital literacies and technology integration in the classroom, and how teachers’ literacy practices are reflected in their teaching of digital literacies within an IB program. Four teachers across the school divisions were purposefully selected to participate. The first participant was a Junior Pre-Kindergarten Primary Years (PYP) teacher in the Early Learning Center (ELC) who is also a competent user of technology. The second participant is a Grade 2 PYP teacher in the Elementary School who considers herself a novice user of technology. The third participant is a Middle Years Programme (MYP) and Diploma Programme (DP) humanities teacher in the Secondary School who primarily teaches Grades 7, 11, and 12 and is a proficient user of technology. The final participant was the instructional technology coordinator, who is an advanced user of technology and works across all three-school divisions. She was previously the Secondary School’s MYP Design teacher.

Each case study sheds light on the study’s research questions from the different thematic vantage points.

**Rachel**

Rachel considers herself a competent user of technology who actively incorporates strategies to support the teaching and learning of digital literacies. She is a
Bahamian national with 10 years of teaching experience. She has been at LCIS for nine years, and during this time she has taught Grade 2 and Junior Pre-Kindergarten. She has not taught outside of The Bahamas.

Rachel is currently pursuing her master’s degree in teaching and learning through an online Nova Southeastern University program. She has been trained in Level I and II of the PYP. In a self-contained classroom, she teaches literacy, math, the PYP units of inquiry (which include both science and social studies), and art, with the support of a full-time instructional aide. Specialist teachers teach Spanish, physical education, and music. Inside her classroom, there is an interactive whiteboard and a cart with 18 iPads loaded with various age-appropriate software. Additionally, she has access to GoPro cameras and a variety of STEAM-related resources. Her students attend school from 8:30 a.m.-2:45 p.m., with most literacy instruction occurring in the morning.

**Attitudes, beliefs, or personal experiences with technology**

Rachel exhibits a favorable attitude toward technological use, and she uses digital tools frequently in her personal life. Specifically, she shops and banks online, and she stays connected with family members both within and outside the Bahamas with video applications such as Skype, Whatsapp, and email. Additionally, she stated that she most recently upgraded all of her televisions to Liquid Crystal Display (LCD). Several researchers have investigated whether digital literacy practices in the classroom are influenced by teachers’ personal use of technology. One such example is Tour’s (2015) study, which suggested that there are “common patterns” in how teachers use digital tools in their personal and professional life. That is, how the teachers make use of specific
technologies in their personal life are apparent in the type of experiences that they offer their students in the classroom (Tour, 2015). Rachel also reported that while she is taking online classes for her master’s degree, the program itself uses technology only minimally. She shared that her undergraduate teacher education courses did not prepare her to use technology to support teaching and learning in the classroom setting. Although she completed her undergraduate degree in 2000, when technology was becoming ubiquitous in higher education, she could not recall one educational technology course nor any general technology being utilized during her teacher educational programme.

Despite her lack of preparation to teach technology, Rachel articulated that technology adds significant value to student learning. She stated,

[Technology] [is] very valuable. It is valuable because, they [students] have to function in the era that they were born in. In order for a child today to function, they have to be technologically educated. Have to be. They just won't make it. They just won't.

Consequently, her enthusiastic description of what technology integration looks like within a lesson aligned with the value she assigns to it. She stated:

It looks like something that can definitely reinforce a skill. It should be interesting. The children should be motivated because the children I'm teaching now, they're in the era of technology. It's not strange; it's not scary for them [students]. To me I think it's more exciting. I think students become more interested when technological devices are used...[Technology] breaks this myth of Piaget’s beliefs regarding students learning spans. When they use technological devices [students are able to sit] longer, and these are little kids...they sit there the whole time and then the students go from the language arts right into a math lesson. That's amazing.

Rachel suggested that when digital tools are integrated into lessons, they have the potential to revolutionize teaching and learning. Students, even at the age of four, are able
to sit for longer periods of time when working with digital tools such as iPads. They are transfixed by technology in ways that teachers cannot as easily accomplish alone.

Dockstander (1999) supports Rachel’s notion. She asserted that when knowledgeable educators use technology appropriately, these powerful tools could be valuable for keeping students engaged in their learning process.

While Rachel expressed that technology was both valuable and necessary for 21st century learning, she also proposed that the most successful classrooms need to achieve a balance of teaching with or without digital tools. She noted,

The only thing is, we have to teach the children to put the technology in the right place. Right now I feel as though for some children, it's excessive. They need to be exposed to it, but it also needs to be in the right proportions and at the right time.

This statement clearly indicates that Rachel does not see digital literacy as social practice. While she articulates the importance of digital tools, she is viewing the use of these tools in the traditional form of technology, such as use of web searches, presentation software programs like PowerPoint, and word processing programs. She is not considering how technology is changing the modes of communication for our students (Kress, 2010). That is, literacy is no longer just confined to printed text. Instead, literacy is multimodal—meaning-making occurs through the “reading, viewing, understanding, responding to and producing and interacting with multimedia and digital texts” (Walsh, 2010, p. 213).

Instead, Rachel advocates that there is a time and place for the use of digital tools, and that their use needs to be appropriate to the instruction. Additionally, she argued that it is important for students to understand that they can still learn without the use of technology. She used an example from her personal life, in which she described limiting
her son’s time on the computer or reminding him that he could still read a book, take a walk, or write in a journal when there is no internet access available. For Rachel, learning does not cease when there is no technology. She explained, “Just getting that, and getting that into their minds early, that it is valuable. Use it, but it needs to be properly managed.”

Research supports some of Rachel’s assertions. Dockstander (1999) posits that technology integration becomes inappropriate when the technology use drives the curriculum. That is, the decision to use digital or traditional literacy strategies must depend on the particular needs of the learner. During her interview, Rachel was clear that teaching digital literacies requires a different skill set than the one used to teach traditional literacies, particularly with regard to the four year old age group that she teaches. For instance, she needs to be sure that her students understand an app or tool before conducting a lesson that makes use of them. This type of instruction is particularly time consuming with such young children. At this point in the students’ academic career, emergent literacy abilities are developing. Students are learning phonological awareness, which is the ability to recognize and manipulate the sound units that make up words. With this in mind, teachers working with children as young as four develop specific skill sets associated with early traditional literacy development, such as language games and nursery rhymes. Similarly, digital literacy skills require early development. Rachel believes that skills such as exploration and independence are key attributes for young students to develop in relation to technology use. The International Society Technology Education (ISTE, 2008) supports Rachel assertions. These standards state a teacher
should "develop technology-enriched learning environments that enable all students to become active participants in setting their own educational goals, managing their own learning, and assessing their own progress" (p. 1). However, the standards also state that teachers should use their knowledge about teaching and learning to “advance student learning, creativity and innovation in both face-to-face and virtual environments” (p. 1). It does not mention technology tools at all. Again, Rachel’s comments suggest that she does not have an understanding of what digital literacy is or what she is expected to do.

**Digital literacies and technology integration within the IB Programme**

Rachel’s definition of literacy was: “the ability of the child to be able to read, write and comprehend anything, at their level.” Her definition is similar to what many define as traditional literacy, “the ability to be able to read, write, speak and listen” (Schrock, 2016, slide 1). and what this research has defined as traditional literacy. Her definition of digital literacies emphasized digital tools as opposed to social practices. As she elaborated,

Digital literacy for me would be the ability to be able to not just read any device that's digital, but to be able to comprehend the lingo because there are some lingos that are specific to certain machines. Being able to comprehend the lingo that's associated with specific technological devices. It varies depending on what it is, you know, that you're using.

The role that technology plays in Rachel’s cultivation of digital literacy within the IB programme is its reduction to the notion of “added tools.” That is, she uses digital tools to enhance her lessons, rather than to engage students in digital literacy practices that improve thinking critically, toward promoting self-regulated learning and enhanced literacy skills. During the interview, she maintained that she works to emphasize
interactive, open-ended learning, in contrast with drills and practice. When planning her lessons, she considers whether incorporating technology would support the teaching of the lesson objectives, increase student motivation, and/or capture and maintain students’ interest. She stated, “I incorporate the technology in my instruction when it is effective and meaningful. When the children are really truthfully learning from it, they're engaged. But the key word for me is meaningful. How meaningful is this activity?” She further elaborated that technology can be extremely engaging for students. She explained, “I find that they become very engaged. Very, very engaged. Especially when they can have a MacBook or an iPad for themselves.” Rachel’s understanding of students’ technology engagement became even clearer when she described a unit she taught on how the world works, specifically various forms of transportation, during which she used software like Flip Chart and Brainpop. She used those tools to take her students on a virtual tour of the various modes of transportation that have been used since 1950. She stated, “I just remember the boys just being really all excited, and they literally wanted to make little toy boats and little rafts.”

While Rachel articulated her belief that digital technology increases student engagement, she also contended that strong classroom management is critical. She emphasized that, when preparing lessons, particularly those in which technological tools are being used, teachers need to be organized. She said, “If you don't demonstrate enough [classroom management], it creates a problem because you're going to have 18 little hands going up. ‘Ms. X is it this?’ or, ‘Which button should I press?’ ‘Well I didn't get that.’” ‘Show me.’”
Rachel asserted that time and safety are also limitations to designing instruction that enables students to use technology and cultivates digital literacies. She stated, “Time. Just finding the time because you always have to set up. There's always a set up before some technological activity. Safety. How are we using these devices? Are we using them in a safe manner?” Both the British Education Communication and Technology Agency (BECTA; 2004) and Earle (2002) contend that teachers are often unable to make use of technological tools due to lack of time.

Many of Rachel’s pedagogical beliefs regarding digital literacies and technology integration were evident during all three of the observations. For example, the classroom arrangement facilitated both student-centered instruction and students’ use of technology. Throughout the three lessons I observed, there was evident use of multiple digital tools, such as iPads, videos, an interactive whiteboard, and various apps. Additionally, during all three lessons, Rachel’s instructional aide helped prepare for the lessons, worked directly with individual students, and moved throughout the classroom, monitoring and supporting where needed.

The lessons were designed around the PYP transdisciplinary unit of inquiry: Who We Are: An inquiry into the nature of the self and what it means to be human. The central idea of the unit was “Every day, I can learn about who I am and what I can do with my body.”
Description of the Observations

Observation One. During the first observation, students were beginning to examine how the inside of their bodies work. The objective of this lesson was to understand heart function. Students first watched a video about the heart, and then they went to various different stations throughout the class, where they engaged in activities that they needed to access by inputting a QR code. The activities consisted of songs that help students count to 100, clapping, jumping in place, and dancing. The idea behind these activities was for students to move different parts of their bodies and increase their heart rate. The students’ independent work consisted of drawing something new they learned in their “My Body Can” booklet.

When I entered the room for this first observation, I noticed that the names of each center had been labeled but the iPads were not set up. During the interview, Rachel emphasized the importance of teacher preparation when utilizing technology. She pointed out that a lack of preparation at this age level often led to an ineffective lesson. Despite her strong belief in the importance of preparation, Rachel herself was not adequately prepared for the lesson. It is unclear whether this lack of preparation was a one-time event or an ongoing challenge for her.

During the first part of the lesson, she reviewed what the students had previously studied regarding their body. Next, she had them take a sip of water and asked them to think about where the water went. After asking several more questions, she had the students watch a video on how the heart works. The interactive whiteboard was used to display the video, rather than for multisensory learning, such as collaborative problem
solving, or a virtual field trip. Following the video, she asked the students to sit in their table groups, only later realizing that she had forgotten to set up the iPads. Her instructional aide quickly recovered them from the cart where they were stored and handed one to Rachel. However, when Rachel began to use her iPad to model how the students would use QR codes (something they had previously studied), it was evident that she had not only forgotten to set them up, but she had also neglected to check the software she intended to use. Unfortunately, she was unable to access the QR codes on several of the iPads. Furthermore, several iPads had not been charged in advance, and one was not working at all. During this delay, students quickly lost focus, and they began chatting and playing with one another. After several attempts to make the software work, she decided to dismiss the students to the centers. Even students with an iPad had difficulty following the directions they had received; many students called out our names for assistance. My presence was useful in this context, however, as I jumped in to help a group. Rachel ultimately reduced the number of work groups from five to three, and she asked some students to share iPads. Students who were forced to share became upset, and some refused to engage in the activity. Finally, time ran out before the lesson was completed.

**Observation Two.** During the second observation, the students were already seated on the rug directly in front of the interactive whiteboard when I entered. Having the students seated on the rug rather than at their desks allowed Rachel to maintain the control she described during her interview. The students were in close proximity to her when she gave them instructions. This allowed her to quickly check behavior when
needed. Again, she used the interactive whiteboard only to display a video, this time about the parts of a computer. She consistently paused the video to check for understanding. The objective of this lesson was to build on the prior lesson about parts of the body, in order to demonstrate the similarities and differences between human parts and computer parts. After the video, students were dismissed back to their desks, where they each found a worksheet, glue, and some cut-out arrows. The students glued down the arrows to indicate which computer and human parts were similar. Students completed the worksheet as a group, allowing the students to use their peers as resources, while Rachel remained at the front of the class to model how to answer each question.

**Observation Three.** During the third observation, Rachel again used the interactive whiteboard, this time to teach the students a song about the letter H. During the first part of the lesson, the students were seated on the carpet far from the interactive whiteboard. Not only did she want to maintain control with the close proximity, she wanted to ensure that they remained on task. Moving them away from the interactive whiteboard allowed her to monitor the students and deliver the lesson. During this portion of the lesson, she made the H sound and displayed words on flashcards that begin with the letter H. This lesson design was consistent with her belief in the need for balance between digital and traditional skills. As she introduced the letter H, she ensured that students viewed the letter written on paper as well as on the computer screen. Next, students were asked to stand up and turn toward the interactive whiteboard, where she displayed a music video about the letter H that students sang along with three times. Following the song, students were dismissed to their desks located in the center of the
room to turn to their literacy letter books. Students were asked to draw a picture of words that Rachel described. For example, she would say, “I am thinking of a word that begins with the letter H. It is something that we put on our head.”

**Analysis of the Observations.** The technology used during three observations of Rachel’s teaching served multiple purposes. In particular, it gave students access to engaging and interactive activities while also promoting student independence. The last lesson was more in alignment with her stated pedagogical beliefs and the ways in which she described other digital lessons during our interview. As part of the interview, Rachel affirmed her strong pedagogical belief that teachers must be adequately prepared. However, in lesson one, she failed to demonstrate adequate preparation. What did occur, however, was just as she predicted: multiple hands went up, yet not all students were able to complete every station. Watching the lesson and witnessing her lack of preparation, it became clear why Rachel thought the school needed more technological expertise and more dedicated technology personnel. She commented that if a technology specialist been in the room, they would have assisted with the technology preparation and fixed technology glitches while she and her instructional aide moved forward with the lesson. It is with regard to this articulated technology perspective that Lumpe and Chambers’s (2001) study about “context beliefs,” such as how external factors or individual to support someone in achieving their objective, comes into play. It is possible that Rachel believes that schools requires more personnel so that the burden of preparing for technology lessons is shifted to the technology specialist.
While Rachel said that she believed technology should be used to enhance her lessons, she did not use the digital tools to transform the way she teaches. For example, lesson two could have been technologically enhanced had the worksheet been displayed on the interactive whiteboard. Further, use of the interactive whiteboards would have facilitated a multisensory learning opportunity, with students matching the parts of the computer to the parts of the human body. This use would have further engaged their focus on both the board and the objective of the lesson, toward understanding the similarities and differences between the human body to the computer. Instead, many students shifted their eyes from their teacher to their paper and struggled with not-yet dexterous fingers when attempting to complete tasks like gluing thin arrows. These tasks ultimately emphasized fine motor skills as the objective of the lesson. Additionally, Rachel should have embedded some higher-order thinking skills into the lesson, such as connecting images with words, especially given that students had a difficult time making the connections between the human brain and the computer brain (the CPU). As this was a difficult concept for an introductory lesson, making the lesson interactive and more collaborative might have been more effective.

In lesson three, her use of a song engaged the students and reinforced her objective to learn the sound of the letter H. She integrated what she considered digital literacy practices—showing a YouTube version of the song on the interactive whiteboard—with traditional literacy practices—having students (or at least those who could) draw or write. Finally, during the technological component of lesson three, she maintained control through clear behavior-management techniques. She was organized
and prepared, and students remained engaged as they problem solved to figure out the word Rachel was describing.

**School's influence on the implementation of digital literacies**

Rachel believes that there are numerous advantages to implementing digital literacies and technology into the IB programme. First, she indicated that teachers have no more excuses for boring lessons. She also suggested that technological advances have provided opportunities for teachers to expand beyond text-based learning and to engage all learners. Technology has evolved into an adaptable learning tool that supports how we demonstrate concepts, assign projects, and assess progress. As for LCIS, she advocated for a clear technology curriculum that would seamlessly integrate into the PYP. She stated, “I still feel as though, for the younger kids, it'll be beneficial for the children to have a technology curriculum and have a teacher just to teach those basics.”

