ABSTRACT

SIMMONS, BRANDON DEAN. The Professional Development Needs of School-Based Leadership in Preparation for a District-Wide One-to-One Initiative in a Large Urban School District

The purpose of this study was to determine the professional development needs of school-based leadership in preparation for a district-wide one-to-one initiative in a large urban school district. This study used an explanatory sequential mixed methods design to answer the three research questions that drove the study. Research for this study was conducted in one of the top 20 largest school districts in the United States with over three hundred school leaders (principals and assistant principals) fully completing the Likert-Scale professional development survey (phase I) and six district leaders participated in follow-up semi-structured interviews (phase II) to discuss survey results and potential solutions to the needs that emerged. The results of the first phase of this study showed that the recruitment and retention of public private partnerships, leading an online meeting, establishing long-term technology refresh plans, and updating school budgets as areas of professional development need for school leaders. In the second phase of the study, district leaders suggested that school districts in preparation for an one-to-one initiative should ensure that every school had a full-time instructional technology facilitator. District leaders also suggested that school districts should provide professional development to school leaders via blended learning models where school leaders would attend face-to-face trainings during summer break or on dedicated teacher workdays followed by extensive online follow-up trainings, and mandatory professional learning team participation.
The Professional Development Needs of School-Based Leadership in Preparation for a District-Wide One-to-One Initiative in a Large Urban School District

by
Brandon Dean Simmons

A dissertation submitted to the Graduate Faculty of North Carolina State University in partial fulfillment of the requirements for the degree of Doctor of Philosophy

Curriculum and Instruction

Raleigh, North Carolina
2015

APPROVED BY:

_______________________________ ________________________________
Dr. Kevin Oliver Dr. Jenifer Corn
Committee Chair

_______________________________ ________________________________
Dr. Ellen Vasu Dr. Lance D. Fusarelli
DEDICATION

This study is dedicated to everyone who said "I Couldn't", "I Shouldn't", or that "I Wouldn't"... You motivate and drive me every day! Thank You!
ACKNOWLEDGEMENTS

The Doctorate process should be considered a process of change. Over the last four years I have changed drastically both personally and professionally. There are so many people I need to thank.

First, I want to think my Lord and Savior, Jesus Christ, for all my many blessings for which I do not deserve. You have lit a fire in my heart to be the best and have provided me the desire and determination to never quit.

To my parents: Dad, thank you for setting a true example of what a work ethic is and should be. Thank you for teaching me to always be the provider my family deserves and for teaching me that no one should ever out work you. Mom, thank you for all the many nights you stayed up helping me with my homework, studying for tests, or pushing me to do my very best academically. I would not be Dr. Brandon D. Simmons, if it was not for you.

To my wife, Stacy: Thank you for allowing me to be me and for allowing me to chase my dreams. You give me the confidence to reach for my dreams and the safety net I need when I am down or when I fail. I love you so much! You’re a great wife and an even better mother.

To my son, Bryce: I hope you understand how much you are loved and how much you make me a better man. No matter what I accomplish, my greatest achievement will be being your dad!

To my best friend, Hank (my Olde English Bulldogge): Thank you for teaching me how to be a dad and for all the late nights you laid at my feet in the office as I typed away on this and many other research papers. My goal in life is to be the man that you think I am.
To my extended family and Papa Tom: Thank you for your love and support! Also thanks for understanding when I was away chasing my dreams and was unable to be at most family events. I love you all!

To my family members I have lost: (Aunt Sylvia, Papa Ashley, Granny Shirley, and Granny Mary Jewel). There is not one day that goes by that I do not think of you. Your example of how to navigate life has never left me. Our loss is Heaven’s gain!

To my friends who I consider family: Please know how much I am thankful for each one of you. If I had one wish for my children, it would be to have great friends like I am fortunate to have!

To Coach Lewis: Thank you for constant words of advice and encouragement. You gave me my teaching philosophy: “Be a gap filler-Fill the gaps for kids that society has left”. You have been a father to the fatherless for almost three decades and have turned many boys into men! Thank you!

To Coach Dirks: Thank you for believing in me, when I didn’t believe in myself. You always held me to a higher standard and were the first one to chew me out when I did not hold myself to your standard. I will never forget the first night at football practice when you scared me to death, quoting Rick Flair and Full Metal Jacket! WHOOO!

To Dr. Wendy Johnson (Dr. J, Methodist College): I owe you so much! I miss you so much! You gave a young boy, who was the first from his family to go to college, the confidence and belief that he could conquer the world! I will never forget what you taught me: “People will line up to tell you NO….They will tell you that you can’t….They will tell you that you shouldn’t…..Who are they? You are the only one that is qualified to tell you that!” Chase your dreams, and prove them wrong! RIP Dr. J!
To Nancy Baenen: Thank you so much for believing in me, for editing my work (BAENENING), for your understanding and advice. I would not be here without you! You are my Vince Lombardi!

To Dr. Colleen Paeplow: Thank you for your constant words of advice and encouragement. You have mentored me from the beginning and I would not be the researcher I am today without your guidance and support! You are a great co-worker, but a even better friend!

To My WCPSS Family: Whether you edited my work, helped me with SAS programming, or with APA... I would not be Dr. BS without you guys!...I love you all!

To Dr. Florence Martin: Thank you for teaching me how to write. For several months, we met via Skype to discuss my progress (academic writing) and to discuss how I could improve my writing. I would not have the confidence to finish my dissertation at NC State without you! Thank you so much!

To Dr. Kevin Oliver: There was so many times you could have given up on me. My first drafts were so bad and it took a long time for me to understand really what I was doing. Thank you all your many edits, your words of advice, and for guiding me through this process. You have been with me from the first class to my final paper. Words cannot express my gratitude for all you have done!

To Dr. Jeni Corn: Whenever I was stuck on a certain aspect of this study, I would look to work completed by the Friday Institute and yourself for guidance. Thank you for your guidance, your feedback on my work, and overall guidance you have provided me through this process.
To Dr. Vasu: Thank you for agreeing to serve on my committee and for your feedback. I am truly grateful for your experience and expertise that you have brought to this committee. You have been an integral part of this process. I only wish I could have taken a class with you during my time at NC State.

To Dr. Fusarelli: Thank you for agreeing to serve on my committee. You were one of my favorite professors and it was important to me that you were a part of my dissertation committee. Thank you for everything!
BIOGRAPHY

Born in rural Sampson County, North Carolina to loving, hard-working, Christian parents, I spent my childhood playing sports and spending time with family and friends. In 1997, my parents saved for an entire year to purchase my sister and me our first computer. The excitement of that Christmas morning has never left me and the confidence that I return to school with after the Christmas break drives me to ensure every child has equitable access to technology in their earlier years. Digital Literacy, just like reading literacy, is not a skill...it is a right for every child.

After graduation from Methodist College in 2005, I began my graduate education career at East Carolina University in their Master of Arts of Education in Health Education program. This program was offered completely online in an asynchronous format. This program was my first online education experience and it immediately interested me. I felt then, and still today, that distance education and instructional technology could close the gap that socio-economic status and geography position place on students, in K-12 grades, as well as higher education.

After completion of my Master of Arts in Education degree, I decided to go forward at East Carolina University with a second Master of Arts in Education degree with a focus in instructional technology as well as a graduate certificate in Distance Learning and Administration. At that time, I developed a love for technology leadership and a desire to pursue a personal educational portfolio that would fully prepare me to be a future technology leader in K-12 education. It was this desire that convinced me to pursue two Doctorates in Education: a PhD in Curriculum and Instruction with a focus in Instructional Technology and an EdD in Educational Leadership simultaneously. It is my belief, that the large and
demanding course-load over the last five years has prepared me for the increasing large
demands of future educational leadership positions in K-12 education. For me, 21st century
educational leaders need a new skillset that just one of these of degrees could not fully
prepare me for. Online education provided me opportunities, which without technology,
would not have been available to me. For these opportunities, I have become an advocate of
technology implementation in schools at all grade levels as well as utilization of effective and
appropriate online education.

It is my belief that the future of education, as well as our nation, will be fueled by
technology and innovation. We are currently preparing our students for some careers, which
have not been created yet. Twenty years ago the internet was barely available to corporations,
wireless technology was only a hope for the future, and cell phones were large systems, in
bags, inside a person’s car (Lei, Conway, & Zhao, 2007). Only the imaginations of gifted
innovators can predict what future careers and technology advances are in store future
generations, but as educators must begin, now, preparing future generations for these future
needs by providing them with the technological literacy required to understand future
innovations and technological needs.

Technology cannot just be a subject we teach or a topic we cover, it must be
immersed into our everyday teaching practices and academic modeling. Adequate
instructional technology integration takes place when technology can be camouflaged into
every lesson, with the subject being the star attraction and the technology serving as an
effective production assistant. Most educators do not realize that technological
advancements, comparable to one- to-one laptop initiative, distance learning, and digital
learning, are present in educational history. A great example of educational innovation is the
introduction of notebook paper and the pencil to the educational setting. In that particular
time period, a pencil and paper for every child was just as new and innovative. Just as now
we do not expect each child to share one pencil and one piece of paper, we should not expect
our children to share one computer among classmates, classes, or even grade levels (Lei,
Conway, & Zhao, 2007). I am a firm believer in the positive effects technology can have at
the elementary school level as well as the upper levels of K-12 education in North Carolina
schools. It is my belief, that we should not be concerned by the initial costs of
implementation, but the long term costs of not implementing technology in our elementary
and upper level K-12 schools in North Carolina.
# TABLE OF CONTENTS

**ACKNOWLEDGEMENTS** ................................................................................................................................. iii

**LIST OF TABLES** ........................................................................................................................................... xv

**LIST OF FIGURES** .......................................................................................................................................... xvi

**CHAPTER I Introduction** ............................................................................................................................... 1
  - Benefits of an One-to-One Initiative ........................................................................................................ 2
  - Purpose of the Study .................................................................................................................................. 5
  - Significance of the Study ............................................................................................................................ 7
  - Methodology Overview ............................................................................................................................. 8
  - Theoretical Framework Overview .......................................................................................................... 8
  - Terminology .............................................................................................................................................. 10
  - Organization of the Study ......................................................................................................................... 11
  - Summary .................................................................................................................................................... 13

**Chapter 2 Literature Review** ....................................................................................................................... 14
  - Background ............................................................................................................................................... 16
  - Key Components of a Successful One-to-One Computing Initiative ...................................................... 17
    - Long-term and short-term planning ...................................................................................................... 18
    - Sustainable funding .............................................................................................................................. 19
    - Continuous professional development ............................................................................................... 24
    - Teacher buy-in ..................................................................................................................................... 25
    - Leadership ............................................................................................................................................ 27
  - Leadership in an One-to-One Computing Initiative .............................................................................. 28
  - Theoretical Framework ............................................................................................................................ 36
    - National Education Standards for Administrators (ISTE-A) ............................................................ 36
    - Visionary leadership .............................................................................................................................. 38
Subjectivity Statement .................................................................................................................. 68
Summary ........................................................................................................................................ 70
Chapter 4 Results ............................................................................................................................ 71
Research Questions .......................................................................................................................... 71
Response Rate .................................................................................................................................. 72
Participants’ Demographics (survey) ............................................................................................... 72
Quantitative Findings: Phase I ......................................................................................................... 74
  Survey reliability .............................................................................................................................. 74
  Descriptive statistics ....................................................................................................................... 75
  School leaders’ knowledge of specified tasks .................................................................................. 76
  Frequency of school leaders’ completing specified tasks ............................................................... 77
  Frequency of school staff completing specified tasks ..................................................................... 82
  Perception of importance of instructional technology tasks .......................................................... 83
PD Differences Among Groups ...................................................................................................... 84
  Leadership Positions .................................................................................................................... 85
  Grade Span of the school ............................................................................................................... 86
  Professional Development Needs and Poverty .............................................................................. 88
  Years’ Experience ......................................................................................................................... 88
  Computer skill-level ....................................................................................................................... 89
Qualitative Findings: Phase II ......................................................................................................... 91
Interview participants ...................................................................................................................... 91
  Interview Participant 1 ................................................................................................................... 91
  Interview Participant 2 ................................................................................................................... 92
  Interview Participant 3 ................................................................................................................... 92
  Interview Participant 4 ................................................................................................................... 92
Blended Learning .................................................................................................................. 141

Instructional Technology Facilitator .................................................................................. 142

Limitations .......................................................................................................................... 143

Recommendations for Practice .......................................................................................... 144

Recommendations for Future Research .............................................................................. 146

Summary and conclusion .................................................................................................... 148

References .......................................................................................................................... 150

Appendices ......................................................................................................................... 169

Appendix A Survey Protocol ............................................................................................... 170

Appendix B Interview Protocol ........................................................................................... 181
LIST OF TABLES

Table 1 Costs and Resources/ Addressed Issues Needed for Implementation ...........................................20
Table 2 Potential Sources of Initiative Funding ..................................................................................73
Table 3 Participant Demographics ........................................................................................................57
Table 4 Participants by Position ..........................................................................................................73
Table 5 Participants by Grade Span ....................................................................................................73
Table 6 Participants Years of Experience .............................................................................................74
Table 7 Participant's Education Level ....................................................................................................74
Table 8 Participants Computer Skill-Level ............................................................................................74
Table 9 Knowledge Results .....................................................................................................................76
Table 10 Frequency of School Leaders Completing Specified Tasks (Mean) ................................................78
Table 11 Frequency of School Leaders Completing Specified Tasks (Percentages) ........................................79
Table 12 Frequency of School Staff Completing Specified Tasks ................................................................82
Table 13 Technology Beliefs ....................................................................................................................83
Table 14 PD Needs by Position .............................................................................................................85
Table 15 PD Needs by Grade Span .......................................................................................................87
Table 16 PD Needs based on Poverty-Level of the School .....................................................................88
Table 17 PD Needs by Years of Experience ............................................................................................89
Table 18 PD Needs by Computer Skill-Level (I know how to) ................................................................90
Table 19 Interview Themes Overview ....................................................................................................94
Table 20 Visionary Leadership Quote Summary ....................................................................................107
Table 21 Ideal Device by Grade Span ..................................................................................................117
Table 22 Ideal Device by Position .........................................................................................................117
Table 23 Ideal Device by School Poverty Level .....................................................................................118
Table 24 Ideal Device by Interview Participant .....................................................................................119
LIST OF FIGURES

Figure 1. Principal's Impact on the Classroom ................................................................. 32

Figure 2. ISTE Standards for Administrators (ISTE, 2009) .............................................. 37

Figure 3. Explanatory Sequential Design (Creswell & Plano-Clark, 2011, p 84).............. 53
Chapter I

Introduction

One-to-one computing initiatives, where every student in a particular class, grade level, entire school, or school district is assigned a personal computing device, originated in states across the United States, such as Maine, Texas, Pennsylvania, Michigan, Florida, and Virginia. Maine was the first state to employ such a technological initiative in 2001 and laid the framework for future statewide initiatives in both Florida and North Carolina. Individual school districts have also taken on the challenge of implementing a variation of a one-to-one computing initiative with the largest school district implementation being in Henrico County, VA.

While preliminary research into one-to-one initiatives focused on student outcomes, and best practices for successful implementation, educational literature has not fully addressed the type of leadership behaviors needed to foster the culture required to obtain the most return on the large investment needed for the implementation and sustainability of an one-to-one computing initiative (Afshari, Bakar, Luan, Samah, & Fooi, 2008; Ertmer, Bai, Khalil, Park, & Wang, 2002; Gibson, 2001; Schiller, 2003; Hayes & Greaves, 2014). Moreover, the role and the importance of school-based leadership in the sustainability of one-to-one initiatives have not been addressed.