Currently, LCIS has one instructional technology teacher whose goal is to support the teachers in their use of technology within the IB programme. Rachel advocated for the addition of another specialist teacher who could teach the students specific technological skills. Rachel’s preference for an additional technology is worth noting, as it implies both reluctance and hesitation to fully accept the importance that digital literacy has in the life of our students.

She further suggested that teachers need more time to work with the instructional technology teacher to enhance their skills. She indicated frustration as well as apprehension regarding her uncertainty about how to implement specific software or
apps. This frustration was evident when she was unable to access the software for the QR codes in observation one. Most importantly, however, she expressed concern over not having IT standards for the elementary students. She stated,

We don't have a curriculum for technology. Because we don't have technology standards ... For example, as simple as my students being able to know what letters are on the left and what letters are on the right of the keyboard.....Looking at a whole keyboard and knowing what ESC means. Knowing what the arrows going up or down mean.

Rachel indicated that teachers are encouraged by their school heads to use technology within their lessons to enhance and reinforce their teaching. She provided specific examples of how her head of school has supported her. She stated,

Taylor [pseudonym] expects you to keep improving. She always expects more from you. She is very up-to-date with the programs and she is very savvy with all of them. She can show you so many different ways of what you can do on just one program. I like that. There's always constant growth, there's constant improvement of getting a job or an assignment, a task. I like that.

Rachel also indicated that the administration supports teachers with the necessary resources and systems. She stated, “We would really be dishonest if we say we don't have enough technology. We have a very good supply of technology.”

Rachel’s concluding remarks were poignant. She explained, “I don't like the personal touch that technology sometimes takes away.” This belief is strongly linked to Bahamian culture and history regarding technology. While high-speed Internet first became widely available in the US in the early 1990’s, it did not arrive in The Bahamas until 2000. Bahamian nationals are known for being friendly, outgoing, and informal. They are very polite and hospitable. They also enjoy getting to know people, and sharing a meal is the most common way to build a relationship. So, it is understandable that this
rapid technological revolution has brought with it some unintended consequences. Where there would once be face-to-face conversations and personal reminders, they have been replaced by email and the impersonal, all-school Friday memo. Rachel stressed how this has changed the culture of the school. That is, while the school is progressing technologically, with the addition of, one-to-one lap-tops and interactive whiteboards, the implementation of Science, Technology, Engineering, Arts and Mathematics (STEAM), and the development of a school website and electronic report cards, we have also lost some of the simplicity and interpersonal skills that this country truly values.

**Heidi**

Heidi is a Canadian national with more than 17 years of teaching experience. She taught for 10 years in Canada before marrying and relocating to The Bahamas. She first taught at LCIS from 2000-2003. She returned in 2010 once all of her children were school age, and she has been teaching Grades 1 and 2 for the past four and a half years. All three of her children attend LCIS.

She holds a BA in Early Childhood Education from Ryerson University in Toronto, Canada. She has been trained in level I, II and III of the PYP. Like Rachel, she also teaches, literacy, math, and the units of inquiry course that is inclusive of both social studies and science. Other subjects, including Spanish, physical education, art, and music, are taught by specialist teachers. She has an interactive whiteboard in her classroom and shares a cart of MacBook computers with the other Grade 2 class. Heidi also has access to vast technology resources (i.e., iPads, GoPro cameras, and STEAM resources) from our technology helpdesk.
**Attitudes, beliefs or personal experiences with technology**

Heidi classified herself as a novice user of technology. While she believes that digital literacy and technology integration affect instruction and are useful for maximizing student learning, she does not use it often in her personal life. She openly acknowledges that technology is an area she struggles with inside the classroom. She commented, “Do I like the digital literature for myself? No, I'm not comfortable with it but I do see how excited the children get, especially, at the Grade 2 level when they're new to it all.” She indicated that she does have a Facebook account but rarely accesses it, and that she only uses Facetime and email to stay in touch with her family back home. She rarely used technology during her teacher education courses, nor did her courses prepare her to incorporate it into her teaching.

Although Heidi is not comfortable with digital tools, she does believe that they bring value and build student confidence. She said:

I think it really helps to build their confidence, just becoming aware of technology. I'm thinking about too when we first, when they first open up the computer, a lot of them didn't know how to manipulate the keyboard at all. They barely knew how to type, surprisingly enough, because I think they use their iPads all the time. At the beginning of the year in technology class we did a lot of, the kids learned how to manipulate the keyboard, basically. What every button was used for. We've been having assessment on it so they could become aware of it. I think after that, definitely after that, their confidence really develops immensely because they were no longer afraid to use the computers.

Heidi also suggested that students aren’t “digital natives.” Heidi instead believes that we should not assume that students automatically acquire technological skills. Rather, she contends that technological skills are specific practices that must be
embedded within lessons. Therefore, teachers are responsible for teaching students specific skills related to digital tools and literacy.

Heidi defined literacy as freedom: it confers the ability to express one’s thoughts, analyze new information, and understand the surrounding world. She stated, “It means you can write down your thoughts, your feelings. I personally love to write in my journal a lot and it helps me work through issues I may be having or just allowing myself think and write.” This pedagogical belief is rooted in the idea that traditional literacies develop intellectual stamina and curiosity, build vocabulary and emotional resilience, and serves as tools for lifelong learning. Heidi reads three books per day to her students and is pleased with the school’s recent addition adoption of Junior Great Books. She believes that these type of textbooks support higher-order thinking skills and stimulate powerful conversations with her students. Yet, when asked to describe digital literacy, she said, “obviously I think of computers, I think of an iPad, I think of anything technical.” Like Rachel, she believes that digital literacy is nothing more than digital tools students can use, thereby ignoring the social and cultural practices of digital literacy that can allow students to make the most of their multiple interactions with digital media. Her views also demonstrate her desire for more traditional literacy as opposed to less digital literacy. This was most evident when she was asked to describe what technology looks like when integrated into her classroom. She shared that, every day, she displays an image on her interactive whiteboard to stimulate conversation. She felt that this is a very rudimentary use of digital literacies. She rarely takes advantage of the medium to present the multimedia lessons of which it is capable. Additionally, she struggles with balance,
especially when it concerns ensuring that both digital and traditional literacies are appropriately integrated within her lessons. With the vast digital resources available at LCIS, there is constant pressure to use them, even when teachers may not believe that use of the tool is appropriate. This was exemplified when she stated, “It’s still really important to be able to hold the pen properly but it’s equally as important to be able to push the keyboard.” Here, she was referring to a recent PYP conversation surrounding whether we should continue to teach cursive writing. While she recognized the importance of learning to type for our students, she also believed that learning to read and recognizing cursive handwriting is essential.

Heidi also stated that where technology is concerned,

I'm old school but I'm becoming more a new school. I think [technology] is fun, exciting, challenging, mind-boggling and rewarding. It's been extremely rewarding for me because [considering] where I started to where I am now, I have really progressed nicely. I feel way more comfortable around the computer and anything digital.”

Again, she knows the importance of developing student digital literacy skills but she also recognizes that she has much to learn. She attributed her recent improvement in using Web 2.0 tools—which require users to be able to interact with one another or contribute content—to the support of a technology specialist. She said, “She's been wonderful for me in terms of really helping me understand the importance of using technology within my classroom and in my teaching.” This statement implies that she may not have seen the benefits earlier. Her strong beliefs regarding the importance of traditional literacies may have made her a particularly late adopter of technology in both her personal and professional life. The availability of effective professional development
and one-to-one support seems to have influenced her acceptance of technology for teaching and learning.

**Digital literacies and technology integration within the IB Programme**

Prior to the hiring of an instructional technology specialist, Heidi was primarily using digital tools and software only during the second half of the school year. This timing is directly related to her pedagogical belief that students are not ready earlier in the year and first need to be taught key digital literacy skills, like keyboarding and using search engines. Further, she was not comfortable with or knowledgeable about various software programs for classroom instruction. She continually asserted during her interview that she has made it a goal to increase the integration of technology within her lessons, now that she has weekly support.

Heidi believes that students benefit from guidance, instruction, and practice where digital literacies are concerned. This was most evident during my observations. All of her lessons were deliberately designed to teach her students specific skills in sequence, thereby laying the foundation they need to become successful technology users.

**Description of the observations**

**Observation One.** During my first observation, Heidi’s lesson was co-taught with the instructional specialist. The lesson objective was to teach the students about cyberbullying and to provide them with strategies to prevent it. Heidi launched the lesson with inquiry questions, which were handwritten on sentence strips and placed on the whiteboard. I wondered why she did not display them directly on the interactive
whiteboard. She posed questions such as: “Why do people bully?” “How do you think bullying makes people feel? What kind of emotions do students feel?” and “What would be the best thing to do if you were bullied?” All students were actively engaged and raised their hands, responding appropriately. Next, the instructional specialist began her part of the lesson where she showed a video about cyberbullying. The essential question for this part of the lesson was: “What can you do when someone is mean to you online?” She then used the interactive whiteboard to play a video for the students. Following the video, the instructional specialist asked the students “If someone asked you to describe what cyberbullying is what would you tell them? What would be your response?” A student responded “bullying online.” The instructor technology coordinator was looking for the students to put the definition in their own words, because she continued to probe and encourage the students to use words other than online and bullying.

As she continued to probe, she asked the students what kind of advice they would give a friend who is being bullied online. A student responded, “You could delete the message.” Another student shared that you could block the site. The instructional technology teacher continued to ask students a variety of related questions, such as who could a student speak with if the cyberbullying continued, and what emotions the student might feel when being cyberbullied.

After reviewing a video, Heidi read a scenario to the children and asked them whether it was an example of cyberbullying. As a part of the scenario, one student shared her password with a friend. Later, when the young girl logged on to her site, she saw that the site had been tampered with. The students talked about the concept of trustworthiness,
including not sharing their passwords. Heidi reiterated to the children that the definition of bullying is being mean, picking on someone, and saying hurtful things. She then reviewed the definition of cyberbullying, which is specific to being mean to someone online.

Following the directed lesson, students answered a series of questions, such as how they define cyberbullying, identifying the countries where the most cyberbullying happens, and brainstorming ways to end cyberbullying. Students were also directed to use a search engine to find the answers to their questions. Heidi reminded the students about how they had previously used search engines to find endangered animals for their science unit of inquiry. The instructional technology coordinator concluded the lesson by reviewing suggested phrases that students could use when trying to answer the questions. Students then began to work independently on the questions.

**Observation Two.** During the second observed course, Heidi introduced a new unit of inquiry. She began by displaying a photo on the Promethean board. The photo was of her family. The students were encouraged to ask questions about the photo, and the questions required full-sentence answers rather than simple yes/no questions. Heidi wanted the students to become familiar with the processes of asking questions and inquiring. Students began asking questions such as “Is that some type of river?” and “What is the white line?” as well as “How many children do you have?” Throughout this activity, students actively participated. Heidi worked to support the students in asking inquiry questions while the students thought about the photo. During this portion of the lesson, technology was used as an “added tool” solely to provide a visual display. The
rest of the lesson involved no technology. Students were randomly assigned to groups, which kept students from working with their friends or usual work partners. The activity encouraged collaborative work, required critical thought, and engaged the students’ interest.

**Observation Three.** During the third observed class, Heidi demonstrated significant progress in developing digital content within her instruction. She used 2.0 tools and instructed the students independently. Upon entering the classroom, the students were engaged in using a keyboard software program called Dance Mat, which is used to teach typing skills and keyboard fluency. The software program has four levels, each of which consists of three stages. Students participated at varied levels and stages, as the program allowed them to move at their own pace. The program was extremely interactive, with cartoon characters speaking to them along the way. All the students were on task and actively engaged. Heidi and her instructional aide circulated in the room and provided support when needed.

After fifteen minutes, the students were asked to stop. They were then asked to switch to Keynote, a software program for Mac computers designed for creating beautiful presentations. The students used Keynote to create their family trees, which included learning how to place their names on their own trees to prepare for creating the different backgrounds and shapes to make their family trees visually interesting. As Heidi gave directions on how to log onto their Keynote presentations and find their saved work, most students easily completed these tasks without direction. Before the students began working on their family trees, however, she reviewed the concept of generations. Using
Heidi’s family as an example, the students helped her complete her own family tree, going back to her great-grandparents. For the remainder of the lesson, students diligently worked on their own respective family trees.

**Analysis of the Observation.** Heidi’s pedagogical beliefs were in direct alignment with how she supported her students in developing and creating digital content. During her interview, Heidi reported that she had learned a great deal from the instructional technology coordinator. She stated,

> I've been using a lot more technology this year because thankfully, we now have an instructional technology teacher coming in once a week so I have learned a great deal from her. She's got a great collaborative mind. She's been wonderful for me in terms of really helping me understand the importance of using technology within my classroom and in my teaching.”

Given this positive relationship, it was not surprising to see the instructional technology teacher co-teach during the first observed lesson. Heidi’s approach demonstrated that each student has tremendous responsibility when working on the computer. She wanted students to understand how to become good digital citizens. Digital literacy is not just about digital tools; it is about students being able to function in digitally enabled society. As a part of the IB programme, teachers are encouraged to teach how students access digital information in a safe and ethical manner. Further, she wanted to reiterate the earlier lesson that bullying is not something that can only happen in person, but that it can and does also happen online. Finally, she introduced the basic research skills one needs to have when trying to gather information from the Internet. However, instead of just jumping to research skills, she first grounded students in how they safely access that information.
During the second observation, which was an introductory lesson into the student's social-study unit of inquiry, fewer technological tools were used. She practiced the belief that she stated during her interview, in which she asserted that students must first develop traditional literacy skills on which they can draw—such as encoding, decoding, vocabulary development, reading, and writing skill sets—in order to develop the technical aspects of literacy. This lesson introduced complex words, and she had the students handwrite their questions instead of typing them, as she believes that students retain more information when they write by hand. Yet, what was missed here is that literacy is much more than how a student acquires the technical abilities associated with literacy. Literacy is how we make meaning, relate to others, and solve problems (Jones & Hafner, 2012).

However, by lesson three, Heidi was fully integrating 2.0 tools within her lessons—in particular, students were learning to create with the digital tools. She was far more at ease in teaching this lesson, acknowledging to the students that she did not know how to do everything on Keynote.

Heidi was committed to helping students develop healthy habits and attitudes when using technology. She also demonstrated her determination to ensure that her students understand the benefits, dangers, and opportunities that technology provides. Finally, she was careful about what she used. Rather than simply using technology for its own sake, she sought to ensure that the technology she used actively enhanced her lesson. She understood that students need to negotiate information in multiple modes, such as text, visual, and audio, but she also struggled with what digital media to use.
Additionally, she continued to put emphasis on traditional literacy by shaping her lessons around what are commonly framed as traditional skills sets of literacy “reading handwriting, speaking and listening”. (Schrock, 2016, slide 1).

**School's influence on the implementation of digital literacies**

Heidi articulated during the interview that the school’s vision regarding the development of digital knowledge and examples is clear. She said,

> I think the school sees the importance of what we have to do to be competitive in the world and where these kids are going. They have to be prepared to be able to use technology to get to where they’re going and I think we’re starting at a very young age.

She highlighted that the school’s policies are particularly clear regarding teacher requirements for technology integration. However, when asked to provide some specific examples, she listed how she used the tools to complete administrative duties rather than classroom instruction. She stated:

> Certainly any correspondence that goes on within the school is done through email or Google Docs. As a teacher, there’s a lot reading which is fine. Sometimes some days are more than others, but yes, in terms of understanding what’s going on at the school you have to use the computer. It’s a requirement. Obviously, I’ll report digitally. Correspondence with parents is usually done by emails. Just navigating all of that is a requirement of the teachers in addition to, yes, trying to incorporate it into the lessons, not all the lessons but into your teaching daily or weekly absolutely.

> It was the mundane rather than the pedagogical uses of technology that immediately came to her mind.

> She appreciated the support that the school provides for the teachers regarding technology integration. Again, she reported that teachers have ample support for both
infrastructure and how to specifically incorporate Web 2.0 tools within lessons. Like Rachel, she also talked about the support that her Head of School provides. She stated:

I can always speak to Taylor [pseudonym] whom I directly deal with. She herself is very computer savvy and computer literate. I think she has pushed me, first of all with my yearly goals, she has always made me incorporate technology as one of my goals. She feels it’s important and useful within the classroom. She gets excited when we do use it. That’s contagious. It makes me realize that I need to step up my teaching. I need to step up my knowledge. I need to step my understanding of computers and the use of technology in the classroom. I think it is just her positive encouragement.

In her concluding remarks, she directly attributed her success to the support and professional development that the school provided, both of which enabled her and her students’ evolution from simply being consumers of digital content to becoming digital content creators and collaborators. She shared:

I’m sitting and smiling because I think for me, taking time off from teaching and coming back and having three kids who use technology a lot in their own personal life as well as in their school life, that is allowing me to develop my comfort level and it is amazing. I can make a mistake and not get screamed and yelled at, just work on finding my comfort level. I think this school has really made it very comfortable for me to step up my game and just feel more comfortable using technology daily and personally and in my teaching.

Heidi was developing a level of confidence that encouraged her openness to integrating more technology and digital literacies within her teaching. She felt supported to make mistakes and take risks.

Ava

Ava is a 27-year old Swedish national and has been teaching for four years, two of which have been at LCIS. Ava holds a BA and MA in Economics and Social History from the University of Glasgow. Additionally, she attended an IB school as a student and
received her full Diploma in 2005. Currently, she teaches Humanities Middle Years Programme (MYP) Grade 10 students and Humanities Diploma Programme (DP) to Grades 11 and 12 students. All of the students she teaches are required have a MacBook computer. She teaches in two different classrooms, both of which have an interactive whiteboard.

Attitudes, beliefs or personal experiences with technology

Ava considers herself a proficient technology user. While she uses online banking, movie streaming, and social media platforms such as Facebook to keep in touch with family, she does not blog or use Twitter. She said, “I'm very careful with what I put online because obviously it's a digital footprint, and that's something I learned when I was younger. It was drilled into me, ‘Be aware with what you put on the Internet. Once it's there, it's always there.’” It is interesting to note that even though she completed her teacher education courses fairly recently, she indicated that those courses did not prepare her to effectively model teaching and learning through connected, reflective, and collaborative methods. She explained,

It [the teacher education program] touched upon technology integration, but going into the state system in Scotland, where I did my first teaching job, they did not have the resources. They were just beginning implementation ... I was part of the first-year group of teachers trained for the Curriculum for Excellence which is pretty much equivalent to PYP/MYP. The goal was to implement more technology, e.g. bringing in iPads, bringing one-to-one laptops into the system.

Ava believes that students should have the opportunity to create rich multimedia and collaborative projects that improve their higher-order thinking skills and teach them how to process the vast information they encounter on the Internet. However, she also
believes that there is role for traditional literacies, such as face-to-face conversations and collaboration, handwritten notes, or reading print books. She stated:

There needs to be a good balance between technology and interaction with the peers and with the teacher. Not everything has to be done with computer. Not everything has to be shown in a PowerPoint. Sometimes talking about it is better. Sometimes creating an online discussion forum for a certain post is ideal. ... I think it's [Internet] is a great tool, we can do a lot with it but at the same time, they have to be aware that they can't become too reliant on it. They still need to be able to do basic proofreading. They still need to be able to find research, use prints, not just Google. “I'll Google this” or “I'll go to Wikipedia and check that out.”

Ava, like Rachel and Heidi, spoke about the digital tools that support literacy, not literacy itself. Ava defined literacy as “reading, writing, calculations, and understanding.” She stated,

I think literacy is something that we've always used and it's always been key in education. To me, it doesn't matter if it's traditional literacy or if it's digital literacy. The same skills are still required. The students still need to be able to skim texts. They still need to be able to determine structures. They still need to be able to write properly.

Consistent with this statement, Ava described how she worked to incorporate peer assessments, continuous constructive feedback, and public speaking into her writing assignments and presentations. Ava is closer than the other two participants to understanding digital literacies. Like Jones and Hanfer (2012) outlined in Understanding Digital Literacy a Practical Introduction, whether it is traditional or digital literacy, “reading and writing are complicated processes” (p.12). While the skills may be the same for traditional or digital literacy, what Ava does not touch on in her prior statement is that reading and writing do require different skills depending on the situation. For example, writing an English essay involves different processes than writing a science lab report.
Ava is not honing in on this idea of how students are making different meanings, relationships, and identities in varying situations when engaging with literacy (Jones & Hanfer, 2012).

Ava is most enthusiastic about digital literacies and technology integration when they are used to support students in fostering cultural understanding and global awareness. She enjoys creating authentic projects where students have the opportunity to create and share with other students around the world. She posited, “At the same time, they [students] can access so much more material. They can look at different perspectives. If you set up a global classroom, you can have Skype conversations with students on the other side of the world.” Despite her passion for increasing global awareness, she, too, returned to this notion that students are losing something with the increase of digital tools in education. She asserted that even the most sophisticated digital tools do not help students if they do not have the traditional, fundamental skills of close reading, grammar, spelling and writing. She said, “Yes, you can get your iPad, you can get your computer to read the text back to you, but how you process that information is not the same.” Again, she is focusing on the digital tools rather than how those tools have begun to change what it means to be literate.

Ava believes that students must be critical and informed users of technology and should leave school equipped with the skill sets required for being digital consumers, creators, and collaborators. She believes that accomplishing this will require more from teachers—more time, more professional development, and more knowledge about how to use digital tools effectively.
Digital literacies and technology integration within the IB Programme

Ava stated that students are most engaged with digital content when the task is open-ended and they are allowed to be creative. She was very passionate when describing her most effective lesson using technology integration. This lesson challenged the students to move away from their comfort zone and try something different. She shared how she encouraged her students to be risk-takers:

You're all pretty proficient in doing PowerPoints and presentation lessons. Come up with something else. Some of them came up with little videos. Some of them came up with role-play. Some of them even created a poster. They had to have certain pieces of information that had to be on the presentation, whichever format they chose, but they like the freedom, and that's why technology is great. You have freedom. You have choice. It doesn't have to be a poster; it doesn't have to be a presentation. It doesn't have to be a blog. There are so many different tools that you can use.

Ava endeavors to be an open-minded educator. For example, while not an avid user of social media, she did encourage students to use that medium to express their opinions and share their ideas openly. When I asked her if she directly incorporates Twitter, blogs, or Facebook in her class, she stated, “Honestly, I would have no idea where to start.” However, she followed up by stating that she nonetheless encouraged her students to use them appropriately.

Ava’s articulated pedagogical beliefs included an appreciation of the value of providing students with rich multimedia opportunities, offering choices for engaging with digital tools, and fostering balance between digital and traditional literacies. These beliefs were evident during the classroom observations that are described in the following section.
**Description of the Observations**

**Observation One.** The first observation took place during a Grade 7 Middle Years Programme (MYP) Humanities course. During the first part of the lesson, students were completing a project on sustainability. Students had been asked to investigate a specific policy, programme, organization, or development that was intended to, or actually did, enhance sustainability. Possible examples included the development of hybrid cars, resource efficiency, or recycling programmes in different countries. The main objective was for students to research a chosen topic, show their research, and evaluate their findings. Ava quickly reviewed the key components of the project to ensure that the students had adequate resources and were properly citing their sources. Students then worked for the next 30 minutes on finalizing their projects. They worked quietly and were on task. Ava moved around the room providing support where needed.

Completed projects were uploaded into Google Docs for assessment purposes. The class then moved into a new unit about food security. In a previous lesson, students had covered basic ideas of food security, such as war, trade, transport, access to water, politics, climate, and religion. During the first part of the lesson, Ava reviewed the terminology from the previous day and recapped the seven issues that they had covered. She asked them to provide examples for each issue to show their understanding. During this part of the lesson, she directed students to close their computers and to focus on the conversation and the PowerPoint presentation displayed on the interactive whiteboard. She reminded students that they would have access to the presentation on the class
website. Only a few students had paper and a pen with them in order to jot down additional notes.

Next, she asked the students to share what they had learned about Ancient Egypt’s civilizations from the readings, and then showed students a short video. Ava asked students to write down key words and ideas from the video while they watched. At this point, she allowed them to take notes on the computer. At the end of the video, they were asked to share two ideas from the video with a partner. The goal was for students to collect nine different points regarding food in Ancient Egypt’s civilizations. Students gathered ideas such as “they ate birds,” or “they harvested grapes and made wine,” or “they ate a rich variety of breads.”

Next, they began to discuss how the Nile was the main source of food in Ancient Egypt. The students were asked to come up with five issues that the Nile created for the farmers in Ancient Egypt. Students’ responses included unintentional flooding, drought, diseases, and the dangers posed to farmers by hippos. Ava then moved to the conclusion of the lesson. She began speaking with them about the planning tools that farmers used to address the issues of flooding and drought, which then led to a discussion of the similarities and differences between the calendar used by Ancient Egyptians and our modern calendar.

For the assessment of the lesson, Ava directed the students to complete a “Harvest Wheel” that would include the seasons and months. She also wanted them to incorporate three images that represented what took place during the various seasons. Ava never directed them to a particular site to find images. However, students quickly opened their
computer and complied with ease. The students worked until the bell rang, and Ava directed them to submit what they had done on Google Docs.

**Observation Two.** The Grade 10 students had been studying causes of World War I and trench warfare. The students had strong background knowledge of the situation in Europe in 1914. However, they had not yet looked at specific battles. As a part of this lesson, Ava wanted to provide an opportunity for students to research specific battles and to present their findings to the class. Students had begun work on their presentations earlier in the week. Students were asked to focus on battle technologies, the course and events of the battle, and both the immediate and long-term effects of a particular battle on the overall war. Students had been placed into pairs (although one group had three students), and each was assigned a specific battle from the following: the Battle of Somme, the Battle of Jutland, the Battle of Verdun, and the Battle of Gallipoli. As a part of their final PowerPoint presentation, students needed to include required details about battle tactics, technologies, and outcomes. They also were required to make their presentations appealing with the use of graphics, videos, sound, or music. Finally, their work needed to include a bibliography.

During the next 50 minutes, students worked on their presentations. Ava walked around and supported students where needed. During this time, she also consistently reminded students that they should be creative and take risks in their presentations. As I walked around, watching the students interact with one another, I noticed only one student handwriting her notes in a notebook. The rest of the students collaborated on the presentation via Google slides. As students were to be assessed on their presentation
skills, they practiced maintaining good eye contact, enunciating their words, avoiding reading directly from the PowerPoint, and keeping their audience engaged. Following the presentations, students in the audience provided feedback for the presenters.

During the second half of the class, the students gave their PowerPoint presentations. I was able to observe three of them. The first group discussed the Battle of the Somme with confidence and ease. The PowerPoint was well organized and visually creative; they experimented with font styles and graphics throughout presentation. They did not read from the slides and maintained direct eye contact with the audience. The second presentation was on the Battle of Verdun. These students were clearly nervous. This could be attributed to my (the school principal’s) presence in the classroom or to the fact that the mother of one of the presenters is one of the school’s Department Heads. I suspected he thought I would mention the presentation to his mother. As a result, the student may have felt extra pressure to perform in my presence. He and his partner had a difficult time recalling the facts and events of the battle and had to read directly from the slides. Their slides followed the order of requirements in the syllabus. While there were very few graphics, they did embed a video in the final slide, summarizing the events of the battle.

The final presentation I was able to observe was on the Battle of Jutland. This group included the student who had handwritten her notes. As she spoke about her slides, she used her notes with ease to help her summarize key events. Most students’ slides closely followed Ava’s example. Few students ventured far from the example she set or took risk to envision a different presentation styles. Ava had reminded them that her
example was not definitive and encouraged them to take risks, but very few students did. The final PowerPoint had minimal graphics, although it was well organized and the students clearly knew their topic. They were articulate and presented with ease.

**Observation Three.** This lesson was conducted with Grade 10 MYP Humanities students. They were also working on their presentation, creative, and collaborative skills. Upon entering, Ava asked the students to collaboratively review the details they had previously discussed about the effective use of PowerPoint. After a few minutes, students were asked to share what their table had discussed. Group one shared tips on how a PowerPoint should be organized, noting that fonts, images, and backgrounds should not be distracting, slides should be organized, and salient bullets should be used. Group two discussed how students should present, highlighting the importance of facing the audience with good eye contact and in a voice audible to everyone. The next group outlined what a good audience looks like: pay attention, do not chat with your neighbors, close your laptops, and be respectful. The last group explained the rules of asking good questions once the presentation was completed, including being respectful, being attentive and present in order to avoid asking questions that have already been asked, and providing feedback.

Students were studying the economics of tourism, and their assignment was to market a type of tourism. The challenge was that students could not use traditional tourist activities such as spring break, eco-tourism, sports tourism, or health tourism. Instead, they had to come up with something unique, such as adventure tourism or religious
tourism. They again worked in pairs, with the exception of one group that had three students.

As I moved around the room and watched the students work together, I noticed that the group with three people could not agree on which type of tourism to choose. One member in the group wanted to do recreational tourism, while the other two members argued for religious tourism. One of the two girls argued that they needed to do something different. By marketing religious tourism, she asserted that they could cover how people traveled for pilgrimages, missions, or leisure purposes. However, the young man in the group, who was very athletic, wanted to cover a more adventurous type of tourism and incorporate sports. In the end, the girls convinced him to be a risk-taker and they began working on religious tourism. Some of the other groups choose topics such as festival tourism and “dark tourism”—tourism to historical places with morbid associations.

After 30 minutes of work, students began presenting. Only one group finished in the time available and presented on adventure tourism. They used an interesting video that included extreme skiing and parasailing. Additionally, they used appealing background images and music and incorporated voice-over. The other students were engaged when watching the presentation. The presenters spoke clearly, had good eye contact, and were genuinely excited about their topic. Afterward, the students in the audience asked good questions and provided constructive feedback. Following the presentation, Ava shared that they would complete the rest of the presentations during their next period.
Analysis of the Observations. Ava heavily emphasized the use of multimedia content, creativity, and both research and collaborative skills in all three of her lessons. Further, she included what Buckingham (2008) identified as critical aspects of digital literacies:

1. Representation: students had to identify varying viewpoints when conducting research, such as when they looked at different opinions on how specific battles affected WWI.
2. Language: students had to use visuals and texts.
3. Production: students used PowerPoint for their presentation.
4. Audience: students needed to understand who they were writing for and presenting to.

Ava’s lessons required students to integrate technical skills with critical thinking skills. In each lesson, Ava included directions as to how and why students should use their computers. Additionally, she wanted the students to understand how accessing information online affects their interpretation and production.

During the first observation, Ava used a range of strategies for her students’ diverse learning styles. She used what she described as both traditional literacies and digital literacies. However, I advocated that she was indeed using literacy as a social phenomenon rather than just addressing the technical skills students need to acquire. Students engaged in rich conversation, both with and without their computers, and she also integrated video and PowerPoint into these conversations. Further, she encouraged her students to be creators of digital content, such as asking them to select appropriate
images for their harvest wheel. Additionally, she emphasized the importance of being
digital consumers when they completed their task on sustainability. Her lesson on
Ancient Egypt allowed for student investigation, such as when they had to locate relevant
images, as well as student collaboration, such as when they worked in pairs. In this
lesson, students were doing more than using digital tools. They were engaging with and
thinking about digital media.

Lesson two integrated both research and collaborative problem solving skills.
Students worked together to locate information and graphics on their chosen battle and
figured out how to present information in a logical manner within a given time frame.
Each pair created no more than seven or eight PowerPoint slides, and all incorporated
images related to the topic. Yet, students demonstrated very little risk-taking as digital
creators. As Ava shared during her interview, many students lack the research skills
needed to complete assignments such as this. Students were required to synthesize,
summarize, compare, and contrast information from multiple sources. Typically, this type
of integration poses significant challenges for students, particularly when they are
working with multiple sources. In this particular lesson, students became focused on
finding appropriate information and not plagiarizing, thus leaving little time for
creativity. Their lack of digital creation can also be attributed to researching an assigned
topic and not whatever they wanted. Students may be more creative on a topic of their
own choosing that is presumably of greater interest to them.

Like the first two lessons, lesson three incorporated skills such as researching,
communicating, collaborating, developing, and designing. In lesson three, Ava also
embedded marketing and negotiation. Students would ordinarily have quickly gravitated toward the tourism most closely linked with their personal interest. By narrowing their choices, she forced them to move past their comfort zone and create something different. I also observed the art of negotiation at play when members of one group had to convince another member that they could do an excellent presentation that did not include some aspect of sport.

Ava emphasized the importance of a teacher's lessons being organized and engaging to reduce student distraction when using digital tools. During the interview, she stated:

If they're a fully, engaged in a lesson, if you planned your lesson well, you're not going to have any troubles with it. They [students] will want to perform, they will want to do their best, whereas if you give them what they consider a boring task, whether it's answering questions ... sometimes that's necessary, but then they're more likely to be distracted and to go on sites that they're not supposed to be on.

Because Ava presented three well-organized lessons, students were engaged and focused during direct instruction as well as when working independently. I did not witness students sneaking looks at multiple screens or being distracted. They used their time wisely and were ready to present within the allotted time. It was clear the Ava had set clear routines for her classes and used technological tools for purposeful activities. In alignment with her pedagogical beliefs, each of her lessons also included how communication is represented in different contexts to different audiences; in other words, multimodal literacy. She incorporated text, visuals, and audio within and around new communication media. Finally, students were consistently provided with feedback and support during their independent work time.
School's influence on the integration of digital literacies

Ava asserted that the school has articulated a clear vision for the faculty. She lauded the school for embracing technology and all the challenges it brings. She stated:

You know that the world is developing, and that technology is constantly changing. This school is not shying away from it. If anything, it's embracing it. You're empowering both students and teachers to do something with it [technology] and to use it effectively. In my opinion there is a very clear vision.