While the importance of school-based leadership has been neglected within an one-to-one initiative, there has been prior research that has identified school-based leadership as the most important factor in the long-term success of a school and on long-term growth in student achievement (Afshari et al., 2008 Checkley, 2004; Ertmer, Bai, Khalil, Park, & Wang, 2002; Gibson, 2001; Harvey, 2003; Wilmore & Betz, 2000). Prior research by
Simmons (2014) indicated that leadership is an important factor in the successful implementation and sustainability of a district-wide one-to-one initiative. This study seeks to build on prior research by Simmons (2014) and help identify key leadership behaviors that school-based leadership are lacking or not proficient in, in order to develop training, as well as professional development that will help address these needs before school districts invest large amounts of money and resources into a new learning ecology that school-based leadership are not prepared to lead.

**Benefits of an One-to-One Initiative**

When one-to-one programs are properly implemented, research shows significant increases in student achievement. There has been a large number of research studies who have found student benefits in a one-to-one computing initiatives (Bebell, 2005; Campuzano, Dynarski, Agodini, & Rall, 2009; Goldberg, Russell, & Cook, 2003; Hunter & Greever-Rice, 2007; Hayes & Greaves, 2014; Sheninger, 2014; Mollette et al., 2010; Sclater et al., 2006; Shapley, Sheehan, Maloney, & Camikas-Walker, 2010; Suhr, Hernandez, Grimes, & Warshauer, 2010; Warschauer, 2006; Weston & Bain, 2010). Project RED studied close to 100 one-to-one initiative schools across the country and discovered proper implementation leads to increased academic achievement for students as well as increased graduation rates and decreases in disciplinary actions and dropout rates (Tamim et al, 2011). This large scale, nationwide, longitudinal study, set out to discover the benefits of educational technology and specifically one-to-one programs implemented in schools. Findings show that one-to-one programs allow teachers to individualize learning for all students and students have the ability to learn at their own pace in a very engaging manner. Interventions, in this technology transformed classroom, are student-centered and individualized. These interventions are most
successful with English Language Learners, special education students, and reading interventions programs (Tamim et al, 2011). Project RED discovered that technology transformed interventions in these areas are the top-model predictor of improved standardized test scores, dropout rate reduction, course completion, and improved discipline.

Students are not the only audience that benefit from one-to-one enriched classrooms. Teachers’ role in the classroom and their professional development are also enriched. Over time teachers begin to master the technology that they have in the classroom and begin to consistently implement more media into their lessons. Teachers reported using their laptop in a variety of ways including: developing instructional materials, conducting research related to instruction, and communicating with other teachers (Silvernail & Lane, 2004). The role of the teacher, in the classroom, switches from a lecturer to more of a facilitator role where the teacher guides students through learning (Edwards, 2013; Corn, 2009). This study is focused on the professional development needs of school-based leadership in preparation for a district-wide one-to-one initiative in a large urban school district in the southeastern United States.

**Statement of the Problem**

One-to-one computing initiatives are a large investment, with research showing that the per pupil expense being at least $250 per year (ABELL Foundation, 2008). When multiplied by thousands of students, these initial investments involve millions of dollars in taxpayers' investment into an instructional technology tool. These large investments are seen by some educational leaders as either too expensive, or too risky to undertake at a large scale. This avoidance, by some school districts, is causing a division of students who have access to 21st century tools (e.g. laptops, iPads) and those who do not.
Education administrators are charged with the responsibility of providing comprehensive technology infrastructure to students, teachers, and school staff that promotes effective technology integration with the ultimate goal of adequately preparing students for a world where technology is ubiquitous. The importance of leadership in the development of their students is cited heavily in the research (Fullan, 2014; Elmore, 2003; Marzano et al., 2005; Sergiovanni, 2005; Marzano & Waters, 2009; Dufour & Marzano, 2011). Educational leaders cannot be complacent in regards to the needs of their students and the growing need for increased technology access is one that cannot be ignored.

A review of the literature in this area, however, demonstrates that successful integration of technology in schools requires effective leadership through modeling its use, being visionary, and most importantly acquiring personal proficiency in educational technology (ISTE, 2009, Brooks-Young, 2006; Picciano, 2010), but little is known regarding how prepared educational leaders are to lead these new learning ecologies. More research is needed to determine the current skillset of educational leaders on specific components that research suggests are essential leadership characteristics of successful leaders of one-to-one initiatives.

The school district that this study was focused on has recently proposed and passed a local school bond referendum totaling close to one billion dollars. This new funding will provide the necessary resources to build 16 new schools, renovate seven existing schools, and provide over 124 million dollars for instructional technology. The 124 million dollars budgeted for instructional technology includes funding to increase computer and/or tablet access to a 3 students to 1 computer ratio, provide every teacher a personal laptop for educational use, update every school’s wireless network for faster performance and increased
capacity, and pilot several one-to-one computing initiatives at selected school across the district. It is the goal of district leadership to continue to build on this technology investment through grant funding, public-private partnerships, and fund reallocation with the ultimate goal of the school district having a one-to-one computer to student ratio in the near future. With such a large investment of taxpayers’ money invested, as well as the need for further large public investments, it is imperative that district leadership ensure that school-based leadership is fully prepared to lead schools with new or increased access to technology.

**Purpose of the Study**

The need for creating a strong school-based leadership team is heavily cited in educational research (Fullan, 2014; Hayes & Greaves, 2014; Marzano et al., 2005; Sergiovanni, 2005; Marzano & Waters, 2009; Dufour & Marzano, 2011) and the importance of leadership is crucial to the implementation and sustainability of a large one-to-one initiative (Oliver Molletee, & Corn, 2012; Penuel, 2006; Holcomb, 2009; Hew & Brush, 2006; Hayes & Greaves, 2014). While increased attention has been directed to the need for improved professional development of school-based leadership in general, training in the area of technology has received minimal attention. Part of the reason for a lack of development in this area “has been the struggle to determine the administrator knowledge base needed in technology and the management of technology in the school situation” and the impact this lack of knowledge has on technology use in the classroom (Awalt & Jolly, 1999, p. 4). A review of the literature in this area, however, demonstrates that successful integration of technology in schools requires effective leadership through modeling its use, being visionary, and most importantly acquiring personal proficiency in educational technology (ISTE, 2009, Brooks-Young, 2006; Picciano, 2010).
Twenty-first century schools should be led by leadership teams that represent all stakeholders of the school (Fullan 2014; Dufour and Fullan, 2013; Hargraves and Fullan, 2013; Fullan, 2012). Technology is not only changing how students learn, and how teachers teach, it is also changing the skill sets and leadership styles required for school administrators to successfully lead these new learning environments (Fullan, 2014). These leadership requirements are simply too much for one person to face alone, hence, Assistant Principals, as well as teacher leaders, must play a larger role in leadership decisions within the school (Fullan, 2014; Dufour and Fullan, 2013).

A flaw in technological expertise, at the school-based leadership level, not only affects the individual, but the school, the staff, and the students of the school as well. Many educational administrators, who are uncomfortable with technology, typically lack the visionary leadership to plan, implement, and lead a technological innovation (Gibson, 2001). Instructional technology professional development, for educational leaders, has improved over recent years, but training on the issue is still lacking (Picciano, 2010; Brooks-Young, 2006; Allen, 2003; Gibson, 2001). The implications of ignoring this major issue can affect student achievement and college or career ready graduates for years to come. Research is needed to determine the professional development needs of school-based leaders to ensure they are fully prepared to lead these future initiatives. The purpose of this study is to identify the professional development needs of school-based leadership in preparation for a district-wide one-to-one initiative as well as discover what potential solutions district instructional technology administrators believe could address the identified needs in the first part of this study.
For this research study, the following questions helped to inform the understanding of phenomenon being studied which is the professional development needs of school-based leadership in preparation of a district-wide one-to-one computing initiative in a large urban school district.

1. What are the professional development needs of school-based leaders preparing for a one-to-one computing initiative?

2. Do differences in professional development needs exist among:
   a. Leadership Positions
   b. Grade Span of the school
   c. Level of poverty at the school
   d. Years’ experience
   e. Computer skill-level

3. What potential solutions do educational leaders believe could be implemented to addresses the professional development needs identified in this study?

Significance of the Study

The focus of this study was the professional development needs of school-based leadership in preparation for a district-wide one-to-one initiative in a large urban school district. As of December 2014, Henrico County, VA is the largest school district (48,000 students and 62 schools) to undertake an one-to-one laptop initiative on their own. The school district, on which the current research is focused, is over three times the size of Henrico County’s student population (over 155,000 students) and consists of 173 schools.

Discovering the professional development needs of school-based leadership in a large urban school district could provide several different benefits for future technology initiatives
in the K-12 educational setting including: (1) informing training programs for educational leaders in preparation for computing initiatives, (2) providing a better understanding of what the most significant needs are of current school-based leadership, (3) and providing University professors a foundation to develop future courses to address the needs of this new learning ecology and better prepare future leaders for technology infused learning environments.

**Methodology Overview**

A mixed-methods approach is beneficial when seeking a more "complete analysis" than either qualitative or quantitative research alone is able to provide (Ivankova, Creswell, & Stick, 2006, p. 3). This study implemented a popular form of mixed methods research, explanatory sequential design. Explanatory sequential design consists of two different phases: a quantitative phase and a follow-up qualitative phase (Creswell, 2003). Creswell (2005) described this method as consisting first of collecting quantitative data and then collecting qualitative data to help explain or elaborate on the quantitative results (p. 515).

For this study, the quantitative phase was a Likert Scale online survey of school-based leadership within a large urban school district. School-based leadership included Principals and Assistant Principals of each of the 173 schools within the school district. The second phase of this study included interviews with six members of the District Instructional Technology Department as well as the Assistant Superintendent for Academics for the school district being studied.

**Theoretical Framework Overview**

Although the initial one-to-one computing initiative findings were promising, the literature ignored the type of leadership behaviors necessary to foster this environment
(Afshari, Bakar, Luan, Samah, & Fooi, 2008; Ertmer, Bai, Khalil, Park, & Wang, 2002; Gibson, 2001; Schiller, 2003; Hayes & Greaves, 2014). Moreover, the role of the school based leadership regarding integration of one-to-one computing programs has been neglected. There is, however, a body of literature that identified school leadership as the most important element in school success (Afshari, Bakar, Luan, Samah, & Fooi, 2008; Checkley, 2004; Ertmer, Bai, Khalil, Park, & Wang, 2002; Gibson, 2001; Harvey, 2003; Wilmore & Betz, 2000). Moreover, Gibson (2001) found that the presence of informed and effective leadership was the most important factor in the integration of educational technology into the learning environment. Literature on school leadership indicated that the characteristics, skills, and behaviors of the school leader could be employed as a vehicle for school improvement. For instance, effective school leadership begins with the role of the Principal (Fullan, 2014; Marzano et al., 2005). Principals play an integral role in the facilitation of educational change (Fullan, 2014; Brooks-Young, 2013; Schiller, 2003) and educational reform (Fullan, 2003) while being held accountable for student achievement leadership from foundational educational leadership literature.

In 2001, the International Society for Technology in Education (ISTE) facilitated several meetings of stakeholders, from across the country, including representatives from the National Association of Secondary School Principals (NASSP), National Association of Elementary School Principals (NAESP), American Association of School Administrators (AASA), National School Board Association (NSBA), North Central Regional Educational Laboratory, members of multiple state departments of education, and university faculty (Schrum, Galizio, & Ledesma, 2011). ISTE developed numerous frameworks for individual target audiences including students, teachers, and administrators.
Led by ISTE, this team decided there was a need to promote “the idea that knowledge, practice, and specific skills were needed for administrators to be ready to support the appropriate use of technology in a school” (Schrum, et al., 2011, p. 242). This team created and released the National Education Technology Standards for Administrators (ISTE-A) in 2001. Over the next few years ISTE developed numerous frameworks for individual target audiences including students, teachers, and administrators that represented the skills needed to thrive in a technology infused school environment.

ISTE updated the ISTE-A in 2009 to take into account the widespread function of technology within the schools and the necessity for administrators to create learning environments more aligned with technological and career shifts (Schrum, et al., 2011). These standards represent a national consensus between researchers and practitioners of what administrators need to know and do to support, as well as lead effective technology integration in schools (Allen, 2003).

The 2009 ISTE-A are comprised of five standards, each representing skills deemed necessary for administrators to lead schools in an increasingly technology-infused society (ISTE, 2009). The second edition of these standards consisted of Visionary Leadership, Digital-Age Learning Culture, Excellence in Professional Practice, Systemic Improvement, and Digital Citizenship.

**Terminology**

- **Ubiquitous computing**—the widespread availability of portable, networked technologies providing a new model of technology access for students when needed or wanted (Hill, Reeves, & Heidemeier, 2000).
Pedagogy- refers to the teaching skills teachers use to impart the specialized knowledge/content of their subject area(s) (National Board for Professional Teaching Standards, 1998).

One-to-one initiative/program- an educational program where every student in a particular grade level, classroom, school, or school district is provided a personal computing device to complete their schoolwork while at school and sometimes for use at home (Penuel, 2006).

School-based leadership- for this study, school-based leadership consists of Principals and Assistant Principals of either an elementary, middle, or high school in the district being studied.

ISTE-A Framework- are a set of standards published by the International Society for Technology in Education (ISTE) for the purpose of helping educational leaders leverage the use of technology in K-12 education to enable students to learn effectively and live productively in an increasingly digital society.

Organization of the Study

This study is broken down into five chapters. The first chapter’s introduction was built to introduce the background and context of the topic being studied, which are the professional development needs of school-based leadership in preparation for a district-wide one-to-one initiative in a large urban school district. The purpose, significance, methodology, and conceptual framework of the study were introduced to give the reader a clearer understanding of the study being conducted.

Chapter two provides a comprehensive, yet succinct, review of the literature related to this study being researched. The researcher provides a background of previous successful
one-to-one laptop initiatives in the United States as well as the critical components that were found in each of these initiatives. The later sections of chapter 2 discuss the roles leaders play in one-to-one initiatives, and concludes with a detailed description of the study’s theoretical framework—the National Educational Technology Standards for Administrators developed by the International Society for Technology in Education (ISTE) in 2009.

Methodology is the focus of chapter three, where the researcher provides an overview of the methodology used for data collection, the research design, and the plan for analyzing data collected throughout the study. This chapter discusses the participant selection process, a breakdown and explanation of both the sample, and the argument for its adequate representation of the population. The third chapter concludes with an overview of the limitations of the study, and the researcher’s subjectivity statement followed by chapter summary and introduction to chapter 4.

The fourth chapter is dedicated to the findings of the study. Survey results will be presented using descriptive statistics in both table and narrative form. The second portion of chapter 4 will be built on the themes and patterns that have been pulled from the follow up semi-structured interviews with the members of the District’s Instructional Technology Department and the Assistant Superintendent for Academics.