Ava spoke enthusiastically about how teachers receive professional development and support at LCIS. Like Heidi, she also spoke enthusiastically about the technology support they receive from the IT staff and the instructional technology teachers. She particularly enjoyed professional development that involves peer-to-peer sharing. She believes that it provides the most concrete information for teachers to accept and immediately implement in their classrooms. She said:

I find it really inspiring when there is a forum for teachers and colleagues to talk about what they're doing and how they're doing it. A lot of different ideas are shared…. What it does, is it makes you think. It makes you think about your own lessons, it makes you think about how you're utilizing the tools that you have at hand or to make the lessons more interesting with the students. I remember key observations with one of the other teachers. I was sitting observing this lesson. I was like, "I didn't do that. That's a really good idea." She was using the whiteboard as a drawing tool whereas she had something else up on the projection.

Ava’s obstacles to integrating 2.0 tools had little to do with the school’s influence. However, the school did help remove one obstacle when it added generators; previously, frequent power outages were a source of frustration. Perhaps in accordance with her notion that there must be a balance between digital and traditional literacies, she stated that many frustrations stem from over-reliance on technology. She argued:
At the same time, we are becoming too reliant on technology. You forget what it's actually like to just teach without the use of digital tools. You forget...the students forget about getting back to the basics from time to time, such as the use of pen and paper. Over reliance on technology is not always great, because if a computer breaks down, all your resources are there. Then you are forced to go back to basics and nowadays people act like they don't know what to do.

Ava asserted that, because there is so much digital content available, today’s students take it all for granted. Her concerns are the challenges that many digital immigrants are facing: How much screen time is too much? How do I avoid digital distractions when I am teaching? How do I support students in understanding that there are multiple perspectives and that not all sources are reliable? She wants to help students to develop critical thinking skills while using the Web 2.0 tools. She posited:

Like I said, it's to do with the reliability and the value of the information you're reading. Obviously they have access to so many different perspectives. Sometimes these perspectives are not always backed up; they just assume, "This person said that. It must be true." Recently an extended essay student wanted to use a quote from this girl who wrote her PhD that has not been published. I asked her, “How can you use that? It has not been validated yet?” The student responded: “But it's printed, it's written.” Another example is Wikipedia. I remember there was a whole argument regarding its validity because individuals could alter the information at any time.

Ava believes that, while digital tools have indeed made things easier and faster to use, they have also created a whole new set of challenges for educators.

**Donna**

Donna is a Bahamian national who has been a teacher for seven years and has taught at LCIS for the past five years. She holds a Bachelor of Business Administration (BBA) in Computer Information Systems from The College of the Bahamas. Currently, she is pursuing her MA in Adult Education from the University of West Indies. She
considers herself to be an advanced user of technology and is extremely enthusiastic about all Web 2.0 tools. For the last four years, she has held the position of MYP Design Technology teacher for Grades 6-10. In 2015, she switched positions to become the technology coordinator. She is also the mother of two LCIS students: one in Grade 5 and one in Grade 8.

**Attitudes, beliefs or personal experiences with technology**

While she does not consider herself a technology geek, Donna heavily uses technology in her personal life. Besides, banking and shopping online, she reported owning multiple gadgets: iPhone, iPad, and a few game consoles. She openly admitted to being on the computer all the time. She prefers email to face-to-face communication and often uses Skype instead of the telephone.

Unlike the other participants, Donna’s educational background did prepare her for teaching technology in the classroom. Originally, Donna was trained as computer specialist. While working at The College of the Bahamas, she was asked to train some of the faculty on various computer applications. She enjoyed being able to support individuals and seeing how much they progressed after she taught them something. That experience encouraged her to go back to school to obtain her teaching certificate, and she has been teaching ever since. However, she indicated that it was not the teacher education program that had prepared her for teaching technology, but rather her own background in computer applications. She believes that technology enhances a teacher's lesson and, when executed properly, creates students who are excited to learn. Further, she spoke about how technology allows teachers to reach multiple learning styles. She shared,
I think it [technology integration] reinforces the learning quite a bit. I like the idea that technology is able to appeal to so many different types of learners: to the visual learner, the kinesthetic learner, and the tactile learner. The students appreciate that they can learn as well in different ways; they can learn by watching, by doing, by listening. I think they're able to appreciate the lesson that's being taught a bit more. The memory allows them [students] to remember to understand a bit more what they are learning. They see connections better.

Nevertheless, like the other participants, she also advocated for the idea of balance between digital and traditional literacies. She said, “I definitely think it [technology] requires more thought and more preparation, but it also requires a balance.” Donna suggested that, when teaching literacy, the teacher needs to be not only skilled in teaching the cognitive processes, such as phonemic awareness, but also able to support students in how literacy supports students in making meaning (Jones & Hanfer, 2012). That is, her emphasis on “making meaning” aligned with the concept of literacy as a social practice.

When asked to define literacy, Donna defined it as a set of skills needed for comprehension. She stated:

Literacy means having the ability to understand the world around you and to be able to function in that world. When I think of reading literacy I thinking of being able to have a set of skills that allows me to communicate, enhance my life and allows me to move forward.

She believed that literacy enabled one to apply one’s skill set to effectively connect, interpret, and discern the intricacies of the world. It is interesting to note that, when asked to describe digital literacy, she stated, “Digital literacy...means having the ability to use the tools that we consider non-traditional to be able to function.” In other words, she believed that digital literacies were a new way of seeing and thinking about the world. She elaborated on this point when I accidentally referred to her course as...
Information Communication Technology (ICT). She quickly corrected me: as a part of her MYP Design Technology class, students are required to conduct research, synthesize evidence, and apply their findings to the development of innovative products, services, systems, and 2.0 technologies. The MYP Design Technology class is far more than an ICT class, which focuses on basic use of software without the requirements of synthesis and application. In an ICT class, students use, and in the Design Technology class, students create. She explained:

In design technology, students are confronted with a challenge or they have a problem that they must solve. The idea is to get them to be aware of vast tool set out there that can assist them in solving their problem. In terms of connecting that digital literacy to my subject, they have to have an awareness of the not only the digital tools that are out there, but I am is also developing their critical-thinking skill set. They must use research skills to figure out the best tools to solve the problem.

While she uses technology on a daily basis in her classes, she emphasized that teaching students to use specific digital tools is not always the objective of her lesson. As an example, she described a task in which her students had to create a new logo for a client. The focus of the lesson was how to communicate. As a part of the assignment, students were required to conduct an interview with their client. She wanted students to understand the importance of posing the right questions and how to collect data from responses. Students also were required to do research, which developed their ability to effectively locate, evaluate, and use information. The amount of technology used in her lessons is driven by the objective of the lesson.

Donna believes that collaborative computer-based learning environments enhanced both student learning and student inquiry. As did the other participants, she also
expressed belief that these environments present challenges such as student distraction and increased teacher preparation. Like Ava, Donna asserted that when a teacher is well prepared, students are engaged and distraction is minimized.

**Digital literacies and technology integration within the IB Programme**

Donna consistently affirmed that technology integration is the key to supporting all students. However, she also indicated that the use of technology could have a negative effect if lessons are not well thought out. She stated:

> If they [students] all feel engaged, their behavior should be very good because they're fully engaged. They're excited about what they're doing and they want to do what they're doing. If they don't feel engaged, if it's too easy or if it's too hard, you will lose them.

Donna is committed to ensuring that students are exposed to a variety of digital tools and practices that allow them to reflect deeply about their emerging creative skill set. She believes that when used appropriately, technology can enhance all content areas. This belief was clearly evident in the practices I observed during her lessons.

**Descriptions of the Observations**

**Observation One.** The first observation took place during a Grade 9 MYP Design Technology class. The students were studying product research; more specifically, how to make an old product appeal to a new audience. During this particular lesson, students had already completed a rebranding video and were now studying product evaluation. In other words, how to determine whether the product does what it
was intended to do. The students were going to evaluate one another's videos and
determine whether the product redesign met the owner’s design specifications.

To open the lesson, Donna shared a one-minute video, completed by one of the
students. The product was Vibram five-finger sneakers. The sneakers have been marketed
as shoes to wear for every event. After watching the video, Donna walked the students
through various questions they could ask to determine the success of the product: did the
video demonstrate that the product was effective for the buyer? Was the background
music appropriate for the video? Did the camera angles capture the product
appropriately?

Over the next 30 minutes, Donna allowed the students to create questionnaires
regarding the design of their videos. Students created the documents using Google Docs.
In small groups, students shared and assessed each other’s videos. Students easily used
Google Docs to both create their own questionnaires and respond to classmates’
questionnaires.

**Observation Two.** Observation two was conducted in the Coding and Robotics
Club with Grade 7 and 8 students. The Coding and Robotics Club was designed to foster
an appreciation of the art of programming, robotics, and electronics. Students learned
how to teach computers do “anything.” This particular club was for students new to
programming, but it also encouraged students who already have some skills to have a
place to hang out and accept new challenges. For this lesson, students were becoming
familiar with the basics of programming in the JavaScript language, a modern and
flexible language with wide applications in web programming.
Donna opened the lesson by reviewing concepts in Java: how to assign values, how to incorporate a loop, and the importance of including a background. Her website for the club was displayed on the interactive whiteboard. She used the website to guide her review of code writing. Once she completed the review, she shared the objectives of the lesson, accompanied by the *Mission Impossible* theme music: to create an animation scene that (1) made use of color; (2) made use of at least one moving image; and (3) incorporated at least five shapes. Students worked in pairs on this task for the next 20 minutes.

Next, students shared their creations. The first pair of students created a UFO that moved downward and changed background colors. The students shared how they ran into problems trying to change their background colors. The next pair had also created a spaceship; however, they were unable to animate it, as they had forgotten to include a specific piece of code. The spaceship ended up being a bleep as it was stuck in a fast loop. Donna asked whether anyone could assist with where they went wrong. The first pair pointed out that they had forgotten the equal sign.

The next pair made the spaceship launch from Earth into space, but one of the shapes was disconnected from the ship. Again, Donna asked the students for assistance to see what command was missing. This took a bit of time, and Donna had to help the group see what was missing. The final group’s computers froze, and initially they were unable to share their creation. However, they sent it to another student’s computer and were finally able to display their product, which was a UFO shooting up to space.
Donna concluded the class with praise for the students’ accomplishments. While it was well after 4:00 pm, the scheduled end time for the Club, students wanted her to continue, which was a clear indication of their enthusiasm and engagement.

**Observation Three.** Lesson three was conducted with both Grade 5 classes. Donna was teaching this particular lesson instead of the classroom teachers, since it served as an introduction to technological concepts and skills they would need for their Social Studies Unit of Inquiry. Students were required to create a presentation depicting information about a chosen civilization. Scratch was one of two applications that the students could use to create their final presentation. The Scratch application would allow the students to develop code by demonstrating their understanding through animated role-play.

Donna opened the lesson by having one of the students pretend to be a robot. She shared that robots cannot think for themselves; they are controlled by the commands that programmers give them. The interactive whiteboard displayed a PowerPoint highlighting points that Donna wanted the students to remember about programming robots:

1. Cannot think for themselves
2. Take instructions from programmers
3. Follow instructions exactly as they are given
4. Contain a chip with instructions
5. Allow humans to do things that would be very difficult or impossible to do unassisted
Next, she displayed a list of commands that the robot needed to be “programmed” to follow. She asked one of the students, Jane [pseudonym], to pretend to be the robot, and then prompted the class: “OK, let’s get this programming going.” As the robot, Jane closed her eyes and was directed to follow all commands given her. Students could only use the commands displayed on the board and no others. Commands included stand, close, bend, walk, turn, and move. Donna led the students in reading the commands aloud, ensuring that they understood all the commands. Next, she spun Jane around, and the students had to use commands to move Robot Jane around the classroom. When the student provided a good command, she would touch Robot Jane and Robot Jane would move according to the command. This continued until the students successfully navigated Robot Jane across the room to the assigned destination.

During the next part of the lesson, students watched an introductory video on Scratch. Following the video, she asked them to share a few things they recalled about Scratch from the video. Next, she had the students help her create a video using Scratch. She showed them how the coding pieces fit together and that each color stood for something, such as blue equals motion or purple equals sound. Together, the class used the character Sprite to perform four functions: (1) say “Hello Grade 5,” (2) wait for three seconds, (3) walk five steps, and (4) say “Welcome to Scratch.”

Next, laptops were distributed to the students and they all logged into Scratch. Donna wanted them to simply play and experiment to create something. Once all the students were logged in, the room became silent, as all the students were actively engaged in trying to code.
**Analysis of the Observations.** Donna’s lessons followed the pedagogical beliefs she described in her interview. That is, all three lessons were well organized and embedded with participatory skills, and the technology used was both appropriate to the task and easy to use. Her adequate preparation also helped students stay focused and largely avoid distractions while using digital tools. She consistently addressed multiple modalities, as she used visual, auditory, and tactile mechanisms to engage her students. During each lesson, she created an environment where students felt safe to take risks. She offered praise and encouragement, allowed them to ask questions and collaborate with their peers, and make mistakes. Donna easily captivated the students in the first few minutes of her lessons with videos, demonstrations, websites, background music, and even with her personal energy. In all of the lessons, students assumed the role of digital creators, which allowed them to develop and use resources to support them in creating a personal learning connection. As she shared during her interview, Donna wanted students to “be aware of [digital tools] and to choose the best tools to use in order to create something that they are passionate about.”

Donna used technology appropriately. For example, during the first part of the Grade 5 lesson, she chose not to have the computer open while she was introducing the topic, encouraging the students to focus on what she was saying and minimizing distraction.

Lessons one and two demonstrated what Garcia (2014) would categorize as “connected learning”—specifically, learning that is “peer-supported, interest-driven and academically oriented” (Mirra, 2014, p. 13). Students had the opportunity “to gain more
knowledge and skills at higher levels of intellectual rigor when their learning originates from issues or activities that innately captivate them” (Garcia, 2014, p. 10). In lessons one and two, Donna incorporated opportunities for students to engage in peer review, whether by examining each other's videos or by giving feedback on their coding product. Each task also included problem-solving skills, such as how to get a new audience excited about an old product or figuring out how to design a spaceship with five shapes.

Donna is a connected educator. She taught her students to communicate with purpose and collaborate effectively. Finally, she approached her teaching with balance.

School's influence on the integration of digital literacies

Donna asserted that LCIS has a vision for how technology integration and digital literacies should be used, but that the vision needs to be stated more clearly. She said:

LCIS knows that it wants to have students realize that this technology is here and we want the students to use technology, to experiment, to see what's out there, to see what's ahead, just to be at the edge of what's happening, be prepared for the world that we are in now and the world to come. We do have a vision. However, it could be a bit clearer for teachers, particularly in terms of literacy and how computer/digital literacy can be used to enhance learning.

Donna contended that there are three major influences in implementing digital literacies at LCIS: time, teacher skill set, and increased professional development. The demands of the IB programme require teachers to cover a great deal of specific content. As a result, teachers have to make hard decisions and may respond by covering less content or by teaching fewer skills to students. Further, she maintained that teachers need to expand their own skill sets. She said, “Sometimes teachers’ skills sets ... [are] a limitation as well.” She believes that teachers lack the confidence and knowledge to use
some of Web 2.0 tools. They see it as “one more thing to do,” rather than something to implement seamlessly within lessons in ways that can transform their teaching.

While she lauded the administration for providing teachers with access to vast resources, she emphasized that more needs to be done to ensure teachers know how these tools can be used. She stated, “The school is doing a good job in providing resources for teachers, but I think the overall vision of how useful these tools can be could be a bit clearer.” Where professional development is concerned, she also shared:

While there is some training provided for teachers, I think more training is needed. We are seeing results of the training that has occurred and there are infinite resources for the teachers to use, but we still need more targeted training.

When asked what she means by “targeted training,” she described providing teachers with clear expectations of the outcomes of professional development, in terms of both performance and practice.