The fifth and final chapter is focused on the major themes from the findings of the study, as well as the relationship to the research literature, and potential implications for research and practice. Based on the review of literature, and the findings of the study, the researcher will make suggestions and recommendations for future research in the areas of professional development needs of school leadership in preparation for a district-wide one-to-one initiative.
Summary

The purpose of this study was to determine the professional development needs of school-based leadership in preparation for a district-wide one-to-one initiative in a large urban school district. This study used an explanatory sequential mixed methods design to answer the three research questions that drove the study. The mixed methods approach consisted of two distinct phases. The first phase of data collection was an online Likert survey of school-based leadership on the extent they have completed specific tasks in the past as well as how difficult they believe specific tasks would be to successfully complete in the future. Once this data was collected and analyzed, the second phase of data collection began. This consisted of semi-structured interviews with members of the district’s Instructional Technology department that focused on possible solutions and changes that could be implemented to successfully meet the professional development needs of school-based leadership of a district-wide one-to-one computing initiative in a large urban school district. Chapter 2 will present a literature review of research relevant to the study.
Chapter 2

Literature Review

Technology has dramatically changed how people work, learn, conduct business, communicate, and spend leisure time. In 1984, only 8.2% of U.S. households possessed a home computer, which was the first time the U.S. Census (2014) collected data on home computer access. As of 2012, the U.S Census Bureau reported that 78.9% of households have a home computer (U.S Census Bureau, 2014). These percentages have rapidly increased over the last thirty years. Along with home computer access, personal computers are ubiquitous throughout our everyday ecosystem and being proficient in operating a computer has become a requirement for most white-collar jobs or careers (NTIA 2002; Ceaparu, Lazar et al. 2004; Hu, 2002; Lazaar, Jones, & Shneiderman, 2006).

In response to the changes in everyday life due to technology, schools are making substantial investments in technology and technology infrastructure. These investments have lead to an educational technology market worth $7 billion dollars annually (digedu, 2014). The investment in school facilities is expected to allow administrators, teachers, and students seamless access to technology tools, educational materials, and information during the school day as well as, in some cases, at home via a student's school issued personal learning device (Corn, 2009; Crawford, 2011; Silvernail, 2011).

Technological advances and the influx of technological devices has changed not only the skills needed to be a successful in the 21st century world, these changes have also revamped how students learn, how teachers teach, and the skill sets that school-based leadership need to possess to ensure they are providing appropriate leadership to the 21st century schools that they are leading. Leadership, especially at the school-level, is widely
acknowledged as an important influence on school effectiveness and school improvement (Anderson & Dexter, 2005; Brockmeier, Sermon, Hope, 2005; Shen, Gerard, & Bowyer, 2010; Eyal & Roth, 2010). Early technology integration research primarily focused on teachers, who were implementing one-to-one initiatives, but neglected Principals: “it is unclear how prepared Principals are in computer technology because the majority of the technology literature is about teachers and the instructional environment” (Anderson & Dexter, 2005, p 46). Principals will not be ready to provide adequate and practical instruction that is necessary to restructure schools without a thorough understanding of computer technology (Anderson and Dexter, 2005).

Instructional technology initiatives, which are implemented in a proper and sustainable manner, can provide students with access to the tools that they will be expected to operate effectively after graduating high school. Even though the benefits and opportunities for learning are significant, many educational leaders are still hesitant to take on initiatives due to the risk involved (Crawford, 2011; Silvernail 2011; ABELL Foundation, 2008; Bonifaz & Zucker, 2004; Bouterse, Corn & Halstead, 2009; Dunleavy, Dexter & Heinecke, 2007).

These educational investments are a huge financial risk for government agencies, taxpayers, and for the students if the initiatives fail to prepare them for a technology filled world. As technology changes the learning environments in K-12 schools, research is needed on the skills needed for educational leaders to successfully lead, evaluate, and sustain technology initiatives in their individual schools, districts, and state educational agencies. This study sought to determine the professional development needs of school-based leadership, in a large urban school district as the educational agency plans to invest millions
of dollars in personal learning devices with the goal of lowering the student-to-computer ratio to a 3:1 ratio within the next year as well as implementing several one-to-one computing pilot initiatives within the district at preselected schools.

Background

Ubiquitous computing or one-to-one computing programs refer to educational initiatives where each student has direct access to computing hardware throughout the school day and sometimes after school (Corn, 2009; Anderson & Dexter, 2005). In the United States, these programs were first initiated in states like Maine where lawmakers believed they would provide an economic advantage for their students. A 2001 report to the Maine state legislature documented this change: “Driving much of this complexity and change are new concepts and a new economy based on powerful, ubiquitous computer technology linked to the Internet” (McCarthy & Breen, 2001, p1). These changes have occurred in a quick and rampant pace and the public education system has failed to keep up with these changes (McCarthy & Breen, 2001). There are several reasons why education leaders are choosing one-to-one computing programs as the cornerstone of their technology initiatives – including improving the in-class educational experience, providing universal Internet access to disadvantaged homes, and building stronger connections between teacher and parent, as well as school and community (Hanover Research Council, 2010; Anderson & Dexter, 2005; Corn, 2009).

Successful planning and implementation of a one-to-one computing initiative demands careful attention to a variety of factors, especially from the leaders of the school or school district where the implementation is taking place. Effective leadership is fundamental for the successful implementation and sustainability of the initiative, as are thorough
planning, initial and ongoing targeted professional development, buy-in from all stakeholders, and a robust infrastructure (Oliver, Mollette, & Corn, 2012; Edwards, 2013; Fullan, 2001; Marzano, Waters, & McNulty, 2005). Education Leaders should plan to assess the initiative’s impact on student learning and use the results to make adjustments to improve that learning.

In this review of the literature, I will provide an overview of successful one-to-one implementations from across the country, critical components of a successful one-to-one program which include prepared leadership, school-based leadership's role in one-to-one programs, and provide the theoretical framework for the study (ISTE-A Standards). I will conclude with a brief summary and an introduction to chapter 3, which will focus on the methodology that will be used to explain the professional development needs of school-based leadership in preparation for a district-wide one-to-one computing initiative in a large urban school district.

**Key Components of a Successful One-to-One Computing Initiative**

Even though technological advances have increased dramatically since the 1970’s, the same vital components, of a technology initiative, are required for the initiative to be successful and sustainable. For this study, one-to-one computing implementation vital components were broken down into five categories: long and short-term planning, funding/resources, teacher support, continuous training/professional development, and leadership. In each component’s section I will discuss the role of school-based leadership in that particular aspect of a successful one-to-one computing initiative.
**Long-term and short-term planning**

A major factor in any successful educational initiative, is strategic long-term and short-term planning by leadership at both the school and district levels (Fullan, 2014; Dufour and Fullan, 2013; Marzano Waters & McNulty, 2005). One aspect of long-term planning is deployment planning for personal learning devices. Prior research by Simmons (2014) suggested staggered deployment to first leadership teams, then teachers, before full deployment to students. Staggered deployment would allow leadership to become familiar with the learning devices so they could look strong in front of their staffs as well as could help with the deployment to teachers. Research by Fullan (2012) and Corn (2009) suggested that pre-implementation planning should start at least 12-18 months before planned deployment to students. This dedication to long-term planning ensures teachers that the current implementation is not a short-term fad, but a long-term dedication to systematic improvement.

As important as long-term planning is strategic planning. Strategic plans, for both individual schools and school districts as a whole, should be aligned with the goals of the technology initiative (Simmons, 2014; Fullan, 2013; Fullan, 2012). When strategic plans are properly aligned with the goals of the technology initiative, educational leaders effectively communicate to teachers, students, and to the public the importance of the initiative and the vision for the future.

The allotment of time for planning by both teachers and leadership is also considered to be vital to the sustainability of a one-to-one technology initiative (Oliver et al., 2012; Fullan, 2012; Abell Foundation, 2008). Teachers need adequate time to plan lesson embedded with technology as well as time to participate in professional learning teams that
will focus on the development of technology rich lesson plans as well as the personal development of technology skills of team members (Simmons, 2014). School-based leadership need individual planning time as well as time to plan with leadership from other schools (Simmons, 2014; Dufour and Fullan, 2013). Research shows that school-based leadership's support of the initiative is vital to the success and sustainability of the initiative (Simmons, 2014; Fullan, 2001; Oliver et al., 2012). One method to build this support is through professional learning teams between leadership from schools within a district and within the individual schools itself (i.e. Principals and Assistant Principals). These teams would focus on similar goals as teacher professional learning teams, but instead of pedagogy, Principals would focus on procedures, policies, and strategies that would enhance the positive impact the initiative could have on student achievement.

**Sustainable funding**

Implementation of a one-to-one computing initiative is a large financial investment. This investment that can rapidly reach tens of millions of dollars over a multiple year investment. Research shows that recent one-to-one programs have cost Local Educational Agencies (LEAs) between $250-600 per student per year (ABELL Foundation, 2008; Hayes & Greaves, 2014). Most LEA districts are choosing to spread the individual implementation costs (i.e. laptop, software, and etc…) over four years to decrease the initial impact on the annual district budget. These costs are calculated on only direct costs of the program (i.e. laptop, updates to school networks, and other peripherals), which does not include indirect costs of implementing and sustaining the initiative (i.e. additional technology technicians, insurance premiums for the computers, repairs, or technical trainings). Other costs and
resources that should be considered in the implementation of one-to-one programs are included in Table 1:

Table 1 Costs and Resources/ Addressed Issues Needed for Implementation

<table>
<thead>
<tr>
<th>Costs (Bouterse, Corn &amp; Halstead, 2009, pp. 2-3)</th>
<th>Resources Needed or issues to be addressed (Dunleavy, Dexter &amp; Heinecke, 2007)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Device: the initial cost including insurance</td>
<td>1. Fragile or excessively heavy machines</td>
</tr>
<tr>
<td>2. Support: Customer and technical support</td>
<td>2. Limited desk space for students</td>
</tr>
<tr>
<td>3. Professional development: includes training of personnel to provide familiarization and proficiency with the operation of equipment and software to carry out school tasks, whether instructional or administrative.</td>
<td>3. Inadequate battery life of laptops</td>
</tr>
<tr>
<td>5. Software: any applications or operating system purchased but not originally bundled with the device.</td>
<td>5. Data loss (Student work loss, computer crashes)</td>
</tr>
<tr>
<td>7. Retrofitting: the amount that must be spent to wire an existing physical location</td>
<td>7. Online research offered instructional challenges for them because of concerns that students might access inappropriate materials (i.e. games, pornography, etc.), or waste time with inefficient or ineffective searches</td>
</tr>
<tr>
<td></td>
<td>8. Unreliable Internet access (wireless or dead spots)</td>
</tr>
<tr>
<td></td>
<td>9. The use of video in the classroom can lead to a high level of noise and some students intentionally use this as a distraction</td>
</tr>
<tr>
<td></td>
<td>10. Infrastructure inadequacies-</td>
</tr>
<tr>
<td></td>
<td>11. Networked laptops detracted from effective teaching and learning if not properly implemented</td>
</tr>
</tbody>
</table>

Ritzhaupt, Hohlfeld, Barron and Kemker (2008) offered the following recommendations for assessing, planning, and funding technology integration: a) recognize funding is temporary and needs are ongoing; b) seek technology funding from multiple sources; c) infuse technology planning into standard school operations; d) compose technology committees with diverse stakeholders; e) include professional development for key stakeholders; and f) establish an effective measurement system.
When discussing funding, prior research by Simmons (2014) argued that the only way to ensure sustainability of a one-to-one initiative is through systemic reallocation of established funding on a yearly basis. Overall, a one-to-one computing initiative cannot rely on one source of funding, but educational leaders should fund these initiatives from a diverse group of funding sources. Even though fund reallocation should be the primary source of funding, Other avenues of funding should be explored and leveraged, but the district should not become dependent on this funding to support essential aspects of the one-to-one initiative.

After fund reallocation, educational leaders need to be creative and deliberate in building a funding portfolio that will meet the short-term and long-term needs of the district or school. The availability of these funding sources will vary, but educational leaders should explore funding avenues from the following potential sources: public-private partnerships, national and local grants, grassroots fundraising, cost-saving budgeting and research contracts. Other than funding reallocation, public-private partnerships are the steadiest funding source for the main components of the initiative. When designing these partnerships, the school district needs to ensure that the business is large enough to commit long-term to the school system and that the terms benefit the school district long-term (Simmons, 2014).

Grants are another source of funding that should be explored by district leaders. In large-urban school districts, educational leaders must target national grants. Smaller local and state grants might not provide enough funding to make a significant impact within the district, but could be beneficial if individual schools within a district were awarded. Some grants require the organization to provide matching funding for the amount of the grant. After fund reallocation, these funds could be used more effectively by applying for a
matching funding grant that would double the amount of investment the school system could make.

Public fundraising is another avenue for funding that educational leaders must explore. Many districts have looked to public bond referendums to fund the large startup costs of a district-wide implementation (Rhor, 2014). A bond referendum is a provision permitting voters in a school district to accept or reject the granting of school board authority to issue (sell) bonds to generate revenue for the purpose specified in the referendum (Rhor, 2014). If a bond passes, taxpayers within the municipality will be taxed based on the value of their various property for a set amount of years to repay the debt that the bonds has caused.

Grassroots fundraising is another form of public fundraising. In this model, individual schools within a school district takes charge of raising funds to support their individual initiatives. Some educational leaders believe that this model could be an effective supplement to annual technology funding (Simmons, 2014). The benefit of having so many schools within a school district is the amount of local communities that these schools can tap into for funding. The key here is to communicate the message that every donation makes a difference no matter the amount (Simmons, 2014).

Another supplemental funding source that prior research has suggested as a possible avenue for school districts or schools is contracts for research/piloting new products (Rhor, 2014). In this model school districts could develop partnerships with educational or technology businesses where the business provides funding for the school district and the district provides opportunity to test new devices or products in their schools, or conduct educational research in the school district. Educational leaders in several large school districts, who have implemented or piloted one-to-one initiatives, have used the contracts to
negotiate reduced purchase prices on hardware and/or discounted training and support
(Edwards, 2013; Simmons, 2014). Table 2 provides a summary of possible funding sources
that educational leaders can use or leverage to sustain their initiative.

Table 2 Potential Sources of Initiative Funding

<table>
<thead>
<tr>
<th>Funding Source</th>
<th>Life of Funding</th>
<th>Suggested Uses</th>
<th>Supporting Research</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fund Reallocation</td>
<td>Reoccurring</td>
<td>Reoccurring costs (laptops, service</td>
<td>Greaves et al. (2012), Hartman(2003), Sorenson &amp; Goldsmith (2013), Simmons (2014), Boser (2014),</td>
</tr>
<tr>
<td></td>
<td></td>
<td>agreements, network costs, staff)</td>
<td></td>
</tr>
<tr>
<td>Cost Saving Budgeting</td>
<td>Reoccurring</td>
<td>Finding savings through effective</td>
<td>Greaves et al. (2012), Hartman(2003), Sorenson &amp; Goldsmith (2013), Simmons (2014),</td>
</tr>
<tr>
<td></td>
<td></td>
<td>budgeting</td>
<td></td>
</tr>
<tr>
<td>Local Grants</td>
<td>Varies from one-</td>
<td>One time upgrades to infrastructure,</td>
<td>Rhor (2014), Greaves et al. (2012), Fullan (2014), Sergiovanni (2009)</td>
</tr>
<tr>
<td></td>
<td>time to specific</td>
<td>specific initiatives</td>
<td></td>
</tr>
<tr>
<td></td>
<td>length</td>
<td></td>
<td></td>
</tr>
<tr>
<td>National Grants</td>
<td>Varies</td>
<td>Large one time or short-term costs,</td>
<td>Rhor (2014), Greaves et al. (2012),</td>
</tr>
<tr>
<td></td>
<td></td>
<td>training expenses</td>
<td></td>
</tr>
<tr>
<td>Grassroot Fundraising</td>
<td>One-time</td>
<td>Specific needs for the corresponding</td>
<td>Simmons (2014), Fullan (2014), Sergiovanni (2009)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>school or schools</td>
<td></td>
</tr>
</tbody>
</table>
### Continuous professional development

When discussing professional development in a one-to-one implementation, research shows that these efforts must consist of content that is focused on tasks that participants are required to complete on a daily basis (Mundry, 2005; Quick et al., 2009; Lambert, Wallach, & Ramsey, 2007). Teachers especially need professional development that is related to their specific subject (Quick et al., 2009; Lieberman & Pointer Mace, 2008), focused on specific tasks that have been proven to improve student achievement (Lieberman & Pointer Mace, 2008; Mundry, 2005; Quick et al., 2009), and effectively integrates technology (Corn, 2009; Frank, Zhao, & Borman, 2004; Hayes & Greaves, 2014; Kanaya, Light, and Culp, 2005).