**Cross Case Analysis**

A cross-case analysis of the data revealed patterns and themes that guided this research. Those patterns included factors influencing teachers’ implementation of digital literacies and technology integration; the role of teachers’ pedagogical beliefs; the school's vision of technology integration; and teachers’ support of professional development. Outlined below is a brief summary of those patterns in alignment with the research questions.
Attitudes, beliefs or personal experiences with technology

Teachers’ pedagogical beliefs and practices shaping implementation of digital literacies. Survey results indicated that the teachers had an explicit understanding of technology integration and firmly believed that it is a necessary component of our educational practices. More than 47% of the teachers used technology daily within their instructional practice as it relates to digital literacies, and another 39% indicated that they use technology whenever they feel it is appropriate for their lessons. The case studies and the observations conducted affirm the survey results. Both the case study participants and the focus group participants strongly asserted a difference between traditional and digital literacies. Many of them referred to the need for a balance between the two. However, I assert that their association of digital literacies is actually specific to the digital tools they are using for their lesson. There seemed to be many motivations for teachers’ attachment to this notion of balance. They repeatedly suggested that they are facing new challenges in teaching students to become readers and writers in a constantly evolving digital environment. Some teachers saw an opportunity cost when teaching digital literacies, and they feared that such instruction is in lieu of teaching the traditional foundation that students require. They suggested that the students are missing a discrete set of skills, such as decoding, handwriting, holding a book, that traditional literacy provides. Teachers seem to fear that the digital tools are, in fact, causing this perceived loss of literacy skill. Teachers at LCIS, however, continue to use these tools. It is possible that, because the school has invested a significant amount of donated funds into technology acquisition, the teachers feel pressure to use these tools all the time. They may use the tool because
they feel obligated to do so, not out of any sincere believe in or understanding of the
value they add to literacy instruction. They do not understand or believe how these tools
are changing what it means to be literate. The teachers do not see being literate as a
social practice. They have not connected how student literacy skills are shaped by
students’ social contexts, and therefore see traditional and digital literacies as different
and discrete things.

Teachers reported that they require additional support to effectively develop
opportunities targeted at assisting students with online research, collaborating with peers,
managing student engagement with Web 2.0 tools, and critically navigating and
evaluating the vast digital content. Teachers expressed belief that a repertoire of skills are
necessary to support students in actively making sense of the world around them,
especially in terms of creating meaning from their experiences and effectively
communicating in different ways. Teachers suggested that digital literacies go beyond
reading and writing and involve developing critical thinking skills that students must
master in order to effectively implement digital content.

The strategies teachers chose to employ strongly depended on the needs of the
particular student. The LCIS teachers believe that, with proper technology integration,
digital literacies promote engagement and motivation and have the potential to reach all
learners. However, teachers in the focus group, as well as Rachel, Ava and Donna,
asserted that effective classroom management and appropriate control are key to ensuring
the successful use of digital literacies and technology integration within the IB
programme. Specifically, Ava and Donna and members of the secondary focus groups
were concerned with digital distraction, as well as with how much screen time is appropriate for students. This was less of a concern at in the Early Learning Center (ELC) and Elementary School (ES), where students do not have one-to-one lap-top computers and spend much less time on the computer.

**Digital literacies and technology integration within the IB Programme**

**Factors influencing the use of technology in the teaching of an IB curriculum.**

Some key factors influencing the use of digital literacies and technology integration were adequate resources, IT support, teachers’ ability to monitor and control the technology, and strategic professional development. The case studies, interviews, and focus groups revealed that, while the technological resources at LCIS are adequate, the use of those resources are based on each teacher’s own technological knowledge, the availability of support for implementing those resources, and on that teacher’s ability to control specific students’ use of technology throughout the lesson. With this in mind, the recommendation of participants in both the focus groups and case studies was that more attention needs to be given to professional development directed toward these limitations. Specifically, they suggested that there should be more collaborative opportunities to discuss the implementation of digital literacies and technology integration. However, teachers are aware of the challenges involved in making time to collaborate, co-teach, and attend professional development sessions.
School's influence on the integration of digital literacies

School's vision of encompassing technology integration, and its influence on implementing digital literacies. The case studies and focus groups revealed a common perception among teachers: that they have a responsibility to students to incorporate digital literacies and technology integration within the IB programme. There was also a level of anxiety among teachers linked to the expectation that they be fully able to use all the technological tools needed to effectively implement digital literacies. The teachers asserted that school administration needs to begin to examine ways that professional development can be maximized and spread more systemically throughout the entire staff. They also suggested that more accessible, targeted professional development would support teachers in feeling more supported both within and outside the classroom. Finally, the teachers in both the case studies and focus groups all recognized that the administration endeavors to provide support and guidance regarding technology integration and digital literacies.

In conclusion, I believe there also needs to be professional development on the new theories of literacy. Foundational skills remain important when teaching literacy, but with the advent of technology, literacy has become so much more. The LCIS participants believe that traditional literacy offers more than digital literacy. Yet, if we begin to see literacy as a social practice, we do not require one definition for literacy. Instead we can begin to acknowledge that different situations require different uses of literacy. This acceptance will give rise to new ways of thinking about teaching and learning, and, in turn, foster different goals for programmes such as IB and school policies.
Chapter 6

DISCUSSIONS AND IMPLICATIONS

The purpose of this study was to examine how teachers integrate digital literacies within the IB programmes, and to understand what influences their implementation. Furthermore, this study was designed to inform my practice as an IB school leader, specifically with regard to supporting my collaboration with the faculty to co-create a healthy digital ecology that advances teaching and learning. The research aimed to answer the following questions:

1. How have teachers’ attitudes, beliefs, or personal experiences with technology shaped their instructional practices?
2. How have teachers interpreted “technology integration” within the IB programme, and how has the programme influenced their teaching of digital literacies practices and technology?
3. What happens when I, as a school administrator, begin to explore how the school’s vision of technology integration is influencing the implementation of digital literacies within the IB programme? How does what I learn influence my work as a school leader?

This chapter is organized into three sections: (1) Discussions—this section synthesizes the study’s findings, connects the research questions with lessons learned, and informs the decision-making for advancing technology integration and digital literacies at LCIS; (2) Implications and Recommendations for Practice—this section offers suggestions for both LCIS and other IB schools leaders regarding teaching
practices that effectively incorporate digital literacies and tools; and (3) Conclusions.

Each section is organized in alignment with this study’s research questions.

**Discussion**

The findings in Chapter 4 and 5 revealed six key themes:

1. The LCIS teachers understand that digital literacies practices are critical skills that students need to acquire in their educational development.

2. The teachers believe that they need to create opportunities for students to learn to strategically find and evaluate information on the Internet, connect and collaborate with others, and produce and share original digital content (Government of Ontario, 2007).

3. The teachers agree with the idea that our students must be prepared to navigate various social contexts and to communicate effectively in each of them (Cope & Kalantzis, 2000).

4. The teachers agree that digital literacies and technology integration have the potential to maximize student learning. Participants provided multiple examples of their students demonstrating engaged, connected digital literacy collaboration and production practices when they used various digital tools in in the context of skillfully planned lessons that connected to the IB curriculum.

5. The teachers cited the following challenges they face when integrating the digital tools: lack of time, digital distraction, and their own technological competence.

6. The teachers suggested that there is a need for more support and collaboration. To meet this need, the school should provide professional development and
collaborative opportunities that are targeted, on-going, strategic, and inclusive of effective use of digital literacies.

The experiences shared in the survey, case studies, and focus group revealed that embedding digital literacies in an IB setting requires a strategic vision, an effective support system, achievable and defined technological competency, and a clear understanding of what new literacies are—specifically, an understanding of literacy as a social practice. This can only be accomplished with strong collaboration across the school, the faculty, the students, and all key stakeholders.

**Attitudes, beliefs or personal experiences with technology**

Lumpe and Chambers (2001) provided a background for understanding teachers’ core beliefs, such as which curricular issues are most important to the teacher and what significance they ascribe to integrating technology. My study built on Lumpe and Chambers (2001), who found that teachers do believe that technology integration is essential for students. As evident in my findings, teachers’ personal use of and positive attitudes and beliefs about technology did result in the use of digital tools, particularly hardware, such as computers, iPads, and interactive whiteboards, and software, such as PowerPoint, coding, and typing programs. My observations suggested that teachers were comfortable using many of the selected tools. In a study conducted on teachers’ perceived barriers to the implementation of digital tools, BECTA (2004) wrote, “Many teachers who do not consider themselves to be well skilled in using ICT feel anxious about using it in front of a class of children who perhaps know more than they do” (p. 7). My findings
suggested that teachers do have this anxiety, but they also recognized that that they do not need to be experts on every tool nor be the sole source of knowledge when implementing Web 2.0 tools. Teachers also suggested that, in order to more effectively integrate technology, they need to be open-minded and flexible risk takers.

Teachers noted three main points of contention regarding barriers to using Web 2.0 tools within an IB setting: (1) more time is needed to implement digital literacies; (2) more support, such as professional development, is needed; (3) students’ digital distraction must be managed. These findings expand on Earle’s (2002) research, which suggested that the key barriers to technology integration are “time, support, resources and training” (pp. 11-12). LCIS teachers agreed that three of these barriers—time, support, and training—pose challenges at LCIS. However, no teacher felt that the school had insufficient technology resources. Building on Earle (2002), my study introduced digital distraction as another key barrier.

Further, my study suggested that technological integration requires teachers to understand how and when to use digital tools. That is, while the LCIS teachers all implement some form of technology integration, they believed that more support is needed to learn how to most effectively integrate digital tools into specific lessons and specific areas of the IB curriculum. This finding is consistent with observations made by Hague and Payton (2010) about how teachers often lack not only the confidence but also the skills to integrate technology effectively. Teachers need support to become reflective practitioners (Hargreaves, 2005). I assert that teachers’ notion of professional development is less about acquiring more knowledge of the digital tools themselves, but
rather about learning how to seamlessly integrate those tools with traditional practices.

Earle (2002) posited:

Integrating technology is not about technology— it is primarily about content and effective instructional practices. Technology involves the tools with which we deliver content and implement practices and better ways. Its focus must be on curriculum and learning. Integration is defined not by the amount or type of technology used but how and why it is used (p. 7)

I found that the pedagogical beliefs that teachers profess are not the only ones that shape their practices. There seemed to be an underlying and perhaps even unconscious hesitation and anxiety among teachers about fully integrating digital literacies. The data suggested that the teachers perceived the implementation of digital literacies as “one more thing to do” on top of all the other teaching obligations they faced as an IB teacher. Some teachers did not feel competent with technology, and consequently avoided learning how to integrate it. Others teachers may have felt that technology caused more problems than it solved. Their stated fears about plagiarism and digital distraction, for instance, were evidence of this attitude. Teo (2008) supported this notion that negative attitudes or fears must be addressed if we are to see an increase in the use of digital literacies and tools.

Teachers are required to use digital tools, yet they often used them in simple ways, such as added tools. For instance, these “added tools” could play a song or a video, or display pictures on interactive whiteboards, to accompany a more traditional style lesson. However, they rarely used them to design lessons that constructed deep meaning
or connected knowledge. For example, Ava used PowerPoint during all the observed lessons. Yet even with her technological competence, Ava only used PowerPoint as a device to supplement her lecture, not as a fundamental learning tool. According to Sandholtz, Ringstaff, and Dwyer (1997), the LCIS teachers are in the *appropriation phase*. LCIS teachers believe that technology is an essential tool for learning and are attempting to use it consistently. However, complete and successful integration may be impossible until teachers’ underlying hesitation and anxiety are conquered.

**Teacher Technological Competence**

The data suggested that the teachers believed more professional support was needed. These findings are consistent with those from Fullan and Langworthy (2014), who concluded that there must be a “learning partnership” between the students and the teacher. These learning partnerships are built on “principles of equity, transparency, reciprocal accountability, and mutual benefit” (Fullan & Langworthy, 2014, p. 12). Teachers become learners alongside the student and thus see learning from the student perspective (Fullan & Langworthy, 2014). Currently, LCIS has a Technology Coordinator and an Academic Technology Director, both of whom support how technology integration and digital literacies are implemented within the IB curriculum. Both collaborate with and support teachers daily. However, there are only two of them and 50 teachers. Out of necessity, this collaboration is currently limited to one or two planning periods per teacher per week. As Earle (2002) pointed out, time is indeed a barrier and a challenge to the effective integration of technology. This limited schedule of individualized support helps to explain the comments and the recommendation shared by
Rachel, the Junior Pre-Kindergarten teacher in the Primary Years Programme (PYP). Rachel suggested that more direction and support for digital literacies and technology integration are required. Rachel recommended that each of the three schools have its own technology coordinator. Rachel, a professed component user of technology, perceived the limited schedule of support to be insufficient and the available support staff to be inadequate. Teachers who were more comfortable with technology seemed less adamant about the inadequacy of current levels of support. My findings in this area are consistent with Earle (2002): support for teachers is key, especially for teachers with lower levels of skill and comfort with technology. Teachers who labeled themselves as “proficient” or “advanced” experienced fewer challenges in implementing digital literacies than those teachers who labeled themselves as “novice” or “competent.” Teachers’ perceived levels of competence strongly affect how much support they believe is required. My goal as administrator is to create a culture within which teachers feel empowered to develop their technology skills, as well as to recognize that novice users of technology may develop more slowly and may never be as skilled as the proficient users. The key is that all teachers progress and move forward.

The study also expanded upon findings from Lumpe and Chambers (2001). They found that, while teachers believe that technology integration is critical for student development, their use of technology was dependent upon hardware, software, professional development, and time constraints. My data suggests that teachers’ level of competence or confidence also shapes their digital practices. The more confident a teacher is in her technological abilities, the more likely she is to implement various
digital tools. This was particularly evident during observations of Donna and Anna, when they were teaching students about coding and how to be discerning and critical when viewing search results. These skills, coupled with the use digital tools and the development of an understanding of what literacy means, all contribute to the recipe for creating deep meaning for our students.

**Digital Distraction**

The notion of digital distraction was the other barrier cited by teachers. This was primarily a concern for the secondary teachers. Ava and Donna, as well as the participants in the secondary focus group, shared that students have shorter attention spans and are easily distracted by digital technologies when lessons are not engaging. A recent Pew study, *How Teens Do Research in the Digital World* (Purcell et al., 2012), supports this belief. Of the teachers surveyed, 87% suggested that “today’s digital technologies are creating an easily distracted generation with short attention spans” (p. 7), while 86% suggested that “today’s students are too ‘plugged in’ and need more time away from their digital technologies” (p. 7). The LCIS teachers asserted that more controls need to be put in place so that teachers can monitor students’ screen time. Teachers expressed frustration with how off-task students are during some lessons.

My reflective journaling indicated that this notion was also prevalent among the parents, as expressed during a few coffee mornings, as well as among the administration, as expressed during several weekly management meetings. Both parents and members of the administration team suggested that secondary students’ grades were lower as a direct result of their digital distraction. While personal laptops do offer today’s students easy
access to a wealth of distraction, the reality is that students have always had problems focusing in class. That is, distraction for students is not a new phenomenon that has come into being with technology. However, the research is inconclusive as to how best to proceed. Some researchers (Richtel, 2010; Schwartz, 2013) suggest that schools need to enforce stricter rules when it comes to the use of digital devices, while others suggest that the answer lies in more use of digital tools such as social media, blogging, or interactive whiteboards. While I did not observe any specific digital distraction during my observations, the research is clear: students are grappling with the constant desire to multitask, which pulls away their focus. In the article Growing Up Digital, Wired for Distraction, Richtel (2010) highlighted that, for some teens, this distraction is even more intense. He described how one student received more than 27,000 texts in one month and could been seen texting several people at once. He described another student who played video games for four hours after school. My data suggested that both parents and teachers believe that digital distraction is an issue that must be addressed.

**Digital literacies and technology integration within the IB Programme**

Participating teachers expressed the belief that the ubiquity and accessibility of the Internet and digital tools within LCIS are rapidly changing students’ educational experiences. Furthermore, the participants clearly articulated that new pedagogies and technology usage for learning are needed for our students to become effective learners and future content producers. Cope and Kalantzis (2000) suggested that the new pedagogies created by digital literacies are creating a “profound shift” (p.172). That is, literacy has become multimodal. Texts are accompanied by images; screens are replacing
the leaves of a book; and new modes of communication, such as Twitter and Facebook, are exploding. These new modes of communication have implications such as digital distraction that needed to be understood before they can be addressed (Kress, 2010). These new literacies demand that our teachers create engaging instructional practices that incorporate digital media into their classroom when possible.

Findings indicate that the implementation of digital literacies allowed for both individualization—instruction that is paced to the learning needs of different learners—and differentiation—instruction that is tailored to the learning preferences of different learners. An example of this was the typing program the Grade Two students used during Heidi’s observation. Students were able to work at their own pace, not beholden to a single class pace, and to focus on their own areas of weakness. Digital literacies also allow for personalization. It supports instruction that is not only tailored to students’ learning needs and preferences, but also to their specific interests (“Office of Educational Technology,” n.d.). One observed example of personalization was when Ava allowed the students to design a presentation about the style of tourism of their choice, which encouraged students to consider and select their topic based on their own interests. By creating such opportunities for our students to be creators, innovators, communicators, and collaborators, teachers have the ability to reach all learners in their classroom.