In one-to-one learning environments, these same professional development components are required, but the frequency as well as the methods used must change to be effective and impactful. Professional development needs to be continuous and collaborative (Corn, 2009; Quick et al., 2009; Hayes & Greaves, 2014; Shapley et al., 2010; Silvernail & Buffington, 2009). Research completed by Silvernail and Buffington (2009) found that a 200 hour professional development initiative "was effective in changing teaching and technology practices, which in turn led to improved student performance on standardized mathematics test (p i). The authors suggest that these positive changes were due to how well planned the
professional development was and sustained over a lengthy amount of time. Researchers in Texas found that this model of professional development significantly impacted the implementation of the one-to-one initiative (Shapley et al., 2010).

The second key component of effective professional development in schools who are undergoing a one-to-one implementation is participant collaboration (Shapley et al., 2010; Quick et al., 2009). This was especially true with teachers, who prior research shows that professional development that emphasized collaboration after training was complete showed noticeable changes to their teaching practices (Lieberman, Pointer, & Mace, 2008; Silvernail & Lane, 2004). Interview participants in a recent study by Simmons (2014) suggested that professional development participants should be paired into small groups that would provide long-term support and accountability for future individual technology use.

**Teacher buy-in**

With such a huge investment needed to implement and sustain a one-to-one initiative, numerous stakeholder groups will have to buy-in to the vision and mission that is driving the implementation of the initiative. These groups include community leaders, local business leaders, local and state politicians, and parents (Simmons, 2014; Rockman, 2004; Muir, 2005). Each one of these groups are extremely important to the success of a one-to-one initiative, but the most important group to the success of the initiative is teachers (Corn, 2009; Simmons, 2014; Rockman, 2004; Muir 2005; Hayes & Greaves, 2014)

One finding from past research that is likely to influence the implementation of one-to-one initiatives is teacher’s attitudes and beliefs about technology’s role in 21st century K-12 pedagogy (Hayes & Greaves, 2014; Rockman, 2004; Muir 2005). When teachers do not believe or are not inspired by the potential impact that the implementation can have, then
they are less likely to put forth a full effort or commitment to the implementation, because they do not see the potential benefits to their daily work and student achievement (Becker & Anderson, 2000; Rockman, 2004; Muir 2005).

Personal factors associated with higher levels of computer use also played a role in how technology was integrated. Hennessy, Ruthven, and Brindley (2005) reported teacher traits such as openness to change and recognition of transformative potential of using technology affected how technology was integrated in their classrooms. There were three other significant factors that were found among teachers who were more likely to give tasks using computer work to students. First, teachers whose subject is focused on a small number of topics (i.e. English) were twice more likely to assign computer activities than faster paced curriculums. Secondly, teachers with at-least five computers in their classrooms compared to teachers with limited access to computer labs were twice as likely to provide students with frequent computer experiences. Finally, teachers who had greater technical knowledge used computers more (Hayes & Greaves, 2014). Ponticell (2003) wrote, “conservative teacher and school cultures can make changing classroom and school practices risky” (p 19). Straub (2009), who viewed technology adoption through three adoption theories, stressed that successful facilitation of technology adoption must address cognitive, emotional, and contextual concerns. Barriers reported by Ertmer and Ottenbreit-Leftwich (2009) included lack of relevant knowledge, low self-efficacy, existing belief systems, and the context in which teachers work. In general, schools fail to identify and deal with these concerns.

The context in which teachers work can also be a major influence on technology integration, along with the teams that teachers work with, and the culture of those teams can have great influence on laptop implementation (Hennessy, Ruthven, & Brindley, 2005).
Other authors claim that the subject area in which a teacher teaches has an impact on how technology is used. Hennessy, Ruthven, and Brindley (2005) reported that the book-dominated culture of English is a factor in resistance of English teachers to use of new technologies. Selwyn (2002) contended that math and science departments embraced the use of technologies more than other areas because those subjects have been the traditional domains for computers and high-tech calculators.

**Leadership**

A major barrier to beginning a one-to-one laptop program is the need for state, district, and school leadership. Fullan (2014) asserts that in a rapidly changing world, the leader has two choices: (1) play it safe and be overrun by the tides of change, or (2) plot a course into the future where risk is balanced by gain. Twenty-first century Principals are now faced with this same paradox with one-to-one learning environments. Without perfect knowledge, the element of risk cannot be eliminated. In the case of educators, the tendency is to be conservative. Small incremental change has been the traditional way of reducing risk in meeting new demands, but the increased rapidly changing needs in the area of technology and learning, however, outpace the traditional incremental mode of response.

The precedent of educational leaders implementing incremental changes, is evident in the research. Marzano, Waters, and McNulty (2005), in their meta-analysis study of leadership behaviors provides a possible explanation. They propose that when leaders support an innovation the leaders must be consistent with the order of magnitude of the change represented by the innovation. First-order change is incremental and is defined as the next logical step to take in a school or a district. Second-order change is anything but incremental and involves dramatic departures from the expected, both in defining a problem
and in finding the solution (Marzano, Waters, & McNulty, 2005). The differences between first- and second-order changes can be defined as the difference between incremental change and deep change. Incremental change fine-tunes the current system, while deep change alters the fundamental ways in which the system operates. One-to-one computing initiatives are initially second-order changes, but the incremental changes that are constantly needed are crucial to the sustainability of the initiative. Deciding which implementation framework to use for the various aspects of a one-to-one implementation is a major barrier for educational leaders.

While teachers are asked to change their daily tasks, and practices the most, Principals are required to make changes and share leadership in ways that are not accustom to or ever been required too (Simmons, 2014; Corn, 2009; Oliver et al., 2011). Principals, in this new model, must let go of some of their ownership and power over the school into a new shared model which is shared among the school leadership team, the instructional technology facilitator, and individual teachers (Simmons, 2014; Corn, 2009). This release of power is hard for many traditional Principals, but it is necessary for the initiative to be effective. The school leadership burden is already too large for many educational professionals to handle alone, and in a one-to-one computing school, that workload becomes even heavier. The Principal must have help with this burden, to ensure that every school is lead effectively, appropriately, and efficiently.

**Leadership in an One-to-One Computing Initiative**

The need for creating a strong school-based leadership team is heavily cited in educational research (Fullan, 2014; Elmore, 2003; Marzano et al., 2005; Sergiovanni, 2005; Marzano & Waters, 2009; Dufour & Marzano, 2011). While increased attention has been
directed to the need for improved professional development of Principals in general, training in the area of technology has received minimal attention. Part of the reason for a lack of development in this area “has been the struggle to determine the administrator knowledge base needed in technology and the management of technology in the school situation” and the impact this lack of knowledge has on technology use in the classroom (Awalt & Jolly, 1999, p. 4). A review of the literature in this area, however, demonstrates that successful integration of technology in schools requires effective leadership through modeling its use, being visionary, and most importantly acquiring personal proficiency in educational technology (ISTE, 2009, Brooks-Young, 2006, 2013; Picciano, 2010).

During the early stages of one-to-one computing research, teachers were the focal point of most studies due to their constant interaction with students in the learning environment. Recent studies suggest, however, that the most important issues in effective integration of computers or instructional technology in the classroom “is not the preparation of teachers for technology usage, but the presence of informed and effective leadership” (Gibson, 2001, p. 43). The importance of leadership, in one-to-one programs, has now been discovered and without research that focuses on the professional development needs of Principals, computer technology will continue to be underused or misused in schools (Brooks-Young, 2006; Picciano, 2010). The professional development needs of school-based leadership can be broad and numerous due to the complexity of the position and the demands of the role. These needs are partly due to the challenges and new opportunities that technology presents that dramatically alter the way a school and classroom functions.

A flaw in technological expertise, at the school-based leadership level, not only affects the individual, but the school, the staff, and the students of the school as well. Many
educational administrators, who are uncomfortable with technology, typically lack the visionary leadership to plan, implement, and lead a technological innovation (Gibson, 2001).

Instructional technology professional development, for educational leaders, has improved over recent years, but training on the issue is still lacking (Picciano, 2010; Brooks-Young, 2006; Allen, 2003; Gibson, 2001). The implications of ignoring this major issue can affect student achievement and college or career ready graduates for years to come. The origin or source of these deficiencies is not limited to one particular area, but is a combination of several issues. University educational leadership programs have failed to produce graduates and future educational leaders for a twenty first century educational world and most experienced educational administrators are not comfortable enough with technology to model or manage best practices in schools (McLeod, Logan, & Allen, 2002; Gibson, 2001).

Education administrators are charged with the responsibility of providing comprehensive technology infrastructure to students, teachers, and school staff that promotes effective technology integration with the ultimate goal of adequately preparing students for a world where technology is ubiquitous. In order to accomplish this, teachers along with an empowered leadership team, should develop a shared vision for technology integration. Fullan (2014) argued that 21st century leadership and vision development is too large and too complex of a task for one individual. Twenty-first century schools should be led by leadership teams that represent all stakeholders of the school (Fullan 2014; Dufour & Fullan, 2013; Hargraves &Fullan, 2013; Fullan, 2012). Technology is not only changing how students learn, and how teachers teach, it is also changing the skill sets and leadership styles required for school administrators to successfully lead these new learning environments
(Fullan, 2014). These leadership requirements are simply too much for one person to face alone, hence, Assistant Principals, as well as teacher leaders, must play a larger role in leadership decisions within the school (Fullan, 2014; Dufour & Fullan, 2013). I will discuss the demanding roles of both the Principal and Assistant Principal positions as well as how an one-to-one computing initiative intensifies the demand of both of these positions in the subsequent paragraphs of this literature review.

In a 21st century education environment, a Principal must be an effective technology leader in order to lead a school that is immersed in technology (Yee, 2000; Fullan, 2014). Learning-focused technology leaders ensure technology is driven by curriculum needs and integrated into the curriculum in an appropriate manner (Anderson & Dexter, 2005; Brooks-Young, 2006; Picciano, 2011; Fullan, 2014). In a one-to-one school, the need for technology leadership, by the Principal, is essential to the success of the initiative. The Principal should model technology through their daily actions, electronic communications, and the demonstration of technology skills (Anderson & Dexter, 2005; Brooks-Young, 2006; Rudnesky, 2006; Edwards, 2013). As an instructional leader the Principal should be the lead learner (Quinn, 2002; Wilmore, 2000; Marzano et al, 2005; Fullan, 2014) and should never ask a teacher to model or demonstrate a technology skill or concept which they have not already completed themselves (Rudnesky, 2006).

The integration of technology into instruction requires change, which is usually resented by some teachers. Fullan (2001) emphasized the importance of Principals as technology change agents by stating “for better or worse change arouses emotions, and when emotions intensify, leadership is key” (p. 1). Therefore the most vital skill a Principal should possess in order to move their school into the realm of an 21st century educational setting is
understanding change, the change process, and becoming the catalyst for the desired change. Principals must understand and address the reasons why some faculty resist or sabotage the implementation of technology; ignoring these faculty members’ concerns will be a hindrance to the success of the initiative going forward (Creighton, 2003).

As a change agent, the Principal must understand that change begins and ends at the individual level; therefore the needs of individuals should be identified, assessed, and addressed. Successful change agents understand that change cannot be managed or controlled; but can be understood and led (Fullan, 2001; Fullan, 2014). In education, the Principal is considered the catalyst for change due to their impact on all aspects that are important to the success of a change initiative (vision, stakeholder buy in, leadership, etc…).

Figure 1 depicts the impact of the Principal in a school by demonstrating the Principal’s role as the driver of initiatives at the school-level. The Principal’s decisions or actions impact both individual teachers and students and are exponentially magnified during eras of change (i.e. during a technology initiative).
Many Principals are not prepared for their new role as technology leaders, and therefore, struggle to evaluate both the instructional and technical resources necessary to realize exemplary student achievement in their schools (Flanagan & Jacobsen, 2003; Sincar, 2013). A recent study revealed that Principals continued to face the challenges of a lack-of formal in-service training. According to Sincar (2013), “All of the participants stated that they needed training about the use of technology in both administration and education” (p.1281). Many of school administrators have gained their instructional technology experience through self-instruction, vendors, school personnel, consultants, conferences, or regional service center trainings. Creighton (2003) stated that, “University Principal preparation programs are not adequately providing the necessary skills and dispositions required of Principals in this recent new role” (p.1). “Computer skills learned in isolated in-services are quickly lost if they are not readily applied in teaching, or learned in a context that facilitates instructional design and planning” (Flanagan & Jacobsen 2003,p.127). Brockmeir, Sermon, and Hope (2005) suggested that, without a thorough understanding of instructional technology's capabilities, Principals will not be ready to provide the leadership in instructional technology necessary to restructure schools. Hence, a major problem confronting many school districts is that too many Principals do not have the adequate skills, dispositions, training or developmental experiences in integrating technology into the curriculum. According to Fullan (2014), unless the vision from the Principal is clear, implementation of technology within the classroom will fall short of expectations.

Principals play a large role in the selection of instructional programs, efficiency of the program being implemented, as well as the evaluation of the programs within the school (Fullan, 2014; Dufour & Fullan, 2013). With the implementation of instructional technology
programs, like one-to-one initiatives, the Principal's duties as an instructional leader become much more complex and challenging. Not only must school leaders complete instructional tasks while implementing a one-to-one initiative, they must also be proficient in the instructional technology hardware and software being used as well as develop models of digital citizenship (Fullan, 2014; Dufour & Fullan, 2013). These demands support the need for effective professional development programs and training to ensure these Principals are prepared to lead such complex initiatives. A new leadership model should also be explored where Principals share some of the leadership duties with members of staff and Assistant Principals play a much larger role in school-based decision making (Simmons, 2014).

Research in educational administration tends to be about the Principal despite the majority of educational leaders starting their administrative careers as Assistant Principals. Earlier studies like Marshall (1985, 1992) as well as more recently, Daresh (2001) and Marshall and Hooley (2006) have explored the socialization of Assistant Principals in terms of role development and enculturation. The role of the Assistant Principal continues to evolve. "It used to be that the Assistant Principalship served as an apprenticeship for the role of Principal, providing preparation for the responsibilities, pace, and scope of the positions" (Pounder & Crow, 2005, p. 59). In current K-12 educational climate filled of accountability, Assistant Principals are asked to serve a larger instructional leadership role. Now that schools (and their administrators) have a better understanding of how to relate student data to the school's accountability, there is a need for Assistant Principals to lead schools through change. This requires the Assistant Principal to act as a change agent, similar to the new requirements of their supervisor (the Principal).
The role of the Assistant Principal is complex. According to the U.S. Department of Labor (2008), the Assistant Principal helps the Principal with the "overall administration of the school", (p 9). According to Celikten (2000), the role of the Assistant Principal is to "do whatever is needed to help the Principal maintain a safe and orderly environment. Many educational leaders see the Assistant Principal position as training for future appointment to a Principal (Sergiovanni, 2009; Marzano et al., 2005). In trying to focus more on how Assistant Principals can better be prepared for the role of Principal, one realizes that most Assistant Principals are expected to learn on-the-job. The National Association of Secondary School Principals (2000) addressed this concept in its statement on Leadership Development for School Administrators:

Be it therefore, resolved by the National Association of Secondary School Principals that . . . [school] districts provide funding and opportunities to engage Principals and Assistant Principals in ongoing, sustained, job embedded leadership development that focuses on knowledge, skills, and dispositions that will improve a Principal’s or Assistant Principal’s ability to lead and manage (p 2)

The increased demands of the Assistant Principal role, the educational trends of shared leadership models within K-12 schools, and the historical view of the position as an apprenticeship or training for future Principal roles, is the rationale for including the Assistant Principals of the selected school district in the study of professional development needs. These roles are intensified by the demands of a one-to-one initiative and the need for Principals to share these new demands with their assistant.