The participants expressed that challenges exist in trying to achieve these goals. In the secondary school, teachers shared that our students lack research and fluency skills for locating, organizing, analyzing, and evaluating information from a variety of sources, especially from Internet sources. They further admitted that more needs to be done to
improve students’ skills so that they are able to define problems, plan and conduct research, identify solutions, and make appropriate decisions using digital tools and resources. As a result, teachers strongly asserted that what is lacking are many traditional literacy skills, by which they meant, acquiring a set of cognitive skills such as spelling, reading, decoding, and writing. More specifically, the LCIS teachers believe that many of our students are not equipped with the critical skills of literacy—such as the ability to analyze, infer, synthesize, write with coherence and authenticity, and to use textual information and insights as the basis for informed decisions and creative thought. In order for students to develop their critical thinking, they must read about subject areas. The teachers expressed the belief that, because our students have access to the Google search engine and various apps, they have become reliant on the apps to do the work for them. The students are neither reading closely nor thinking deeply; as a result, some are graduating without specific skills that teachers believe are critical to student future success. The participants shared that they have seen increased instances of plagiarism, an absence of critically evaluating sources, lacking content knowledge, or failing to memorize key facts. Ava described an example of such behavior: a student wanted to use an unpublished dissertation as a reference in her paper. The student supported her use of the source by simply claiming, “It was on Google and it was a dissertation after all.” The student used no other critical faculties or any reasonable evaluative criteria for declaring it an appropriate source. “Google” and “dissertation” were as far as she went.

My reflective journal highlighted that the management staff had similar concerns. During a parent academy, which is our school’s term for a professional development
session for parents, several parents expressed concern with the amount of time students spend on their computers. Parents wanted to understand how much the students really need their computers for homework and classwork. This concern led to an intense discussion during our management meeting about whether one-to-one laptop schools were effective. After a lengthy debate, the team concluded that it was the use of the hardware, not the hardware itself that poses the problem. The team decided to establish a committee for the systematic implementation of research skills throughout the Primary Years Programme (PYP) and the Middle Years Programme (MYP). While each programme does have a culminating research project that students need to complete in Grades 6, 10, and 12, the concern is that not enough of the process was being taught ahead of these grades. Currently, LCIS does not have any technological standards to guide teaching and practice. The school has begun to adopt technology standards suggested by the use of Government of Ontario Ministry of Education (2008) as a guideline for moving forward. Specifically, teachers need to understand how and where students learn tasks, including the following:

1. Access, select, gather, critically evaluate, create, and communicate information.

2. Use the information obtained to solve problems, make decisions, build knowledge, create personal meaning, and enrich their lives.

3. Communicate their findings for different audiences, using a variety of formats and technologies.
4. Use information and research with understanding, responsibility, and imagination (Government of Ontario, 2009).

Don Leu, co-director of New Literacies Research Lab, conducted a research project with 27 seventh graders that demonstrated what can occur when these skills are not addressed and we simply let students “Google it” (Leu, Forzani, Rhoads, Maykel, Kennedy, & Timbrell, 2014). The students in the study were asked to evaluate for credibility an Internet site about the arboreal octopus. Their teacher had previously demonstrated an analytic model for such evaluation. The website included facts such as the creature’s diet and mating rituals. Twenty-six of the students cited the website as a reliable source of information. The arboreal octopus obviously does not exist, but the students firmly believed it did, based solely on the perceived credibility of the website. Leu concluded that students required more help learning to read online material and evaluate online sources (Leu, Forzani, Rhoads, Maykel, Kennedy, & Timbrell, 2014).

The LCIS participants clearly vary in their views of what literacy is. Notions of literacy have evolved over the years from a traditional conceptualization of the development of cognitive skills to the more recent idea that literacy skills and practices are shaped by social contexts of which they are a part. The LCIS participants’ beliefs about literacy align with more traditional views. Therefore, they conclude that traditional literacy sources, such as print books, most effectively encourage skills such as reading for comprehension. They reject neither technology nor progress. However, it would seem that they do prefer to supplement technology with traditional forms of literacy.
School's influence on the integration of digital literacies

Part of the study was to examine my practices as a leader, so that I can make informed and thoughtful improvements regarding digital literacies practice within our IB setting. I drew on the literature from Dana (2009) to engage in this administrator practitioner research. Dana (2009) cautioned that assessing the results of administrator practitioner research can be difficult. She also offered some quality indicators for one to consider while engaged in the inquiry process. I made use of her recommendation regarding principal research, specifically about learning to focus on what I have learned as the principal and researcher. My findings and reflective journaling point to three critical vehicles that are needed if LCIS is to advance digital literacies and technology integration within an IB setting:

1. **Changing the culture of teaching and learning.** The administration needs to create more opportunities for increasing technological competency, collaboration, and inquiry among teachers.

2. **Instructional Leadership.** As the principal, I need to ensure that I position myself as a learner; that I develop and share knowledge about teaching and learning; that I engage in critical dialogue with different members of the school community; and that I regularly examine and re-examine student and staff experiences.

3. **Increase professional development opportunities.** Through our professional learning communities, teachers and administrators need to acquire the intellectual
and social resources to improve pedagogy, integrate technology, and create
generative school and classroom environments.

**Changing the culture of teaching and learning**

The LCIS teachers supported the notion that technological devices and digital literacies have changed how students read, create, and interpret texts (Swenson, Rozema, Young, McGrail, & Whitin, 2005). This study’s qualitative data indicated that teachers understood how technology could support student learning and believed that technology was a required pedagogical skill for educators. If LCIS is to change teaching and learning as it relates to digital literacies and technology integration, then we must acknowledge that digital literacies are not about technological skills but, instead, that that literacy is a social practice. We must also acknowledge how students solve problems, think critically, communicate, collaborate, and create is contingent upon their social contexts. Teachers require support to integrate digital tools reflectively and strategically, in order to deepen students’ learning processes. However, the findings also revealed that the tools themselves do present challenges to many teachers, particularly those who consider themselves less technologically competent.

The teachers also identified different definitions of what it means to be technologically competent. The research on technological competence does not provide a specific definition of such competence for teachers. What has been developed are standards, guidelines, and frameworks, as well as broad statements lacking specific criteria against which teachers can be assessed and lacking specific actions that can be taken. The International Society for Technology in Education (ISTE) created standards
that specify a desired performance profile for technology-literate teachers, but it provided no assessment criteria for teacher level of literacy. The International Baccalaureate Organization (IBO) in 2014 published the document *Teaching and Learning With Technology*, whose main goal is “to support school leaders, educators and specialists as they engage in policy-making, strategic thinking and curriculum design, and as they meet pedagogical challenges resulting from emerging technologies” (International Baccalaureate Organization [IBO], 2014, p. 1). While this document includes the latest research findings and is a step in the right direction, it includes neither strategies for implementation nor best practices. The IBO itself fails to sufficiently support how to advance and increase the use of digital literacies within the IB programme.

Teachers need to understand what is expected of them. A clear definition of digital literacies, coupled with appropriate standards and frameworks, will not only help teachers, but also administrators. I suggest that the IBO should define what it means to be technologically competent. I would argue that that lack of a clear definition of what it means to be technologically competent handicaps teachers and administrators from fully implementing digital literacies. There are many potential options for creating these vital definitions. One option could be partnering with organizations such as Certificate of Educational Technology and Information Literacy (COETAIL). COETAIL is a professional development program for international educators around the world. The program is designed to give teachers multiple opportunities to learn and reflect on their teaching practices as they go through the course. As many of the participants in COETAIL’s courses have graduated from IB schools, the program may be sufficiently
familiar with IB practices and procedures to become a useful partner in the creation of criteria and instruments for assessing technological literacy.

**Professional Development Support Faculty and Student Development**

While the participants repeatedly cited their opportunities to engage with one another on the topic of digital literacies, study findings have shown that teachers do not perceive those opportunities as sufficient. It is possible that administrators have insufficiently addressed concerns regarding the implementation of digital literacies that the LCIS teachers face daily in their classrooms. The findings also indicated that the teachers feel that the demands of the IB programme outweigh the need for increased digital literacies. In certain instances, teachers may not see the specific value that instructional technologies provide for their particular content area. Alternatively, perhaps the types of software that the administration recommends as most helpful in instruction are not always the types of applications teachers know how—or want—to use. Our new portal system is a good example of an enforced digital tool that is of little interest to teachers despite its ultimate value. That is, the school administration often focuses on using technology to complete needed administrative tasks, such as taking attendance and posting homework assignments. Less often, the school focuses on integrating technology into instruction with the goal of constructing deep meaning for students.

As a school, we can try to address this issue with more collaboration among the IB coordinators and the teachers. However, the IB coordinators have significant administrative responsibilities, which reduces the contact time between coordinators and teachers. For the upcoming school year, LCIS is adding two IB coordinators to further
assist teachers in understanding how to balance the IB requirements with the increased desire for improved digital literacies and seamless technology integration within their units.

Finally, the school administration will need to address how we approach professional development. Our professional development is targeted too narrowly and is too focused on how to use various software tools, rather than focusing on the bigger picture of how these tools can support learning targets for classes or subject areas. Hanover Research (2014) examines best practices for implementing successful professional development for technology use. While LCIS has some of these practices in places—such as instructional technology coaches, learning communities, learner-centered approaches, and both continuous and convenient access to relevant teaching resources—there is still much work to be done. I suggest that the current LCIS professional training does not adequately support teachers in understanding the pedagogical practices for using technology. Most research suggests (Dana, 2009; Spires & Barlett, 2012) that school administration needs to fully believe that teacher development is an essential component of successfully integrating digital literacies and technology. I assert that the LCIS administration is not short on belief in professional learning—we currently invest more than $3,000 per teacher annually on professional development. However, we do not have a clear plan. More collaboration is needed between teachers and the administration. Administrators need to create an environment where teachers feel empowered to make continuously reflective decisions regarding the implementation of digital tools and literacies. Other steps include defining technological
competence, at least by LCIS standards; ensuring teachers’ clear understanding of the relevant literacy research and conceptualization of digital literacies and pedagogical practices as intersecting social practices; and increasing collaboration among all stakeholders. Knobel and Kalman (2016) expounded on this idea: “Understanding that teaching is a social practice comprises sets of beliefs, ways of doing things, ways of using resources, configurations of physical spaces and ways of speaking (to students, to colleagues, to parents to administrators, etc.)” (p.4).

**Instructional Leadership**

The study findings suggest that teachers appreciate when the administration provides more time and opportunities to discuss and demonstrate how to use digital technologies within the classroom. Heidi, Ava, and Rachel also indicted that they value when their direct supervisors model, support, and encourage their use of digital literacies.

LCIS has not devoted much focus on how we integrate digital literacies in the “preferred pedagogies of the IB...constructivist, inquiry-based, and authentically-assessed” (International Baccalaureate Organization, 2014, p. 20). My reflective journal highlighted that there needed to be more time for discussion and collaboration between teachers, grade levels, and even across the school. While time for collaborative planning is built into the current schedule, it is not sufficient. LCIS has the experts in place, and each of them hold a key to the puzzle. However, there needs to be time for the librarian, technology coordinator, IB coordinators, and teachers to sit together and reflect on teaching practices.
This study’s reflective journaling also suggested that individuals are wearing too many “hats” in the school. For example, the librarian is not only responsible for keeping the library in order and for providing research classes for students in Grades 3-12, but she also runs the books fairs and book week, accompanies the Grade 11 students on an international research visit, supports the Extended Essay class for Grade 11, and serves as an extended essay supervisor for two students. Where is the time for developing the research curriculum with the other stakeholders?

I assert that we need to take a step back and ask a fundamental question: **What do we want our students to learn?** Like so many other schools, LCIS started with the premise that “we were behind.” LCIS recognized that it did not have adequate digital tools and began to ramp up its investment in technological tools. Discussions centered around what devices we needed, instead of how those devices would enhance student learning. That discussion has continued throughout the past eight years, moving from what type of hardware we need to what latest app we need. The participants agreed that LCIS did not lack resources. I posit that decisions about what type of apps and devices we need should be driven by what teachers are teaching and what students are learning.

Chez Vivian (2015), an educational consultant, summarized it best after her attendance at an IB session entitled *Thinking More Deeply about the Role of Technology in the IB Programmes*: "The integration of technology should always drive the implementation of technology and not the other way around" (Vivian, 2015).

Reflecting on my journal entries, it was evident that some key habits of mind need to be put in place:
First, there needs to be a clear focus on student learning outcomes and on what hardware and software best support those outcomes. This approach needs to be accomplished collaboratively with both the teachers and staff to ensure that teachers are clear on their roles and responsibilities.

Second, more needs to be done to build digital citizenship among students. One recommendation suggested by our Academic Technology Director is for LCIS to become certified as a Common Sense Digital Citizenship School. Making digital citizenship a part of our vision and plan, and holding more parent academies on how parents can partner with the schools in this endeavor, coupled with the completion of the Common Sense Digital certification, is a good beginning.

Third, I need to foster a culture of collaboration. The launch of our Professional Learning communities is a start. However, I need to protect teachers’ time. Meetings and training sessions need to be effectively organized, must encourage more sharing and collaboration, and must stay focused on teaching and learning. We are a small institution, and it is easy to divert attention to the many needs of the school: new construction, expanding the PE and Music program, and fundraising needs. An entry I made in my reflective journal following three meetings with teachers across the school indicated that they enjoyed sharing their accomplishments and challenges and wanted to have more discussions about improving teaching and learning at our school. To do this, I need to be more visible and to stay focused on what is important—advancing teaching and learning.

Finally, as a principal and practitioner, I need to demonstrate that I am a connected learner in the realm of technology, and that I myself am using the tools that I
promote. Teachers need to see me modeling use of technology. There are many possible opportunities that I can use to accomplish this. For example, earlier this semester, I took advantage of the international initiative, “An Hour of Code,” to learn coding with fifth-grade students.

**Implications: Practice, Research, and Policy**

The study findings revealed that the LCIS teachers use digital technology in their daily lives and practices. They have strong pedagogical beliefs regarding the integration of digital literacies within the IB. They understand the importance of digital tools and how those tools affect student learning. However, they need more discussion on what digital literacy really means. Findings were consistent with the literature regarding the importance of professional development for teachers.

Moving forward, the administration has built in three professional development days during the next school year. As an IB school, we need to target professional development in strategic fashion. We need to select a few specific training goals for the year and concentrate on those specific goals. Ad-hoc training must be minimized. As a consequence, the school will have fewer training goals per year, but those goals will be met in more systematic and, presumably, more effective fashion.

Digital transformation in an IB setting requires that students to be taught how to be competent and principled digital citizens. Clear policies and practices need to be embedded within the IB school culture, such as by becoming a Common Sense digital citizen school. That program would address important issues of cyberbullying, digital
distraction, and inappropriate online behavior that create classroom management issues. Students would become equipped with skills for how to think critically, behave safely, and participate responsibly in the digital arena.

Finally, the data generated from this study should serve as a catalyst for more conversations between the school and the IBO about defining teacher technological competence and developing clear guidelines for teachers in IB settings. While the IB has recently created two frameworks—Integration vs. Implementation, which explores the thinking that separates the concepts related to technology from the things we use technology for, and Agency, Information, and Design (AID), a framework that operationalizes technology literacy in the IB programmes—these frameworks serve more as a “lens” for viewing the curriculum during lesson, unit, and school planning (International Baccalaureate Organization, n.d.) rather than a document that provides definitions, detail, and clarity.

As we are about to enter the third decade of the 21st century, we cannot deny that today’s students are born into a digital culture. As educators, we have a responsibility to provide our students with the opportunities to understand and profit from this environment. The findings of this study inform my recommendations on how to help teachers change their digital pedagogical practices in ways that can transform student learning.
CONCLUSIONS

Technological tools have re-configured the possibilities for communication and literacy practices. These changes have altered the way teachers must consider literacy practices within the classroom. This study was conducted to examine how digital literacies practices were being implemented within an IB setting. The goal of the study was to inform my practice as a leader and to determine how to create a healthy digital ecology within an International Baccalaureate programme. The survey, focus groups, and the case studies that made up this study offered insight into teachers’ beliefs and challenges when implementing digital literacies and technology integration within an IB setting.

The overall data has revealed that teachers believe that digital literacies are a critical element to student success, and that the “profound shift” that Cope and Kalantzis, (2009) discussed is well underway. However, this shift has created new challenges for teachers when trying to teach this new pedagogy, including digital distraction, teacher competence, and students’ ability to effectively evaluate digital content. The data also suggested that teachers at LCIS have multiple understandings of digital literacies, particularly with regard to the IB curriculum. Teachers can better prepare students for the digital future if they have a better understanding of what is involved in digital literacy as it relates to the IB continuum. More research regarding how digital literacies are being implemented needs to be conducted between IB schools and the IBO.