In a one-to-one environment, educational leaders are asked to not only perform the extensive duties that I have previously described, but take on new or more complex tasks or
challenges than educational leaders in the traditional school setting. Principals will be asked to manage larger budgets, reallocate funding to cover increased technology costs, create new school technology policies, and manage student and staff technology use (Richardson et al, 2011; Fullan, 2014; Simmons, 2014). Assistant Principals will be asked to manage student discipline involving the misuse of school issued, handle device insurance claims, computer damage cases, as well as other tasks that are delegated to them by the Principal of their school.

While other issues might arise that will require the school-based leadership team of a school to tackle together By determining the professional development needs of Assistant Principals, educational researchers and administrators can develop training for Assistant Principals to participate in to ensure they are fully prepared to lead schools, as a Principal, who currently have a one-to-one computer for every student or are planning to implement a one-to-one computing initiative in the near future.

Theoretical Framework

National Education Standards for Administrators (ISTE-A)

The National Education Standards set a standard of excellence and best practices in learning, teaching, and leading with technology in education developed and disseminated by the International Society for Technology in Education (ISTE). ISTE developed numerous frameworks for individual target audience including students, teachers, and administrators.

The first edition of the ISTE-A standards were published in 2002 to fill the need found in the research for a leadership framework for Principals in a technology immersed school setting. These standards represent a national consensus between researchers and practitioners of what administrators need to know and do to support, as well as lead effective
technology integration in schools (Allen, 2003). These standards were revised in 2009 to five standards in the second edition of the published framework. The second editions of these standards consisted of Visionary Leadership, Digital-Age Learning Culture, Excellence in Professional Practice, Systemic Improvement, and Digital Citizenship as displayed in Figure 2 (ISTE, 2009).

![Figure 2. ISTE Standards for Administrators (ISTE, 2009)](image)

Within each of the five standards, ISTE has provided individual performance indicators to help leaders assess and address important components or concepts of each standard. In total, the ISTE-A framework consists of twenty-one performance indicators. The ISTE-A framework including performance indicators for each standard is included in Appendix C. The review of the ISTE-A framework will conclude with a discussion of each standard individually.
**Visionary leadership**

The first standard of the ISTE-A framework is Visionary Leadership. A technology leader has the ability to inspire a shared vision among stakeholders and foster changes that maximize the use of digital resources to support instruction, learning, and student performance. Technology is not a magic potion that will increase student achievement by simply being present in the classroom. Technology is a tool that educational leader must have a vision for and a defined purpose for its uses (Brooks-Young, 2006, 2013). The key to having a successful technology initiative is developing a school instructional plan that includes input from all stakeholders and is infused with proper use of digital-age resources (Brooks-Young, 2013).

The Visionary Leadership standard consists of three different performance indicators (ISTE, 2009). The first indicator (labeled 1.a) focuses on the development of a shared vision and mission statements that maximizes the use of digital-age learning resources and devices. The second indicator (1.b) is engaging in a process to develop, implement, and communicate a strategic plan that is technology infused and is aligned with the previously developed mission and vision statement (1.a). Finally, the third performance indicator (1.c) is focusing on advocating for policies, programs, and additional funding to support current and future technology initiatives (ISTE, 2009). It is very important that these current and future technology initiatives, which one is advocating for, clearly align with the previously developed mission and vision statements as well as the technology-infused strategic plan (Brooks-Young, 2013).

In a large one-to-one computing initiative, educational leaders must have successful buy-in from several very important groups including the school district’s board of education, local
commissioners and elected officials, and local business leaders (Center for Digital Education, 2005). To earn this buy-in, educational leaders must develop and communicate a clear vision and purpose for investing such a large amount of money into instructional technology and a specific learning tool. This vision should be shared among all previously discussed stakeholders with the addition of parents and teachers. This adopted and shared vision will ensure a long-term commitment to the initiative and will the school or school district overcome obstacles that arise from embarking on a new technology initiative, in this case a district-wide one-to-one computing initiative.

**Digital age learning culture**

The second standard of the ISTE-A framework addressed the need for educational leaders to promote a "Digital-Age Learning Culture" (ISTE, 2009, p 1). This standard consists of five different performance components related to the creation, promotion, and sustaining a learning culture that is rigorous, relevant, and engaging for all students (ISTE, 2009; Brooks-Young, 2013). For the educational administrator, this standard is multi-faceted. To create this learning culture, educational leaders must model effective and appropriate technology use for learning, provide learning environments that are equipped with technology that assists teachers with meeting the diverse needs of their students, and participate in professional learning communities (PLCs) that stimulate innovation, creativity, and digital-age collaboration (Brooks-Young, 2013).

Computers and instructional technology are changing at a rapid pace (Brooks-Young, 2006; 2013). To keep up with the rapid state of change, educational leaders must ensure that all stakeholders are dedicated to continuous improvement of instructional practices that utilize digital-age learning resources which is the focus of the first performance indicator of
standard 2 (2.a). Performance indicators 2.b and 2.d refer to the importance of the modeling effective technology use. By modeling frequent and effective use of instructional technology (2.b), the educational leader will have the background and knowledge required to ensure that teachers are infusing technology appropriately and effectively in their daily pedagogy (2.d). While school based leadership do not directly affect student achievement, unlike teachers, they do provide the learning environments for the teachers to utilize. It is also these leaders' responsibilities to ensure that these learning environments are conducive for individualized and differentiated instruction (2.c). Brooks-Young (2013) suggest that school-based leadership address this standard by frequently observing classrooms to compare teacher's submitted lesson plans to classroom activities, reviewing student work, and reviewing "current equipment and software inventories, locations for equipment, and uses for the equipment, software, and online resources" (p 37).

The final performance indicator (2.e) addresses the need for educational leaders to participate in professional learning communities (PLCs) and/or global online learning communities that stimulate innovation, creativity, and digital-age collaboration (ISTE, 2009). Brooks-Young (2013) suggests that educational leaders participate and/or lead in-house PLCs as well as actively participate in state, national, and global PLCs that align with the needs or vision of their school current environment.

In a one-to-one computing initiative it is critical for school-based leaders to ensure the educational investment that taxpayers and stakeholders have made is being properly used to support teaching and learning (Brooks-Young, 2013). This is accomplished by building and sustaining a digital-age learning culture throughout the school building. Educational leaders create this culture by designing staff meetings where all faculty bring their laptops for
use during the meeting, creating meetings that encourage collaboration among staff members, reviewing lesson plans to ensure teachers are utilizing computing devices effectively, and completing regular classroom walkthroughs to observe teachers’ use of technology within the classroom (Brooks-Young, 2013). For this culture to be effective and sustainable, school-based leadership must model, enforce, and support proper technology use throughout the school day.

**Excellence in professional practice**

The third standard of the ISTE-A framework is Excellence in Professional Practice and consists of four different performance indicators. This standard "requires that administrators have a general understanding of ongoing advances and new applications for technology use, and that they model use of technology (Brooks-Young, 2013, p 50). Specifically this standard addresses the need for administrators to manage and facilitate professional development, lead or participate in PLCs, carry out effective and appropriate communication with all staff and stakeholders, and be aware of educational research, best practices, and potential uses for emerging technologies in education (Brooks-Young, 2006, 2013).

The first performance indicator of standard 3 addresses the need for educational administrators to allocate time, resources, and access for continuous professional development for both their staffs and themselves (3.a). Research suggests that educators participate between 15-60 hours of professional development on an annual basis (Brooks-Young, 2006, 2013). This requirement is even more important in a technology-infused learning environment. Performance indicators 3.b and 3.d address the need for educational administrators to lead, manage, and consume educational research around the effective and
appropriate use of technology in the classroom. Performance indicator 3.b addresses the need for educational administrators to participate in PLCs that support and facilitate instructional technology research. Performance indicator 3.d focuses on the need for educational leaders to stay abreast of educational research and emerging trends related to the effective use of instructional technology as well as encourage ongoing evaluation of all aspects of new technologies and educational initiatives.

The final performance indicator of standard 3 (3.c) focuses on the need for educational leaders to leverage technology effectively to communicate and collaborate with stakeholders. Technology provides several tools for communicating (e.g. Skype, email, GoToMeeting, Facebook, Twitter, and etc...), collaborating (e.g. Google Docs), and disseminating information to a large number of people in an effective and efficient manner (e.g. wiki, blogs, school websites). Brooks-Young (2013) suggests that school-based leadership survey school stakeholders on access to communication tools, to ensure that all stakeholders have the ability to receive important information (i.e., % of homes that have Internet access, and/or home phone).

In a one-to-one computing environment, the importance of keeping abreast of educational research, technology trends, and new changes in educational law or policy is magnified. Technology changes and updates in a very rampant pace, and for teachers to be fully prepared to prepare their students for these changes, school-based leadership must be dedicated to continuous improvement. School-based leadership, in a one-to-one computing school, need to provide the results of recent educational research on a regular basis via electronic communication and through small group discussions during meetings (Brooks-Young, 2013).
Also just as important, in a one-to-one computing environment, as staying abreast of recent educational research is promoting and modeling effective communication techniques using digital age resources. Brooks-Young (2006, 2013) suggests that school based leaderships use wiki’s and blogs to communicate with stakeholders and staff. This would be an effective and efficient communication method since all members of your staff would have a personal laptop and would have direct access. Brooks-Young (2013) also suggests that educational leaders, in technology rich environments, setting a routine schedule for communicating with staff. This could be completed by a weekly email with announcements, important dates, and resources on a specific day of each week during the school year. These emails could be archived to the staff wiki or blog easily as well.

**Systemic improvement**

The fourth standard of the ISTE-A framework is Systemic Improvement and consists of five different performance indicators. Central to this standard is data-driven decision-making that includes collaborating to collect data, analyze data, interpret findings, and share results around staff and student performance (4.b). The fourth standard describes how school technology leaders must recruit and retain technology-savvy teachers and staff (4.c). This standard also focuses on supporting the infrastructure (4.e) and creating strategic partnerships to support “management, operations, teaching, and learning” (4.d) (ISTE, 2009, p. 1).

The final performance indicator of standard 4 (4.a) is an overarching indicator of successful performance and is intertwined within each indicator of standard 4. This indicator addresses the need for educational leaders to possess the skill sets to "lead purposeful change to maximize the achievement of learning goals through the appropriate use of technology and media-rich resources" (ISTE, 2009, p 1). Brooks-Young (2013) recommends that new
school-based leaders review how current technology is identified, used and evaluated within the school. Once this review is complete, the educational leader will be able to ensure proper alignment of these resources in teachers' lesson plans, and in their daily pedagogy.

In a one-to-one computing environment, school-based leaders must be looking to improve themselves as professionals, their schools, and the teachers they lead. Educational leaders should be continuously evaluating the success of their educational efforts and looking for specific areas of improvement (Brooks-Young, 2013; Fullan, 2014). These evaluation efforts are another example of how important educational partnerships are within a successful and sustainable one-to-one initiative. Educational leaders should partner with state Universities and educational researchers to develop evaluation instruments and evaluation plans to ensure that specific initiatives are making the most impact possible on student achievement and teacher’s pedagogy.

When schools provide a personal computing device for every student in the class, school-based leaders must be aware and prepared to address an area they might not be familiar with. This area is the importance of providing a wireless infrastructure that is large enough to handle the significant influx of new devices accessing the wireless network. Educational leaders will have to monitor these infrastructures to ensure that wireless access is not slowed or hindered due to the increase demand the additional devices on the school’s network.

Finally, with so many additional demands on the Principal within a one-to-one learning environment, the job duties of the primary leader of school is too demanding for one person to undertake on their own. Principals need to build strong leadership teams filled with educational professionals that have strengths that fill the weaknesses of the Principal
themselves. According Simmons (2014) this team should include an instructional technologist that can advise, train, and inform school-based administrators on technology-related items and problems.

**Digital citizenship**

The fifth and final standard of the ISTE-A framework is titled Digital Citizenship and consists of four performance indicators. This standard focuses on the school leaders’ responsibility for ensuring equitable access to digital tools as well as promoting, modeling, and establishing “policies for safe, legal, and ethical use of digital information and technology” (ISTE, 2009, p 1). The standard of digital citizenship details how a school technology leader must also facilitate a school-wide understanding of and involvement in global issues through modern digital communication tools (ISTE, 2009).

As the dependence on technology in our general society continuously grows, educational leaders must be aware of and address the issues that the digital divide can have on a school. Performance indicator 4.a addresses the need for educational administrators to ensure "equitable access to appropriate digital tools and resources to meet the needs of all learners (ISTE, 2009, p 2). As a part of equitable access, Brooks-Young (2013) recommends that school-based leadership maintain a inventory of all personal learning devices within the school, their location in the school, the year the device was purchased, and recommended lifespan. This would allow education administrators to allocate funds for systemic refresh of a school's technology to ensure equitable access within the school.

Performance indicators 5.b and 5.c focus on the educational administrator's responsibility to promote, model, and establish policies for safe, legal and ethical use of digital technology as well as responsible social interactions. Brooks-Young (2006, 2013) suggests that
educational leaders successfully meet this indicator by offering Internet safety classes for all staff and stakeholders, provide annual professional development on copyright law and district policies, as well as guidelines for proper use of school and district equipment and services (5.b).

The final performance indicator of standard 5 (5.d) focuses on the increasing importance of global awareness in the K-12 educational environment. Technology allows for communication and collaboration between individuals in different states and even in different countries. While this opportunity for collaboration and communication has several potential benefits for students that are involved, it also highlights the importance of educating students on different cultures, different traditions, and appropriate communication techniques to ensure all students are not offended or hurt from participating with students of different backgrounds, cultures, and/or religions. If global awareness is not addressed prior to these activities, the potential negative issues that could arise would outweigh the potential benefits.

Digital citizenship and online awareness are becoming increasingly important. School-based leadership, within a one-to-one will be asked to develop policies and procedures that will promote safe, legal and ethical social interactions between school staff and stakeholders (e.g. community leaders, parents) as well as online interactions between teachers and students outside of the regular school day. Examples of possible issues that might arise include: teachers and students being friends on social media sites, holding parent conferences or communicating with parents via social media, as well as potential inappropriate online postings by school staff. While most school leaders will have to be aware of these issues as well, these likelihood of these issues arising is increased in a learning environment where every student has a personal computing device.
Summary

Evaluators of one-to-one computing initiatives across the United States found generally positive relationships between one-to-one computing environments and various aspects of the teaching and learning process. They reported that teachers used the laptops to develop instructional materials, access information related to instruction, and communicate with colleagues; students used laptops to complete classroom assignments and conduct research. Students have shown an increase in engagement and motivation after the implementation of several of the one-to-one computing initiatives. Evaluators also report that laptops have facilitated the development of 21st century skills (e.g., digital literacy, creativity and innovation skills, critical thinking and problem-solving skills, communication and collaboration, and self-directed learning among students).

Educational research has shown that effective leadership is fundamental for the successful implementation and sustainability of the initiative. The focus of this study is the professional development needs of school-based leadership in preparation for a district-wide one-to-one computing initiative in a large urban school district.

Chapter 2 of this study provided a review of the literature around one-to-one laptop initiatives, as well as the importance school-based leadership to the success of a one-to-one computing initiative, and concluded with detailed description of the ISTE-A framework. Chapter 3 will outline the methodology to be used in answering the research questions of this study.
Chapter 3

Methods

This chapter will address the methods that were used to examine the professional development needs of school-based leadership in preparation for a district-wide implementation of a one-to-one computing program in a large, urban school district in the southeastern United States. Information concerning research design, research questions, and the research framework for this study will be addressed along with detailed information on site selection, data collection, and analysis. Validity and reliability, ethical considerations, and study limitations will be addressed in the final sections of chapter 3.

Research Design

Mixed methods

This study used a mixed methods approach, which is a methodology for collecting, analyzing, and mixing both quantitative and qualitative data during the research process within a single study, to understand a research problem more completely (Creswell, 2003; Creswell, 2007; Creswell, 2012; Tashakkori & Teddlie, 2003). The underlying principle for mixing is that neither quantitative nor qualitative methods are adequate by themselves to capture the details and complexity of the condition being studied. When used in combination, quantitative and qualitative methods complement each other and allow for more complete analysis (Tashakkori & Teddlie, 2003; Cresswell, 2003; Creswell, 2007; Creswell, 2012).

When designing a mixed methods study, three issues need consideration: priority, implementation, and integration (Creswell, Plano Clark, Guttmann, & Hanson, 2003). Priority refers to which method, either quantitative or qualitative, is given more emphasis in the
study. In this research study both quantitative and qualitative are given equal weight and priority in the study.

Implementation refers to whether the quantitative and qualitative data collection and analyses come in sequence, one following another, or in parallel. This study included two phases, which were implemented in a sequential design. The first phase was a quantitative survey of school-based leadership, where participants were asked about whether they had completed specific tasks in their current position as well as how difficult they perceived specific tasks would be to successfully complete in the future. The research questions were based on the ISTE-A framework by The International Society of Technology in Education (ISTE). The second phase of the study included qualitative semi-structured interviews conducted with administrators of the District’s Instructional Technology Department and the Assistant Superintendent of Academics. These individuals are in charge of designing, implementing, and evaluating the district’s professional development efforts in the areas of instructional technology and technology leadership. Interview participants were provided an online data dashboard where they could review the results of the first portion of this study (survey results). By providing survey results to these educational professionals, educational leaders had a more complete understanding of the current professional development needs of school-based leadership which allowed the researcher to determine what potential solutions or strategies these leaders believed could be implemented to address these needs of school-based leadership.

Integration refers to the phase in the research process where the mixing or connecting of quantitative and qualitative data occurs. Integration is really the heart of the whole mixed methods exercise because the purpose of mixing methods is to get information
from multiple sources, and triangulate the data (Creswell, 2012). The most common mixed methods design combines survey and interview data, as this study did. For this study, an online survey was deployed to all school-based leadership in the school system being studied. Survey data were then analyzed and summarized for interview participants to review before their individual interviews. Interviews were the second portion of the study and consisted of members from the District’s Instructional Technology Department as well as the Assistant Superintendent of Academics in the school district being studied.

After completion of both the survey data collection and interview data collection, results from both protocols were integrated and interpreted in order to answer the study's research questions that drove the research. While the objective of the first phase of this study (survey) was to identify potential professional development needs of school leaders, the objectives for phase II of this study was to gain a deeper understanding of why the professional development areas were needs for school leaders as well as what potential solutions interviewees believed could be implemented to address the needs identified during phase I of this study.

The use of mixed methods represented the best choice for this study because as pointed out by Teddlie and Tashakkori (2003), it enabled the researcher to address research questions in this area that could not be answered by other methodologies. The use of mixed methods assisted the researcher in explaining the results of the quantitative survey, and, interpreting qualitative text for potential solutions or strategies to address the professional development needs of school-based leadership.

While there are both advantages and disadvantages to using a mixed-methods approach when investigating any phenomenon, combining and integrating quantitative and
qualitative approaches to research methods can sharpen the understanding of the research findings (Gay & Airasian, 2000; Creswell, 2012; Creswell, 2007). Tashakkori and Teddlie (2003) add that through using mixed-methods, researchers can build a study based on the strengths of both research methods, which may provide a more complete picture of a research phenomenon or problem. Furthermore, according to Greene and Caracelli (1997), mixed methods design can yield richer, more valid, and more reliable findings than implementing a single quantitative or qualitative study alone. Mixed methods research is a design with philosophical assumptions as well as methods of inquiry (Creswell & Plano Clark, 2007).

**Explanatory Sequential Mixed Method**

This study used a popular mixed methods design in educational research: explanatory sequential, consisting of two distinct phases (Creswell, 2002, 2003, 2005; Creswell et al., 2003). Creswell (2005) described this method as “consisting first of collecting quantitative data and then collecting qualitative data to help explain or elaborate on the quantitative results” (p. 515).

Overall the two-phase structure of the explanatory sequential design method is considered a strength of the plan because it is clear and easy to implement. This design also allows for the findings to be reported using a two-phase format that divides the quantitative and qualitative phases for the reader. This approach generally requires more time for implementing the two phases. For the participant selection model in particular, the researcher also needs to specify criteria for the selection of participants for the qualitative phase of the research, which for this study was administrators of the Instructional Technology Department (Creswell, 2007). This design allowed the researcher to further explain quantitative results
with qualitative data. In this study, the researcher used a semi-structured interview structure to follow up on the results of the quantitative online survey.

There are several benefits to implementing an explanatory sequential mixed methods approach. Creswell and Plano Clark (2007) provided the following advantages of implementing a sequential explanatory design: (1) straightforward to implement, (2) results can be written with two different sections (qualitative and quantitative) and then discussed together, and (3) the design allows the second phase to be based on what emerges from the first phase of data collection. This design also has several challenges that must be addressed:

- The design takes a lengthy amount of time to implement
- It can be hard to secure IRB approval if the second phase of the research protocol is designed to be developed after data collection of the first phase is completed
- The researcher needs to decide which part of the quantitative results needs to be further explained by a qualitative phase of research
- The researcher must decide how to select participants for the second phase of the study (Creswell & Plano Clark, 2011)

The process of implementing an explanatory sequential research design contains four steps (see Figure 3. Stage 1 is focused on designing and implementing a quantitative data collection protocol. Stage 2 is where the researcher determines which quantitative results can be expanded upon by a qualitative data collection protocol. Stage 3, similar to stage 1, is focused on collecting data except in this step the researcher is collecting qualitative data that is designed to expand on the quantitative results. In stage 4 the researcher analyzes, interprets, and reports the results of both data collections in separate sections and then reports
a section on how each data collection interacts with the other (Creswell & Plano Clark, 2007).

Figure 3. Explanatory Sequential Design (Creswell & Plano-Clark, 2011, p 84)
Research questions

Hatch (2002) describes the importance of developing good research questions:

“identifying research questions is a critical step in research design because questions give
direction to the study, limit the scope of the investigation, and provide a device for evaluating
progress and satisfactory completion” (p. 41). Marshall and Rossman (2006) classified
research questions into four types: exploratory, descriptive, explanatory, and emancipatory.
For this study, research questions included looked to describe as well as explain the
phenomenon being researched which was the professional development needs of school-
based leadership in preparation for a district-wide one-to-one computing initiative.

1. What are the professional development needs of school-based leaders preparing for a
one-to-one computing initiative?

2. Do differences in professional development needs exist among:
   a. Leadership Positions
   b. Grade Span of the school
   c. Level of poverty at the school
   d. Years’ experience
      a. Computer skill-level

3. What potential solutions do educational leaders believe could be implemented to
   addresses the professional development needs identified in this study?

Site Selection

The school district studied is one the 25 largest school districts in the United States
(over 150,000 students) and is growing at annual rate of approximately 4,000 students. At the
time of this study, this school district recently gained voter approval for a school bond
referendum that provided millions of dollars to update individual school wireless networks, provide ongoing professional development to educators and leaders on the effective use of digital tools and resources, provide every teacher a personal laptop, and decrease the student-to-instructional computer ratio to 3:1 with the ultimate goal of reaching one personal learning device for every student. This school district was selected as the research site for multiple reasons including:

- The size of the district
- The diversity of the student population
- School district represents 11% of their state's K-12 population
- Current technology environment within the school district

Convenience was also another factor in the selection of the site for research. The researcher worked with the district that was researched. The researcher did not supervise, evaluate, or supervise any of the participants of this study. The department the researcher worked in conducts evaluation, research, and data analysis for the leadership of the school district.

**Current Technology Environment**

One reason the school district was selected as the research site was due to the current technology structure and the vision of district leadership to improve on the current student-instructional computer ratio within the next year. The proposed plan was to decrease the student-computer ratio to 3:1 (student to instructional computer) during the 2015-16 school year and begin planning to reduce the ratio even more within the next 5-10 years via fund reallocation, grant funding, and public-private partnerships. These ratio goals did not take into account teachers’ computers, administrators’ computers while district leadership plans to
ensure each of members of these two groups were issued a personal laptop to use for instructional purposes. This school district had recently successfully proposed a municipal bond referendum for close to one billion dollars to fund new school construction, several major school renovations, and over 124 million dollars in technology funding to provide all teachers with a personal laptop for educational use, update and increase capacity of every school’s wireless network, install a refresh plan for all old devices, and increase the number of instructional computers to a 3 students to one computer ratio. While this funding made a significant impact on the technology needs of the school district, it did not fully meet the technology needs of the rapidly growing school district. District leaders saw this investment as a strong foundation that could be built upon by acquiring additional funding through multiple means. It is imperative that educational leaders at both the school level and district level are adequately prepared to lead these new learning ecologies to ensure that public trust is not lost and future local funding requests are not put in danger of not being approved due to a lack of confidence in educational leaders to efficiently and effectively use taxpayer money.

**Research Participants**

In speaking about quantitative research, Creswell (2005) stated, "The larger the number of individuals studied, the stronger is the case for applying the results to a large number of people" (p. 48). This study's target population consisted of over 500 school based administrators in a large urban school district. For this study a school-based administrator or school-based leadership consisted of both Principals and Assistant Principals. The rationale for including Assistant Principals as participants for this study was due to the following factors:
The high turnover rate of Principals within the school district over the last five years (27.5 average Principal changes per year)

The growing demand on the Principalship position and the need to share leadership among school-based teams

The use of the Assistant Principal position as a training ground for future Principals within the school district

In addition to studying differences in professional development needs, if any, between Principals and Assistant Principals, this study examined differences in professional development needs across the demographic variables of race, gender, and age. While demographics and gender numbers are provided in Table 3, age ranges depended on the self-reporting of survey participants.

Table 3 Participant Demographics

<table>
<thead>
<tr>
<th>Title</th>
<th>M</th>
<th>F</th>
<th>Caucasian</th>
<th>Black</th>
<th>Other</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assistant Principals</td>
<td>135</td>
<td>206</td>
<td>217</td>
<td>103</td>
<td>21</td>
<td>341</td>
</tr>
<tr>
<td>Principals</td>
<td>70</td>
<td>103</td>
<td>129</td>
<td>38</td>
<td>6</td>
<td>173</td>
</tr>
<tr>
<td>Total</td>
<td>205</td>
<td>309</td>
<td>346</td>
<td>141</td>
<td>27</td>
<td>514</td>
</tr>
</tbody>
</table>

Note: Other races include American Indian, Asian, Pacific Islander, Hispanic, and Two or More Races

Data Collection

The data collection instruments for this research study consisted of a Likert-scale survey and individual follow-up semi-structured interviews. The survey participants included school-based leadership (Principals and Assistant Principals) from a large southeastern urban school district. Follow-up interviews were conducted with members of the school district’s instructional technology department as well as the leader of the digital transformation of the school district. Data collection protocols will be discussed in the order they were deployed.
Surveys

Surveys were the primary tool used in the data-gathering portion of this study. Surveys are often thought of as tools to be used exclusively in quantitative research. Gay (1996) and Merriam (1998) indicate that even such tools, which gather primarily numerical quantifiable data, are valuable in substantiating the narrative findings of qualitative case studies. Anderson (1998) states that surveys are often a preferred-use tool for capturing substantial participant data in case study investigations.

Surveys are also a frequently used tool in the triangulation process, which helped to promote the validity and reliability of the study. Additionally, surveys can help determine whether solving any identified problems will be beneficial to the organization. The primary purpose in surveying the school-based leadership of a large urban school district was to discover the professional development needs of these leaders before the implementation of a district-wide one-to-one computing initiative. Research shows that one-to-one initiatives are very expensive initiatives to implement (Abell Foundation, 2008; Shapley et al., 2010) and require a different skillset from school-based leadership to ensure the initiative will be sustainable and impactful on student achievement (Simmons, 2014; Fullan, 2014).

Peterson (2000) contends that survey research is fundamentally a questioning process, which provides answers to a number of non-rhetorical research questions. Research questions provide answers to fundamental who, why, how, where, and what type questions (Peterson, 2000; Yin 1994). The participant data also enable the researcher to gain the kind of insights often sought in the study of educational programs and assists the researcher in evaluating, summarizing, and making conclusions about the preparedness of these individuals to lead one-to-one initiatives (Merriam, 1998).
This study employed closed-ended questions as the primary quantitative tool in the investigation. The survey instrument, The One-to-One Computing Leadership Assessment, described in detail below, was developed for the purpose of collecting data from K-12 school leadership in a large urban school district, related to the research questions described previously.

**Description of the survey instrument**

Fowler (2009) describes survey development as one of the more arduous tasks in the process of survey research. The One-to-One Computing Leadership Assessment, was developed by the researcher based on the National Education Technology Standards for Administrators (ISTE-A) as described in Chapter 2 of this study. Questions were developed and deployed within the following leadership standards: Visionary Leadership, Digital Citizenship, Systemic Improvement, Professional Practice, and Digital-Age Learning.

The survey instrument, The One-to-One Computing Leadership Assessment, consisted of 5 matrix questions based on the 21 performance indicators of the ISTE-A framework. Of these 5 questions, research participants were asked to what extent they have completed a set of tasks in their current role as well as how difficult they perceive it would be to complete the same set of tasks in the future. The rationale for asking survey participants these two question formats was to determine the current baseline on specific tasks or behaviors related to the ISTE-A standards and to determine the perception of how challenging specific tasks would be for the survey participants to complete in the future. By determining which tasks are perceived the most challenging, district leaders will know which topics will require the most training when planning or designing professional development to meet the needs of school-based leadership.
When discussing prior tasks, survey participants were asked to what extent they had successfully completed the task on a five point Likert- Scale. This scale consisted of: 1=Not at all, 2=Minimally, 3=Somewhat, 4=Significantly, and 5=Fully. For survey questions related to future tasks, survey participants were asked to rate how difficult they perceive the task would be for them to complete in the future. The scale for these questions included: 1=Very Easy, 2=Easy, 3=Neutral, 4=Difficult, and 5=Very Difficult. At the end of each section, the survey participant was given the opportunity to provide their reasoning behind why the tasks, if any, that they identified as difficult to complete would be difficult to complete in the near future. The survey concluded with participant’s demographic questions as well as a multiple choice question on how many professional development hours these participants have completed over the prior year and a multiple choice question on their preferred delivery of professional development.