As a leader, I have explored how I contribute to the implementation of digital literacies practices and the integration of technology within LCIS. Professional
development for this digital era must be current, relevant, and ongoing. Teachers, staff, and administrators must all work together if LCIS is to realize this “profound shift” (Cope & Kalantzis, 2009, p. 172).
### Appendix A: Dissertation Work Plan and Timeline

<table>
<thead>
<tr>
<th>Date</th>
<th>Activity</th>
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<tbody>
<tr>
<td>January 23&lt;sup&gt;rd&lt;/sup&gt; - February 7&lt;sup&gt;th&lt;/sup&gt;</td>
<td>Revise proposal and submit to chair</td>
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<tr>
<td>February 8&lt;sup&gt;th&lt;/sup&gt; - 20&lt;sup&gt;th&lt;/sup&gt;</td>
<td>Chair is reviewing revised proposal</td>
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<tr>
<td>February 20&lt;sup&gt;th&lt;/sup&gt; - 22&lt;sup&gt;nd&lt;/sup&gt;</td>
<td>Mid Career Weekend</td>
</tr>
<tr>
<td>February 26&lt;sup&gt;nd&lt;/sup&gt;</td>
<td>Meeting with Chair to review feedback</td>
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<tr>
<td>February 23&lt;sup&gt;rd&lt;/sup&gt; - 27&lt;sup&gt;th&lt;/sup&gt;</td>
<td>Make additional revision based on feedback from Chair</td>
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<tr>
<td>March 6&lt;sup&gt;th&lt;/sup&gt;</td>
<td>Resubmit dissertation proposal with suggested revision to Chair</td>
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<tr>
<td>March 20&lt;sup&gt;th&lt;/sup&gt; - 22&lt;sup&gt;nd&lt;/sup&gt;</td>
<td>Mid Career Weekend</td>
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<tr>
<td>March 22&lt;sup&gt;nd&lt;/sup&gt;</td>
<td>Review revisions with Chair</td>
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<tr>
<td>March 29&lt;sup&gt;th&lt;/sup&gt;</td>
<td>Submit final changes to my Chair</td>
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<tr>
<td>April 2&lt;sup&gt;nd&lt;/sup&gt;</td>
<td>Speak with Chair about finalizing my proposal hearing based on latest changes made</td>
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<tr>
<td>April 5-9</td>
<td>Begin drafting document for the Institutional Review Board (IRB)</td>
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<tr>
<td>April 24&lt;sup&gt;th&lt;/sup&gt; – 26&lt;sup&gt;th&lt;/sup&gt;</td>
<td>Mid Career Weekend</td>
</tr>
<tr>
<td>Week of April 24&lt;sup&gt;th&lt;/sup&gt;</td>
<td>Tentative Proposal hearing</td>
</tr>
<tr>
<td>April 28&lt;sup&gt;th&lt;/sup&gt;</td>
<td>Send MOU to Chair summarizing changes that need to be made following hearing</td>
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<tr>
<td>April 30&lt;sup&gt;th&lt;/sup&gt;</td>
<td>Submit to IRB</td>
</tr>
<tr>
<td>April 30&lt;sup&gt;th&lt;/sup&gt; - May 8&lt;sup&gt;th&lt;/sup&gt;</td>
<td>Make changes based on feedback from IRB</td>
</tr>
<tr>
<td>May 8&lt;sup&gt;th&lt;/sup&gt;</td>
<td>Begin inviting participants and ensure consent forms are signed</td>
</tr>
<tr>
<td>May 11&lt;sup&gt;th&lt;/sup&gt; - 15&lt;sup&gt;th&lt;/sup&gt;</td>
<td>Conduct interviews</td>
</tr>
<tr>
<td>May 18&lt;sup&gt;th&lt;/sup&gt; - June 5&lt;sup&gt;th&lt;/sup&gt;</td>
<td>Conduct observations (at least two observations on each teacher)</td>
</tr>
<tr>
<td>May 29&lt;sup&gt;th&lt;/sup&gt; - 31&lt;sup&gt;st&lt;/sup&gt;</td>
<td>Mid Career Weekend</td>
</tr>
<tr>
<td>May 27&lt;sup&gt;th&lt;/sup&gt; - June 3&lt;sup&gt;rd&lt;/sup&gt;</td>
<td>Do a research memo</td>
</tr>
<tr>
<td>June 12&lt;sup&gt;th&lt;/sup&gt; - 14&lt;sup&gt;th&lt;/sup&gt;</td>
<td>Mid Career Weekend</td>
</tr>
<tr>
<td>July 1&lt;sup&gt;st&lt;/sup&gt; - 19&lt;sup&gt;th&lt;/sup&gt;</td>
<td>Organize and begin analyzing data</td>
</tr>
<tr>
<td>July 19&lt;sup&gt;th&lt;/sup&gt; - 24&lt;sup&gt;th&lt;/sup&gt;</td>
<td>Mid Career Summer Week</td>
</tr>
<tr>
<td>July 21&lt;sup&gt;st&lt;/sup&gt;</td>
<td>Meet with Chair about initial findings- discuss any issues or concerns I may be having- Revise timeline if needed</td>
</tr>
<tr>
<td>August 10&lt;sup&gt;th&lt;/sup&gt; - 31&lt;sup&gt;st&lt;/sup&gt;</td>
<td>Continue analyzing data and begin writing about results</td>
</tr>
<tr>
<td>September 1&lt;sup&gt;st&lt;/sup&gt; - 12&lt;sup&gt;th&lt;/sup&gt;</td>
<td>Collect and/or complete observations if more data is needed</td>
</tr>
<tr>
<td>Date</td>
<td>Event Description</td>
</tr>
<tr>
<td>-----------------</td>
<td>------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>September 15th</td>
<td>Submit preliminary draft of Findings chapter to chair-if no additional data is needed</td>
</tr>
<tr>
<td>September 18th-20th</td>
<td>Mid Career Weekend</td>
</tr>
<tr>
<td>September 20th</td>
<td>Meet with Chair</td>
</tr>
<tr>
<td>September 28th</td>
<td>Meet with chair to review feedback on Findings chapter of the dissertation</td>
</tr>
<tr>
<td>October 1st-15th</td>
<td>Revise Findings chapter and submit to chair</td>
</tr>
<tr>
<td>October 23rd-25th</td>
<td>Mid Career Weekend</td>
</tr>
<tr>
<td>October 25th</td>
<td>Meet with chair to review the revised Findings chapter</td>
</tr>
<tr>
<td>November 1st-15th</td>
<td>Draft “Discussions” chapter of dissertation</td>
</tr>
<tr>
<td>November 20th-22nd</td>
<td>Mid Career Weekend</td>
</tr>
<tr>
<td>November 22nd</td>
<td>Meet with chair to discuss revisions on the Discussions chapter of the dissertation</td>
</tr>
<tr>
<td>December 4th-6th</td>
<td>Mid Career Weekend</td>
</tr>
<tr>
<td>December 1st-15th</td>
<td>Revise final chapter based on feedback from November 22nd</td>
</tr>
<tr>
<td>December 18th</td>
<td>Submit revisions of Discussion chapter to Chair</td>
</tr>
<tr>
<td>December 29th-January 11th</td>
<td>Revise chapters 1, 2, and 3 of the dissertation</td>
</tr>
<tr>
<td>January 11th</td>
<td>Submit revised chapters 1-3 to Chair</td>
</tr>
<tr>
<td>January 29th-31st</td>
<td>Mid Career Weekend</td>
</tr>
<tr>
<td>January 31st</td>
<td>Meeting with Chair about revisions to Discussion chapter and revisions on chapters 1-3</td>
</tr>
<tr>
<td>February 1st-8th</td>
<td>Make final revisions on Discussion chapter</td>
</tr>
<tr>
<td>February 8th</td>
<td>Submit final revision to discussion section to chair</td>
</tr>
<tr>
<td>February 9th-20th</td>
<td>Make revisions to Chapters 1-3</td>
</tr>
<tr>
<td>February 20th</td>
<td>Submit revisions of Chapters 1-3 to chair</td>
</tr>
<tr>
<td>February 19th-21st</td>
<td>Mid Career Weekend</td>
</tr>
<tr>
<td>February 21st</td>
<td>Meet with Chair about chapters 4 (Results) and 5 (Discussion)</td>
</tr>
<tr>
<td>March 14th</td>
<td>Review feedback with Chair about Chapters 1-3 and hopefully set a date for defending dissertation</td>
</tr>
<tr>
<td>March 14th-31st</td>
<td>Make changes final changes to dissertation and submit to committee on April 1st</td>
</tr>
<tr>
<td>March 18th-20th</td>
<td>Mid Career Weekend</td>
</tr>
<tr>
<td>March 21st</td>
<td>Meeting with Chair to finalize date for dissertation and speak about any additional needed revisions</td>
</tr>
<tr>
<td>Week of April 18th</td>
<td>Defend dissertation</td>
</tr>
<tr>
<td>April 20th-June 1st</td>
<td>Make revisions to dissertation based on feedback from the committee</td>
</tr>
<tr>
<td>June 1st</td>
<td>Re-submit Dissertation for final approval</td>
</tr>
</tbody>
</table>
Appendix B: Methodology Matrix

<table>
<thead>
<tr>
<th>Objective</th>
<th>Methodology</th>
<th>Additional Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>R1: teachers’ attitudes, beliefs or personal experiences with technology</td>
<td>Survey for 49 teachers - conducted in June 2014</td>
<td>Interview: with participants, questions to address this particular research questions - Conducted in Late May and June 2014</td>
</tr>
<tr>
<td>R2: “technology integration” within the IB programme</td>
<td>Survey for 49 teachers - conducted in June 2014</td>
<td>Interview: with participants, questions to address this particular research questions - Conducted in Late May and June 2014</td>
</tr>
<tr>
<td>R3 How does it influence my work as a school leader?</td>
<td>Survey for 49 teachers - conducted in June 2014</td>
<td>Interview: with participants, questions to address this particular research questions - Conducted in Late May and June 2014</td>
</tr>
<tr>
<td></td>
<td>4 Observations on each participant as they teach a 45 minute lesson utilizing some aspects of digital literacies - Two to be conducted at the end of the school year and two at the beginning of the school year</td>
<td>Reflective Journaling: description of what occurs in my school site regarding technology integrations:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1. Parent Academy on technology - attend 2 meetings before the end of the school year and two in the beginning of the school year</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Management meeting - technology/ curriculum is a key focus. Again attend two at the end of the school year and two at the beginning</td>
</tr>
</tbody>
</table>
3. Professional learning communities-
   Attend two at the of the school year and two at the beginning

| Artifacts: evidence of any interactions with social media/blogs | Collection of artifacts: weekly lesson plans or units of study teacher have created which incorporate digital literacies or technology integration and professional developments they may have attended which support digital literacies or technology integration; samples of their website sites and digital portfolios | Research memo on the meeting described above |
| Research memo: following the first interview | Research memo: after I have conducted a first observation on each teacher |  |
Appendix C: Interview Protocol

I will conduct one semi-structured interview that will consist of open-ended questions. Each interview will be conducted for about 45 minutes. Each interview will be recorded.

Building Rapport:

- Please tell me about your personal and professional goals?
- Please tell me about why you chose education as your career?

**RQ1: How have teachers’ attitudes, beliefs or personal experiences with technology shaped their instructional practices?**

1. Do you use technology for your personal use?
2. How did your teacher education courses prepare you for using technology to support teaching and learning?
3. What do you think it looks like when technology is being integrated into a lesson?
4. What value do you believe student use of technology adds to their learning?
5. Do you think that using technology (i.e., Internet, creating a digital text) in your literacy instruction requires any skills that a traditional lesson would not?

**RQ 2: How have teachers interpreted “technology integration” within the IB programme and how has the programme influenced their teaching of digital literacies practices and technology?**

6. What does the term literacy mean to you?
7. What does the term digital literacy mean to you?
8. How do you approach literacy education in your classroom?
9. What affects how often you integrate technology in your literacy lessons?
10. Describe the most effective lesson you have taught that integrated technology.
11. How does technology integration affect student behaviors? Engagement?

12. What workshops have been provided by the school on how to use digital literacies practices for teaching and learning? Describe the ones that have affected your teaching the most?

13. What limitations do you perceive as obstacles to including technology and integrating “digital literacies” within the IB programme?

14. Are there any disadvantages to integrating digital literacies within the IB programme? Advantages?

RQ 3: **What happens when I, as a school administrator begin to explore how the school’s vision of technology integration is influencing the implementation of digital literacies within the IB Programme. How does it influence my work as a school leader?**

1. Does LCIS have a clear vision for technology integrations and/or the use of new literacies within the IB programme?

2. How are you required to use technology in your current teaching position?

3. How does LCIS support teachers in integrating digital literacies practices?

4. What limitations do you perceive as obstacles to including technology and integrating it into your classroom?

5. To what extent do you feel the administration supports the integration of digital literacies with the IB programme?
Appendix D: Classroom Observation Form (Sample)

Teacher: Ava

Subject: HUMANITIES

Grade: 10

Number of Students: 16

Time: 90 minutes

Date: September 16, 2015

<table>
<thead>
<tr>
<th>Lesson Structure</th>
</tr>
</thead>
<tbody>
<tr>
<td>What is the learning objective?</td>
</tr>
<tr>
<td>Objective:</td>
</tr>
<tr>
<td>1. To work on Approaches to Learning (ATL’s) in relation to Communication</td>
</tr>
<tr>
<td>2. To research specific battles that took place during the First World War</td>
</tr>
<tr>
<td>3. To work collaboratively with a partner (s) and present their findings in a coherent and logical manner to the rest of the class</td>
</tr>
<tr>
<td>Is the learning objective evident to the students? Does he/she explain the concepts clearly?</td>
</tr>
<tr>
<td>---</td>
</tr>
<tr>
<td>□ Not Evident</td>
</tr>
</tbody>
</table>

**Evidence:** Upon my observation students were on day two of their project. They clearly knew what to do. When I entered, Anna quickly recapped the lesson then students got into their pairs and began working on completing their presentations.

<table>
<thead>
<tr>
<th>Does the teacher explicitly refer to Unit of Inquiry, Concepts, Criteria, either out loud, on the board, or on the portal?</th>
<th>□ Evident</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ Not Evident</td>
<td>□ Unable to determine</td>
</tr>
</tbody>
</table>

**Evidence:**

<table>
<thead>
<tr>
<th>Does the lesson link the objective and activities to one another?</th>
<th>☑ Evident</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ Not Evident</td>
<td>□ Unable to determine</td>
</tr>
</tbody>
</table>

**Evidence describe why or why not:**

<table>
<thead>
<tr>
<th>Does the teacher link the lesson to student prior knowledge?</th>
<th>☑ Evident</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ Not Evident</td>
<td>□ Unable to determine</td>
</tr>
<tr>
<td>Evidence (describe why or why not):</td>
<td></td>
</tr>
<tr>
<td>--------------------------------------</td>
<td></td>
</tr>
<tr>
<td>Identify grouping:</td>
<td></td>
</tr>
<tr>
<td>Battle of Somme: Pair A</td>
<td></td>
</tr>
<tr>
<td>Battle of Verdun: Pair B</td>
<td></td>
</tr>
<tr>
<td>Battle of Jutland: Pair C</td>
<td></td>
</tr>
<tr>
<td>Battle of Gallipoli: Pair D</td>
<td></td>
</tr>
<tr>
<td>Battle of Ypres: Pair E (three students)</td>
<td></td>
</tr>
<tr>
<td>Is the teacher prepared?</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Evidence: While I did not request it. A detailed lesson plan was submitted to me ahead of my observation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identify Instructional Practice?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Not Evident</th>
<th>Unable to determine</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Whole Group</th>
<th>Small Group</th>
<th>Paired</th>
<th>Individual</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Lesson Plan</th>
<th>Standards on the board</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Student creation</th>
<th>Student collaboration</th>
</tr>
</thead>
</table>
What level of thinking was reinforced during the lesson?

| Teacher-directed Q & A                     |
| Lecture                                     |
| Student investigation                       |
| Teacher modeling                            |
| Practice Opportunities                      |
| Print Media                                 |
| Digital Media                               |

- Recalling facts and ideas (knowledge)
- Understanding Information (comprehension)
- Using Information in a new way (application)
- Breaking Into parts (analysis)
- Putting Information together in a new way (synthesis)
- Making judgments and justifying positions (evaluation)
### Focus on the Learner

<table>
<thead>
<tr>
<th>Student Actions</th>
<th>Evidence:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Listening</td>
<td>The very nature of the assignment encouraged students to use all actions. They needed to listen to each other’s presentations, work collaboratively, present, apply their knowledge and speak effectively.</td>
</tr>
<tr>
<td>Hands on activities</td>
<td></td>
</tr>
<tr>
<td>Reading</td>
<td></td>
</tr>
<tr>
<td>Writing</td>
<td></td>
</tr>
<tr>
<td>Speaking</td>
<td></td>
</tr>
<tr>
<td>Use of Digital Media</td>
<td></td>
</tr>
</tbody>
</table>

### Use of technology Integration

<table>
<thead>
<tr>
<th>Use of technology Integration</th>
<th>Evidence:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manipulatives</td>
<td>The very nature of the assignment encouraged students to use all actions. They needed to listen to each other’s presentations, work collaboratively, present, apply their knowledge and speak effectively.</td>
</tr>
<tr>
<td>Software (specific apps)</td>
<td></td>
</tr>
<tr>
<td>I-Pads</td>
<td></td>
</tr>
<tr>
<td>Use of Computers</td>
<td></td>
</tr>
<tr>
<td>Lab Activity</td>
<td></td>
</tr>
</tbody>
</table>
| How do you rate the level digital literacy tools/strategies that the teacher implemented? | □ Too many (technology for technology’s sake)  
☑ Appropriate for the task (students were motivated and engaged)  
□ Not enough (there were times technology could have been implemented effectively) |
| Evidence: Students were asked to create a PowerPoint presentation via Google docs. |
| Level of class engagement | ☑ Highly engaged (Most students are authentically engaged)  
□ Well managed (Students are willingly compliant, ritually engaged)  
□ Somewhat engaged |
| Dysfunctional (Many students activity reject the assignment or substitute another activity) |
| Description: All students were actively engaged. |
| Classroom Environment | Materials are available in the classroom |
| | Models/exemplars of quality work posted |
| | Routines and procedures are evident |
| | Students interact with classroom environment |
| | Student work is displayed |
| | Unit of Inquiry is posted |
| | Criteria is given to the students |
| Description: Evidence that teacher is responding to different needs | A lot |
| | Some |
| | None |
| | Unable to determine |
| Evidence: |
Observer Reflection: In what ways has the lesson you’ve observed impacted your thinking about digital literacies within the IB programme? As students engage with the MYP, the goal is for them is to become aware of the importance of what the IB terms “approaches to learning (ATL) thinking, research, self-management, social, and communication.” These skills are sets of strategies and techniques that people use to achieve a specific purpose. Skills can be practiced and continually improved. For this particular lesson, Anna was focused on the ATL of communication: exchanging thoughts, messages and information effectively through interaction.