**Interviews**

Creswell (2011) indicates that researchers increasingly use a theoretical lens or perspective much in the same way that a quantitative researcher will establish a theory or central premise in order to conduct an experimental design. Creswell (2003) and Merriam (1998) indicate that for the qualitative researcher, the theory emerges from the data. This becomes an inductive and often concurrent process over the duration of the study. It can be delineated as a five-step phase of inductive logic on the part of the researcher:

1. Researcher gathers information (e.g., interviews, observations)
2. Researcher asks open-ended questions of participants or records field notes
3. Researcher analyzes data to form themes or categories
4. Researcher looks for broad patterns, generalizations, or theories form themes
or categories

5. Researcher links generalizations or theories to past experiences and literature (Creswell, 2003, p.132)

To provide triangulation of evidence collection, the use of multiple methods of evidence collection to confirm findings is appropriate (Creswell & Plano-Clark, 2007; Creswell, 2012). Therefore, follow-up interviews were conducted with members of the Instructional Technology department for the school district being studied. For this study, the interviews were semi-structured which allowed the interviewer to ask follow-up questions that provided deeper and more concise data collection. The interview protocol's questions were loosely structured to give the researcher the flexibility to refocus the questions of interview, if he thought it was necessary. The semi-structured interviews are considered the second cycle of data collection within the study. This cycle helped the researcher to ask qualifying and mining questions that have inductively risen from the survey results.

The researcher interviewed 6 members of district Instructional Technology Department. The length of these interviews lasted an average of forty-five minutes each. District-based leadership are extremely busy professionals and the researcher believed that a shorter interview length would promote participation and would not hinder the daily work requirements of these individuals.

All the interview content was audio-recorded. Adler and Clark (2003) suggest that the more unstructured the interview, the more necessary audio-recording becomes. Seidman (2006) points out that a recording device may seem to inhibit open conversation, but the existence of the device is soon forgotten in most interviews. In addition, extensive field notes was kept for each interview. The researcher explained the purpose and benefits of audio-
recording to the participants before proceeding to the interview. Because all the conversations were audio-recorded, the researcher was able to concentrate on listening and preparing the next questions without a need to take notes on all the variations of each interview.

The researcher transcribed all the interview recordings for further analysis. Seidman (2006) argues that all the in-depth interviews should be transcribed word by word, because every word that a participant speaks reflects his consciousness. He warns that paraphrasing or making summaries may lead researchers to make premature judgments about what is important and what is less important. Preserving the words of the participants enables researchers to have their original research information and be able to go back to the original data and check accuracy whenever something unclear comes up. The researcher transcribed all the audio-recordings himself, and no one else listened to the recording of the interviews. Corrections in the transcripts were made to ensure precise use of participants' words. Pseudonyms were used to identify interviewees in the transcribing process and analysis to protect their identity. No personally identifying information about the interviewees was disclosed in any written documents.

Rather than trying to strip the influencing factors, Seidman (2006) recommends that a qualitative researcher recognize and affirm the role of the interview instrument, the human interviewer. The meaning collected is a function of the participant's interaction with the interviewer. The researcher tried to minimize the distortion, by recognizing the interaction and affirming the possible consequences that the relationship might have brought.
Data Analysis

Since units of analysis are not samples as understood in quantitative research, they cannot be generalized to populations. Instead, as suggested by Yin (1994), this study's overarching data analysis goal was to expand and generalize relevant findings within the context of the study's theoretical propositions. This section discusses how both sources of data: survey results, and interview results was analyzed.

Survey results

In order to get a holistic understanding the professional development needs of school-based leadership in preparation for a district wide one-to-one initiative in a large urban school district, a mixed methods sequential explanatory design was implemented. As will be discussed later in this chapter, the researcher employed quantitative tools as part of a mixed method approach, which Creswell (2003) indicates can have value in strengthening and triangulating the findings of case study research. This mixed methods paradigm is ideal for studying the professional development needs of school-based leadership in preparation for a district wide one-to-one initiative because it allows the researcher to collect data that is both detailed and robust. By asking specific questions, the researcher had an opportunity to capture a variety of data in order to gain insights about the phenomena being investigated (Peterson, 2000).

Surveys results were analyzed through descriptive statistic methods as well as analysis of variance (ANOVA) testing between multiple variables of data. The researcher was interested in comparison between the following groups: Position (Principal, Assistant Principal), Years of Experience, Poverty Level of the School, and Self-Assessed Computer Skill-Level.
**Interview results**

Constant comparative method was used to analyze the qualitative data collected (Patton, 2002). The researcher waited to conduct an in-depth analysis of the interview data after all interview data had been gathered to avoid imposing one administrator's meanings onto another's (Seidman, 2006). Afterwards, qualitative text as organized by codes to further ascertain common themes and categories. Based on the qualitative data analyses, research question findings was reported from interviews in descriptive text and tables.

**Inductive analysis**

The analysis of data for this study is based on the guidelines of the constant comparative method. In this method of analyzing qualitative data, devised by Glaser and Strauss (1967):

Data in the form of field notes, observations, interviews, and the like are coded inductively, and then each segment of the data is taken in turn and, a) compared to one or more categories to determine its relevance and b) compared with other segments of data similarly categorized. As segments are compared, new analytic categories as well as new relationships between categories may be discovered (Schwandt, 2007, p.37).

Merriam (2002) states the constant comparative method follows four distinct stages. In the first stage the researcher generates tentative categories and codes each incident into as many tentative categories as are appropriate. In the second stage, the researcher attempts to integrate categories and their properties. The third stage is categorized by the delimitation of theory. Similar categories are reduced to a smaller number of highly conceptual categories and hypotheses are produced. The simultaneous collection and analysis of data ends when the
categories become saturated. The fourth stage is the actual writing of the theory from coded data and memos that "occurs when the researcher is convinced that his analytic framework forms a systematic substantive theory, that it is a reasonable accurate statement of the matters studied, and that it is couched in a form that others going into the field could use" (Glaser & Strauss, 1967, p.113).

**Research Validity**

Research Validity refers to how well an instrument measures what it is proposed to measure (Cozby, 2001; Moskal & Leydens, 2000). There are several ways to measure validity of a study, but in this case the researcher has decided to measure both the face and construct validity of both data collection instruments. Face validity ascertains that measure appears to be assessing what the instrument is meant to assess (Cozby, 2001; Moskal & Leydens, 2000). Second method of validity testing that is being utilized in this study is construct validity. Construct validity is used to ensure that the instrument is actually measuring what it is intended to measure and not other variables (Cozby, 2001; Moskal & Leydens, 2000). To ensure the research validity of this study, a member, a trained social scientist of the researcher's work department, reviewed the research instruments, data collected and analyzed findings to ensure the validity of the work.

When conducting mixed-methods research, Onwuegbuzie and Johnson (2006) used the term "legitimation" (p. 48) when referring to the validity of a study. One form of legitimation that was directly addressed through this study is inside-outside legitimation" (Onwuegbuzie & Johnson, 2006, p. 58). This form of legitimation takes place during both the quantitative and qualitative phases as well as during the integration phase of the study. Inside-outside legitimation is obtained by having another individual trained in social science
research provide objective feedback after reviewing the data collected, the interpretations made, and the conclusions drawn.

This study used triangulation as the validation procedure, which serves as a mechanism for reducing bias and ensuring accurate interpretation of the data. In triangulation, researchers make use of multiple and different sources of methods, investigators, and theories to provide corroborating evidence (Merriam, 2002). Multiple sources of data collection was employed, including a survey, and follow-up interviews.

**Research Reliability**

Reliability refers to the extent to which research findings can be replicated. Reliability is “problematic in the social sciences simply because human behavior is never static, nor is what many experience necessarily more reliable than what one-person experiences” (Merriam, 2002, p 27). Reliability can be increased through triangulation as explained above. Also, reliability was strengthened through an explanation of the researcher's subjectivities, including assumptions and biases about the research.

The reliability of the survey instrument is also important (Cozby, 2001). To test the reliability of this study's survey instrument, the internal consistency of the instrument was measured. In internal consistency reliability, the researcher used the average inter-item correlation method to determine the reliability of the instrument (Cozby, 2001; Moskal & Leydens, 2000). The average inter-item correlation uses all of the items on the survey instrument that are designed to measure the same construct, that in this cases is the five different groups of standards within the ISTE-A framework. The average inter-item correlation is the mean of all the correlations of the five ISTE-A Standards. The results of these reliability tests will be reported in chapter 4 of this study.
Research Timeline

Data for this study were collected in early 2015 and analyzed during the summer of 2015. The first phase of this study (survey of school leaders) was conducted during a three week survey window in March, 2015. The second phase of this study (semi-structured interview) was completed during a two week window in mid May, 2015. Other important dates and milestones include:

- IRB Application Approved (Exempt-Status)-March 6, 2015

Limitations

Limitations are potential weaknesses in one’s study and are out of one’s control (Leedy & Ormrod, 2011; Simon, 2011). Perhaps because this study focuses on a single unit, a single instance, the issue of generalizability looms larger here than with other types of qualitative research (Stake, 2005). Erickson (1986) argues it is the reader, not the researcher, who determines what can apply to his or her context. Stake (2005) explains how this knowledge transfer works: researchers "will, like others, pass along to readers some of their personal meanings of events and relationships--and fail to pass along others. They know that the reader, too, will add and subtract, invent and shape--reconstructing the knowledge in ways that leave it...more likely to be personally useful" (p. 455). Barriers that limit this study include time, finance, access, location, sample size, and the researcher's current position in the school district.
Ethical considerations

This research study was presented to the University’s Intuitional Review Board to ensure all subject are treated in a moral and ethical way. Maintaining high ethical standards was a priority in conducting this study. Part of maintaining a principled philosophy regarding ethical standards requires that the researcher provides concise and thorough information about the purpose of the study as well as how the results will be used. Participants who agree to participate in the study was notified in writing. The participants was asked to sign a consent form for participation which noted the obligation and time commitment to the study. Participant identity and responses are kept confidential and was maintained through secure storage, and disposal of print and electronic data files after 2 years from the completion of the study.

Subjectivity Statement

After graduation from Methodist College in 2005, I began my graduate education career at East Carolina University in their Master of Arts of Education in Health Education program. This program was offered completely online in an asynchronous format. This program was my first online education experience and it immediately interested me. I felt then, and still today, that distance education and instructional technology could close the gap that socio-economic status and geography position place on students, in K-12 grades, as well as higher education.

After completion of my Master of Arts in Education degree, I decided to go forward at East Carolina University with a second Master of Arts in Education degree with a focus in instructional technology as well as a graduate certificate in Distance Learning and Administration. At that time, I developed a love for technology leadership and a desire to
pursue a personal educational portfolio that would fully prepare me to be a future leader in
technology leadership in K-12 education. It was this desire that convinced me to pursue two
Doctorates in Education: a PhD in Curriculum and Instruction with a focus in Instructional
Technology and an EdD in Educational Leadership simultaneously. It is my belief, which the
large and demanding course-load over the last five years has prepared me for the increasing
large demands of future educational leadership positions in K-12 education. For me, 21st
century educational leaders need a new skillset that just one of these of degrees could not
fully prepare me for. Online education provided me opportunities, which without technology,
would not have been available to me. For these opportunities, I have become an advocate of
technology implementation in schools at all grade levels.

It is my belief that the future of education, as well as our nation, will be fueled by
technology and innovation. We are currently preparing our students for some careers, which
have not been created yet. Twenty years ago the Internet was barely available to
corporations, wireless technology was only a hope for the future, and cell phones were large
systems, in bags, inside a person’s car (Lei, Conway, & Zhao, 2007). Only the imaginations
of gifted innovators can predict what future careers and technology advances are in store
future generations, but as educators must begin, now, preparing future generations for these
future needs by providing them with the technological literacy required to understand future
innovations and technological needs.

Technology cannot just be a subject we teach or a topic we cover, it must be
immersed into our everyday teaching practices and academic modeling. Adequate
instructional technology integration takes place when technology can be camouflaged into
every lesson, with the subject being the star attraction and the technology serving as an
effective production assistant. Most educators do not realize that technological advancements, comparable to the one- to one laptop initiative, are present in educational history. A great example is the introduction of notebook paper and the pencil to the educational setting. In that particular time period, a pencil and paper for every child was just as new and innovative. Just as now we do not expect each child to share one pencil and one piece of paper, we should not expect our children to share one laptop computer among classmates, classes, or even grade levels (Lei, Conway, & Zhao, 2007).

I am a firm believer in the positive effects the one- to one laptop initiative can have at the elementary school level as well as the upper levels of K-12 education in North Carolina schools. It is my belief, that we should not be concerned by the initial costs of implementation, but the long term costs of not implementing the one- to one laptop programs in our elementary and upper level K-12 schools in North Carolina.

Summary

Chapter three focused on research methodology. The researcher provided an overview of the methodology used for data collection, the research design, and the plan for analyzing data collected throughout the study. This chapter discussed the participant selection process, a breakdown and explanation of both the sample and the argument for its adequate representation of the population. The third chapter concluded with an overview of the limitations of the study, and the researcher’s subjectivity statement.

In chapter four I will present my research findings. This will include aggregate survey results; themes pulled from the interview data, and will provide results related to each research question which is driving this study.
Chapter 4

Results

The focus of this study was the professional development needs of school-based leadership in preparation for a district-wide one-to-one initiative in a large urban school district. As of December 2014, Henrico County, VA is the largest school district (48,000 students and 62 schools) to undertake an one-to-one laptop initiative on their own. The school district, on which the current research is focused, is over three times the size of Henrico County’s student population (over 155,000 students) and consists of 173 schools.

Discovering the professional development needs of school-based leadership in a large urban school district could provide several different benefits for future technology initiatives in the K-12 educational setting including: (1) informing training programs for educational leaders in preparation for computing initiatives, (2) providing a better understanding of what the most significant needs are of current school-based leadership, (3) and providing University professors a foundation to develop future courses to address the needs of this new learning ecology and better prepare future leaders for technology infused learning environments.

Research Questions

For this research study, the following questions helped to inform the understanding of the phenomenon being studied which is the professional development needs of school-based leadership in preparation for a district-wide one-to-one computing initiative in a large urban school district.

1. What are the professional development needs of school-based leaders preparing for a one-to-one computing initiative?
2. Do differences in professional development needs exist among:
   a. Leadership Positions
   b. Grade Span of the school
   c. Level of poverty at the school
   d. Years’ experience
   e. Computer skill-level

3. What potential solutions do educational leaders believe could be implemented to address the professional development needs identified in this study?

Response Rate

The target population for the first phase of this study was Principals and Assistant Principals of the large urban school district being studied. This population consists of 514 educational leaders (341 Assistant Principals and 173 Principals). The survey was open for three weeks with the researcher sending out three reminder emails for survey participation. Of the 514 educational leaders, 482 administrators completed the survey at least partially (93.7%) and 320 administrators completely finished the survey (62.2%). For this study, the researcher will present results of all partially and fully completed surveys completed during the survey window. Specific numbers (n=) will be reported for each question.

Participants’ Demographics (survey)

Demographic questions were included at the end of the survey, and this placement caused some information to be missing from the results. Five administrative interns completed the survey who were outside of the expected survey population of Principals and Assistant Principals. These individuals were included in survey results as district leaders expressed the majority of these interns, after completing their school administration degree,
are selected to begin their administrative career within the school district as an Assistant Principal. Overall response rates were higher with Principals (75.5%) then Assistant Principals (53.1%) (see Table 4).