This is my second time observing Anna. She consistently utilizes some aspect of technology, and digital literacies within each of her lessons. Yet, I have noticed that she is very deliberate in how she goes about this. She is following what she shared in the interview: “we cannot integrate technology for technology’s sake.”

For this particular lesson, the students had been studying causes of World War I and trench warfare. However, they had not looked at specific battles. Thus, another one of Anna’s objectives was to do some research skills on a set of battles she had chosen. More specifically, she wanted them to focus on the technologies of the war and how the events of the battle had immediate and long-term effects on World War I. To that end, students had to utilize their research skills. Students were required to include information about the battle, e.g. location, date and who was involved, strategies of the war and the course of the war, technologies used, the main events of the battle and the results of the battle. Finally, students were encouraged to
use images and videos anything else they felt applicable and appropriate within their PowerPoint presentation.

Upon entering the classroom, students were reminded of the task that they were to complete by the end of the first class period. As soon as Ava announced that they could work independently for the next 50 minutes, students got right to work. Students were completely engaged, asking questions and researching. The lesson clearly integrated collaborative problem-solving skills as the students had to work together to figure out how to present all the information in a logical manner and within the time requested. Each pair created no more than 12 PowerPoint slides, and all incorporated various pictures relating to their topic. One of the groups incorporated a video. What struck me the most was that I knew most of these students and they are extremely creative and digitally competent. Thus, the lack of risk students took within the assignment, despite Ava’s urging, was interesting. I am attributing this to what Ava shared during her interview, that the students are not experienced at researching. They had to shift through multiple sources to understand and answer the questions about the battle. Thus, I believe that students became more focused on this task rather than on the presentation and the PowerPoint. Additionally, they had to speak on an assigned topic, not whatever they wanted. Another thing I noticed is that only one student handwrote notes to use as a part of her presentation. Finally, I believe that the students struggled with being able to adapt what one produces for various contexts and audiences.

Sadly, I was only able to see presentation from three of the five groups. Of the three groups I observed, only the first
group presented with confidence and ease. The PowerPoint was well put together and they clearly knew their battle. They experimented with fonts and style throughout the PowerPoint. The second group was the only group to embed a video, but they were both very nervous giving their presentation. Further, their presentation followed Ava’s guidelines to the letter, meaning each slide was labeled with her main things to cover: Who, Where, etc. Again, emphasizing that they had a struggle with the research.
Appendix E: Survey

Digital Literacies

The International Baccalaureate Organization (IBO) encourages the teaching of digital literacies. Scholar and author Cathy Davidson explains:

Digital literacy means not only learning but experimentation, process, creativity, not just technology but multimedia imagination, expression—and principles too. It means learning why we don’t have to just be consumers of technology but also active participants in its flourishing. Digital literacy helps us to believe in and fight for the Web (Now You See It, 2011).

IB teachers are encouraged to establish a culture that critically engages students with technology and that supports them in developing a social awareness of how technology is used to convey meaning and information. Teachers must demonstrate how communication is represented in different contexts and to different audiences (e.g. visual, audio or textual modes) and must teach students how to critically evaluate and select relevant information. With this in mind, I would like to understand how technology is being utilized at LCSB.

The survey was created as part of my dissertation. My research is focusing on examining the forces, contexts and situations that influence how digital literacies are perceived, taken up, or resisted at an IB school. This study will provide an opportunity to carefully examine what teachers are experiencing within the IB curriculum as they learn about and work with digital literacies.

Additionally, we will utilize the information to enhance professional development where technology is concerned. The survey is anonymous - so, please answer freely and honestly!

The survey should not take any longer than 10 minutes.

Thank you for taking the time to complete.

Sincerely,

Stacey

Background Questions

1. What is your gender?
   - Female
   - Male
2. What is your age group?

- 21-30
- 30-40
- 41-50
- over 50

3. What grades have you taught? (Check all that apply.)

- JFK
- PRE-K
- Kindergarten
- Grade 1
- Grade 2
- Grade 3
- Grade 4
- Grade 5
- Grade 6
- Grades 7-8
- Grades 8-9
- Grades 10-12

Personal Technology Practices
4. Which of the following technologies do you currently use? (Check all that apply.)

- Email address (school or personal)
- Collaborative Tools (e.g. Google docs, Office Suite)
- Mediums of Communication (e.g. Skype, Whatsapp, Facetime, Texting)
- Movie or music streaming (e.g. iTunes, Pandora Amazon, Netflix)
- Online Commerce (e.g. banking, shopping)
- Online subscriptions (e.g. magazines and newspaper)
- Social Networking (LinkedIn, Instagram, Twitter, Pinterest or Tumblr)
- Cloud file storage (e.g. Drop box, i-cloud, Box)
- Other (please specify):

5. Which of the following devices do you have and how do you use them?

<table>
<thead>
<tr>
<th>Device Description</th>
<th>University or PD</th>
<th>Networking</th>
<th>Teaching</th>
<th>Personal Life</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smart phone (inclusive of data plan, camera and apps)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Laptop computer</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>or desktop computer</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tablet (e.g. iPad, Galaxy tab, etc.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Basic e-reader (e.g. Kindle, Nook, e-books)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>iPod/MP3 player</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Other (please specify):

197
Digital Literacy

Traditionally, literacy refers to reading, writing, listening, and speaking (Holm & Gahala, n.d.). Digital literacy is “a shorthand for the myriad social practices and conceptions of engaging in meaning making mediated by texts that are produced, received, distributed, exchanged, etc., via digital codification” (Lankshear and Knobel, 2008, p. 5). As you answer the next set of questions, please keep the definition of digital literacy in mind.

Influences On Existing Pedagogical Practices with Technology

6. How would you rate your skill set in implementing digital literacies within the classroom?
- Novice
- Component
- Proficient
- Advanced

7. Please rank the activities which impact your implementation of digital literacies within the classroom, with 1 as the most important and 10 as the least important.

- School workshops
- Conferences attended outside of LCIS
- School vision and mission
- IB programme
- Professional Learning Communities
- Prior training
- Curricular materials
- Your own personal technological use
- Inspiration from materials on the internet
- Inspiration from student activities
8. Based on your rankings in question 7, why is your number 1 choice most helpful?

9. Based on your rankings in question 7, why is your number 10 choice least helpful?

10. Please provide two examples of how you are implementing digital literacies within your classroom.

11. Which of the following do you, or will you, utilize when implementing digital literacies within the classroom?

- You give students the opportunity to work collaboratively in virtual environments to learn from and with each other.
- You create tasks where students are required to conduct research.
- You teach students strategies for evaluating the quality of information students find on the internet.
- You create/use a website and invite students to use it to continue class discussions and bring in outside voices.
- You use YouTube videos, Ted Talks, movie streaming, or other similar formats.
- You use social networking (LinkedIn, Instagram, Twitter, Pinterest, or Tumblr).
- All of the above
- None of the above

12. Which of the technological devices or software apps do you access the most for teaching and learning within the classroom? (Check all that apply.)

- Hardware (e.g. iPads, digital cameras, Chromebooks, laptops)
- Utilization of STEM resources
- Collaborative Tools (e.g. Google docs, Office Suite)
- Software (e.g. Raz Kids, Discovery, Glogsters)
- Videos (e.g. YouTube, streaming movies, Netflix)
- All of the above
- None of the above

13. What limitations are there to including technological resources and integrating "digital literacies" within the classroom?
Teacher Beliefs and Attitudes

14. Do you believe that implementing technology into the curriculum is important for student success? Why or why not?

15. While there is no specific, required time to dedicate to the use of technology in teaching and learning, in your opinion, how often should one implement technology within the IB programme at LCIS for teaching and learning?
   - Once a week
   - Three times a week
   - Daily
   - Whenever I feel it is appropriate

16. Which of the following do you feel best represents the technological vision at LCIS?
   - To transform and revitalize teaching and learning by integrating Science, Technology, Engineering, Arts, and Mathematics (STEAM) in JPK to 12th Grades.
   - To use technology to effect social change and impact the future by integrating Science, Technology, Engineering, Arts, and Mathematics (STEAM) in JPK to 12th Grades.
   - To become the leading technological school in the Caribbean.
   - I am not sure.
Appendix F: Coding Matrix

Categorization of factors influencing the use of technology in the teaching of an IBDP curriculum. The use of technology in the classroom demands appropriate and effective usage, real-time monitoring, strategic inclusion, and professional development.

Pedagogical beliefs and practices shaping implementation of digital literacies and technology integration. All learners are reached via the effective use of digital literacies, which allows for meaningful instruction.

School’s vision of encompassing technology integration, and its influence on implementing digital literacies. Educators need support as they achieve technological competency, and are held accountable for instruction.

Embedding digital literacies in an IBDP setting requires a strategic vision, an efficacious support system, achievable technological competency, and a balanced approach to instruction by all stakeholders.
## Appendix G: Coding Details

<table>
<thead>
<tr>
<th>Definition of Code</th>
<th>Category</th>
<th>Themes</th>
<th>Theory</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Resources</strong></td>
<td>Factors influencing the use of technology in the teaching of an IB curriculum.</td>
<td>The use of technology in the classroom demands appropriate and effective usage, real time monitoring, strategic inclusion and professional development.</td>
<td>Embedding digital literacies in an IB setting requires a strategic vision, an efficacious support system, achievable technological competency, and a balanced approach to instruction by all stakeholders.</td>
</tr>
<tr>
<td><strong>Support</strong></td>
<td>Support from Administration and IT team is a constant priority and must be aligned.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Attention</strong></td>
<td>Attention needs to be placed on the generational divide as underscored by personal understanding of competency.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Professional Development</strong></td>
<td>Professional development and collaborative opportunities must be targeted, strategic and inclusive of proper use of digital literacies.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Allocation of time</strong></td>
<td>Proper allocation of</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

202
<table>
<thead>
<tr>
<th></th>
<th>time continues to be challenging and needs to be recognized as an issue.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Control</strong></td>
<td>Control of classroom and insurance of appropriate use of technology must be monitored.</td>
</tr>
<tr>
<td><strong>Digital</strong></td>
<td>The digital divide as it relates to the IB.</td>
</tr>
<tr>
<td><strong>Balance</strong></td>
<td>A need for balance between traditional and digital literacies is prevalent.</td>
</tr>
<tr>
<td><strong>Pedagogical Belief</strong></td>
<td>A pedagogical belief that digital literacies should not be mutually exclusive</td>
</tr>
<tr>
<td><strong>Use of digital teaching</strong></td>
<td>Proper use of digital literacies allows for active instructional differentiation.</td>
</tr>
<tr>
<td><strong>Pedagogical practice</strong></td>
<td>A tried pedagogical practice indicates that the appropriate use of digital literacies</td>
</tr>
<tr>
<td></td>
<td>Pedagogical beliefs and practices shaping implementation of digital literacies and technology integration.</td>
</tr>
<tr>
<td></td>
<td>All learners are reached via the effective use of digital literacies, which allows for meaningful instruction.</td>
</tr>
<tr>
<td>Classroom Management</td>
<td>The need for classroom management for the teachers is exacerbated by the introduction of technology and digital literacies.</td>
</tr>
<tr>
<td>-----------------------</td>
<td>------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Understanding Technological Competencies</td>
<td>Understanding how technological competency is linked to teaching students a blended curriculum. School's vision of encompassing technology integration, and its influence on implementing digital literacies. Educators need support as they achieve technological competency, and are held accountable for instruction.</td>
</tr>
<tr>
<td>Technological Competencies</td>
<td>Teacher awareness of expectations and requirements involving technology is critical; teacher internal expectation Bridging the gap as it relates to implementation</td>
</tr>
<tr>
<td>Anxiety linked to complexity, expectation &amp; teachers lead</td>
<td>Anxiety linked to complexity, expectation, and level of teacher familiarity with technology tools is real.</td>
</tr>
<tr>
<td>Accountability of teacher matter</td>
<td>Bridging the gap as it relates to implementation</td>
</tr>
</tbody>
</table>
n of digital literacies is necessary between administrators and teachers. How to make teachers feel supported. How to schedule PD, conferences and demonstrations for maximum impact.
## Appendix H: Survey Response

<table>
<thead>
<tr>
<th>Question</th>
<th>Number of Respondents</th>
<th>Number of Respondents who skipped</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. What is your gender?</td>
<td>45</td>
<td>0</td>
</tr>
<tr>
<td>2. What is your age group?</td>
<td>45</td>
<td>0</td>
</tr>
<tr>
<td>3. What grades have you taught? (Check all that apply.)</td>
<td>45</td>
<td>0</td>
</tr>
<tr>
<td>4. Which of the following technologies do you currently use? (Check all that apply.)</td>
<td>45</td>
<td>0</td>
</tr>
<tr>
<td>5. Which of the following devices do you have and how do you use them?</td>
<td>45</td>
<td>0</td>
</tr>
<tr>
<td>6. How would you rate your skill set in implementing digital literacies within the classroom?</td>
<td>37</td>
<td>8</td>
</tr>
<tr>
<td>7. Please rank the activities, which impact your implementation of digital literacies within the classroom, with 1 as the most important and 10 as the least important.</td>
<td>36</td>
<td>9</td>
</tr>
<tr>
<td>8. Based on your rankings in question 7, why is your number 1 choice most helpful?</td>
<td>31</td>
<td>14</td>
</tr>
<tr>
<td>9. Based on your rankings in question 7, why is your number 10 choice least helpful?</td>
<td>30</td>
<td>15</td>
</tr>
<tr>
<td>10. Please provide two examples of how you are implementing digital literacies within your classroom.</td>
<td>30</td>
<td>15</td>
</tr>
<tr>
<td>11. Which of the following do you, or will you, utilize when implementing digital literacies within the classroom?</td>
<td>35</td>
<td>10</td>
</tr>
<tr>
<td>Question</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>------------------------------------------------------------------------</td>
<td>-----</td>
<td>----</td>
</tr>
<tr>
<td>12. Which of the technological devices or software apps do you access the most for teaching and learning within the classroom? (Check all that apply.)</td>
<td>35</td>
<td>10</td>
</tr>
<tr>
<td>13. Do you believe that implementing technology into the curriculum is important for student success? Why or why not?</td>
<td>32</td>
<td>13</td>
</tr>
<tr>
<td>14. While there is no specific, required time to dedicate to the use of technology in teaching and learning, in your opinion, how often should one implement technology within the IB programme at LCIS for teaching and learning?</td>
<td>36</td>
<td>9</td>
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<td>15. While there is no specific, required time to dedicate to the use of technology in teaching and learning, in your opinion, how often should one implement technology within the IB programme at LCIS for teaching and learning?</td>
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<td>9</td>
</tr>
<tr>
<td>16. Which of the following do you feel best represents the technological vision at LCIS?</td>
<td>36</td>
<td>9</td>
</tr>
</tbody>
</table>


Descriptive and inferential statistics. (n.d.). Retrieved from