Table 4 Participants by Position

<table>
<thead>
<tr>
<th>Position</th>
<th>N</th>
<th>Response Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Principal</td>
<td>131</td>
<td>75.7%</td>
</tr>
<tr>
<td>Assistant Principal</td>
<td>181</td>
<td>53.1%</td>
</tr>
<tr>
<td>Principal Intern</td>
<td>5</td>
<td>Unknown</td>
</tr>
</tbody>
</table>

A majority of the participants were elementary school leaders (n=158) with middle (n=75) and high schools (n=71) having a similar number of respondents (see Table 5).

Table 5 Participants by Grade Span

<table>
<thead>
<tr>
<th>Grade Span</th>
<th>Principal</th>
<th>Assistant Principal</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elementary</td>
<td>83</td>
<td>75</td>
<td>158</td>
</tr>
<tr>
<td>Middle</td>
<td>28</td>
<td>47</td>
<td>75</td>
</tr>
<tr>
<td>High</td>
<td>18</td>
<td>53</td>
<td>71</td>
</tr>
<tr>
<td>Alternative</td>
<td>0</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Other</td>
<td>2</td>
<td>3</td>
<td>5</td>
</tr>
</tbody>
</table>

Note: “Other” = K-8 & K-2 schools

Survey participants were asked how many years of K-12 educational experience they had with most reporting at least 16 years of experience or more (n=201) (see Table 6). A majority of the survey participants held a master’s degree (n=182) and more than one-third held a doctoral degree or had completed graduate coursework beyond a master’s degree (see Table 7).
Table 6 Participants Years of Experience

<table>
<thead>
<tr>
<th></th>
<th>Principal</th>
<th>Assistant Principal</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-5 Years</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>6-10 Years</td>
<td>4</td>
<td>34</td>
<td>38</td>
</tr>
<tr>
<td>11-15 Years</td>
<td>21</td>
<td>52</td>
<td>73</td>
</tr>
<tr>
<td>16-20 Years</td>
<td>39</td>
<td>42</td>
<td>81</td>
</tr>
<tr>
<td>20+</td>
<td>67</td>
<td>53</td>
<td>120</td>
</tr>
</tbody>
</table>

Table 7 Participant’s Education Level

<table>
<thead>
<tr>
<th></th>
<th>Principal</th>
<th>Assistant Principal</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bachelor’s Degree</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Master’s Degree</td>
<td>68</td>
<td>114</td>
<td>182</td>
</tr>
<tr>
<td>Master’s Degree Plus</td>
<td>46</td>
<td>59</td>
<td>105</td>
</tr>
<tr>
<td>Credits</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Doctorate</td>
<td>17</td>
<td>7</td>
<td>24</td>
</tr>
</tbody>
</table>

Three quarters of survey participants rated their computer skill-level as either intermediate (n=113) or advanced (n=124) (see Table 8).

Table 8 Participants Computer Skill-Level

<table>
<thead>
<tr>
<th></th>
<th>Principal</th>
<th>Assistant Principal</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beginner</td>
<td>4</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>Intermediate</td>
<td>52</td>
<td>61</td>
<td>113</td>
</tr>
<tr>
<td>Advanced</td>
<td>54</td>
<td>70</td>
<td>124</td>
</tr>
<tr>
<td>Expert</td>
<td>21</td>
<td>50</td>
<td>71</td>
</tr>
</tbody>
</table>

**Quantitative Findings: Phase I**

**Survey reliability**

Reliability refers to the extent to which research findings can be replicated.

Reliability is “problematic in the social sciences simply because human behavior is never
static, nor is what many experience necessarily more reliable than what one-person experiences” (Merriam, 2002, p 27).

After a survey is given, there are various statistical ways to assess the reliability of a survey. This occurs by assessing the reliability of the answers to all the questions collectively and the answers to each question on a survey (Merriam, 2002). The most common method of assessing reliability is through what is call internal consistency. The approach analyzes the correlation or relationship of the answers to the questions on a survey with one another. The analysis gives a reliability score generally ranging from a negative number to 1.0, with a score closer to 1.0 suggesting that the survey does produce reliable answers. An acceptable survey reliability score is .70, and a strong survey reliability score is .80 and above (Merriam, 2002; Cozby, 2001). To test the reliability of this study's survey instrument, the internal consistency of the instrument was measured. Reliability analysis was conducted with the results showing that the survey items had a high internal consistency ($\alpha=.906$).

**Descriptive statistics**

Descriptive statistics were used to analyze and report survey results. Survey questions were organized into four different categories: knowledge of a task, frequency of completing a task, perception of the importance of a task, and how often participants completed a task at their school. Survey participants were also asked the following questions, which were aligned to the purpose of this study:

- How prepared do you feel to lead a computing initiative at your school next year?
  
  (included in “I Know How to Results”) (Scale 1-10)

- What is your preferred professional development delivery model? (select all that apply)
- Which computing device do you believe would be the most beneficial to implement at your school as part of a school-wide computing initiative?

**School leaders’ knowledge of specified tasks**

Survey participants were asked to rate their level of agreement on a variety of tasks or areas of knowledge that measured if the survey participants “knew how to” complete the prescribed tasks. The scale for these questions were: 1=Strongly Disagree, 2=Disagree, 3=Neither/Neutral, 4=Agree, 5=Strongly Agree. Table 9 presents the results of the “I know how to” section (mean, standard deviations, N) of the survey and is sorted from the lowest (mean) task to the highest. Results from the “I know how to” section show that recruitment and retention of public-private partnerships, leading an online meeting, and establishing a long-term technology refresh plan as the three top professional development needs based on the mean of each item. Conducting unannounced teacher walkthroughs to look for student collaboration and digital learning as well as data-driven decision making were the two tasks that educational leaders believed they were most skilled at.

Table 9 Knowledge Results

<table>
<thead>
<tr>
<th>Task</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formalize processes used to recruit and retain public-private partnerships</td>
<td>3.17</td>
<td>1.002</td>
<td>306</td>
</tr>
<tr>
<td>Lead and manage an online meeting with other professionals</td>
<td>3.25</td>
<td>1.150</td>
<td>315</td>
</tr>
<tr>
<td>Establish a long-term technology refresh plan</td>
<td>3.69</td>
<td>.990</td>
<td>310</td>
</tr>
<tr>
<td>Update school plans and budgets to reflect ongoing as well as growing costs of technology in all areas of learning</td>
<td>3.81</td>
<td>.954</td>
<td>310</td>
</tr>
<tr>
<td>Review existing lesson plans, student work, and/or other documentation to determine how collaboration and digital learning are addressed</td>
<td>3.92</td>
<td>.760</td>
<td>324</td>
</tr>
<tr>
<td>Reallocate school resources to provide professional development</td>
<td>3.92</td>
<td>.815</td>
<td>319</td>
</tr>
</tbody>
</table>
Table 9 Continued

<table>
<thead>
<tr>
<th>opportunities for staff members</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meet with staff members to discuss methods currently in place to ensure effective integration of digital resources</td>
<td>3.96</td>
<td>.604</td>
<td>326</td>
</tr>
<tr>
<td>Establish and implement policies that promote share cultural understanding and exposure to different cultures</td>
<td>3.96</td>
<td>.827</td>
<td>310</td>
</tr>
<tr>
<td>Model proper technology use for my staff</td>
<td>4.04</td>
<td>.741</td>
<td>317</td>
</tr>
<tr>
<td>Share and lead discussion on recent educational research</td>
<td>4.05</td>
<td>.755</td>
<td>317</td>
</tr>
<tr>
<td>Evaluate the success of your efforts on a specific initiative</td>
<td>4.12</td>
<td>.566</td>
<td>329</td>
</tr>
<tr>
<td>Communicate with parents/stakeholders via social-media</td>
<td>4.13</td>
<td>.905</td>
<td>319</td>
</tr>
<tr>
<td>Ensure proper alignment of my school’s improvement plan with the district’s adopted strategic plan</td>
<td>4.17</td>
<td>.553</td>
<td>332</td>
</tr>
<tr>
<td>Discuss data security and handling best practices with staff members related to confidential student information</td>
<td>4.17</td>
<td>.673</td>
<td>312</td>
</tr>
<tr>
<td>Use online services to share meeting agendas, and supporting documents with staff (e.g., Google documents, Dropbox, Evernote)</td>
<td>4.25</td>
<td>.758</td>
<td>320</td>
</tr>
<tr>
<td>Ensure staff and students are aware of Internet Safety, and acceptable use policies (i.e. Fair use, Copyright)</td>
<td>4.32</td>
<td>.643</td>
<td>310</td>
</tr>
<tr>
<td>Conduct unannounced classroom walkthroughs to look for student collaboration and digital learning</td>
<td>4.35</td>
<td>.649</td>
<td>321</td>
</tr>
<tr>
<td>Use results from your own data analysis to make school-level decisions</td>
<td>4.39</td>
<td>.545</td>
<td>312</td>
</tr>
</tbody>
</table>

**Frequency of school leaders’ completing specified tasks**

Survey participants were also asked how often, if ever, that they completed the specified tasks from the prior knowledge section. The scale for this section was: 1= Never, 2=Yearly, 3= Once a Quarter, 4=Monthly, 5=Twice a Month, 6=Weekly, 7=Daily. Tables 9 and 10 provide the frequency results. Table 10 provides the mean and standard deviation and Table 11 provides the percentages of survey participants who selected each category. Results
from this section are aligned with the results of the “I know how to” section with leading online meetings and recruitment/retention of public-private partnerships being the least frequently completed tasks.

Table 10 Frequency of School Leaders Completing Specified Tasks (Mean)

<table>
<thead>
<tr>
<th>Task Description</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lead and manage an online meeting with other professionals</td>
<td>1.83</td>
<td>1.389</td>
<td>310</td>
</tr>
<tr>
<td>Formalize processes used to recruit and retain public-private partnerships</td>
<td>1.95</td>
<td>1.264</td>
<td>296</td>
</tr>
<tr>
<td>Establish a long-term technology refresh plan</td>
<td>2.18</td>
<td>1.124</td>
<td>293</td>
</tr>
<tr>
<td>School staff members have the opportunity to observe other teachers who are utilizing technology effectively in a lesson</td>
<td>2.68</td>
<td>1.454</td>
<td>353</td>
</tr>
<tr>
<td>Update school plans and budgets to reflect ongoing as well as growing costs of technology in all areas of learning</td>
<td>2.74</td>
<td>1.415</td>
<td>301</td>
</tr>
<tr>
<td>Reallocate school resources to provide professional development opportunities for staff members</td>
<td>2.83</td>
<td>1.424</td>
<td>310</td>
</tr>
<tr>
<td>Ensure staff and students are aware of Internet Safety, and acceptable use policies (i.e. Fair use, Copyright)</td>
<td>2.84</td>
<td>1.392</td>
<td>301</td>
</tr>
<tr>
<td>Teachers meet with school leadership to discuss technology integration</td>
<td>2.94</td>
<td>.999</td>
<td>354</td>
</tr>
<tr>
<td>Teachers who are exemplar instructional technology users have shared what they have learn with the entire school staff</td>
<td>3.03</td>
<td>.717</td>
<td>354</td>
</tr>
<tr>
<td>Establish and implement policies that promote share cultural understanding and exposure to different cultures</td>
<td>3.07</td>
<td>1.621</td>
<td>301</td>
</tr>
<tr>
<td>Ensure ethical use of technology by staff members</td>
<td>3.10</td>
<td>1.641</td>
<td>302</td>
</tr>
<tr>
<td>Discuss data security and handling best practices with staff members related to confidential student information</td>
<td>3.36</td>
<td>1.564</td>
<td>305</td>
</tr>
<tr>
<td>Share and lead discussion on recent educational research</td>
<td>3.39</td>
<td>1.494</td>
<td>313</td>
</tr>
</tbody>
</table>
Table 10 Continued

<table>
<thead>
<tr>
<th>Task</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meet with staff members to discuss methods currently in place to</td>
<td>3.50</td>
<td>1.310</td>
<td>319</td>
</tr>
<tr>
<td>ensure effective integration of digital resources</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Review existing lesson plans, student work, and/or other</td>
<td>3.64</td>
<td>1.585</td>
<td>322</td>
</tr>
<tr>
<td>documentation to determine how collaboration and digital learning</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>are addressed</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ensure proper alignment of my school’s improvement plan with the</td>
<td>3.77</td>
<td>1.286</td>
<td>320</td>
</tr>
<tr>
<td>district’s adopted strategic plan</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Evaluate the success of your efforts on a specific initiative</td>
<td>3.83</td>
<td>1.367</td>
<td>320</td>
</tr>
<tr>
<td>Model proper technology use for my staff</td>
<td>3.97</td>
<td>1.825</td>
<td>313</td>
</tr>
<tr>
<td>Communicate with parents/stakeholders via social-media</td>
<td>4.49</td>
<td>2.267</td>
<td>318</td>
</tr>
<tr>
<td>Use results from your own data analysis to make school-level</td>
<td>4.51</td>
<td>1.507</td>
<td>304</td>
</tr>
<tr>
<td>decisions</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conduct unannounced classroom walkthroughs to look for student</td>
<td>4.54</td>
<td>1.893</td>
<td>314</td>
</tr>
<tr>
<td>collaboration and digital learning</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Use online services to share meeting agendas, and supporting</td>
<td>4.82</td>
<td>1.767</td>
<td>317</td>
</tr>
<tr>
<td>documents with staff (e.g., Google documents, Dropbox, Evernote)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: Table sorted ascending by mean

Table 11 Frequency of School Leaders Completing Specified Tasks (Percentages)

<table>
<thead>
<tr>
<th>Task</th>
<th>N</th>
<th>Never</th>
<th>Yearly</th>
<th>Once a Quarter</th>
<th>Monthly</th>
<th>Twice a month</th>
<th>Weekly</th>
<th>Daily</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lead and manage an online meeting with other professionals</td>
<td>310</td>
<td>64.2%</td>
<td>13.2%</td>
<td>10.0%</td>
<td>5.5%</td>
<td>2.9%</td>
<td>3.5%</td>
<td>0.6%</td>
</tr>
<tr>
<td>Formalize processes used to recruit and retain public-private</td>
<td>296</td>
<td>49.0%</td>
<td>28.4%</td>
<td>8.8%</td>
<td>9.5%</td>
<td>1.4%</td>
<td>2.7%</td>
<td>0.3%</td>
</tr>
<tr>
<td>partnerships</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Establish a long-term technology refresh plan</td>
<td>293</td>
<td>26.6%</td>
<td>47.8%</td>
<td>14.0%</td>
<td>7.2%</td>
<td>2.0%</td>
<td>2.0%</td>
<td>0.3%</td>
</tr>
<tr>
<td>School staff members have the opportunity to observe</td>
<td>353</td>
<td>24.9%</td>
<td>21.0%</td>
<td>32.9%</td>
<td>13.0%</td>
<td>1.7%</td>
<td>3.4%</td>
<td>3.1%</td>
</tr>
<tr>
<td>Table 11 Continued</td>
<td>N</td>
<td>Never</td>
<td>Yearly</td>
<td>Once a Quarter</td>
<td>Monthly</td>
<td>Twice a month</td>
<td>Weekly</td>
<td>Daily</td>
</tr>
<tr>
<td>--------------------</td>
<td>-------</td>
<td>-------</td>
<td>--------</td>
<td>----------------</td>
<td>---------</td>
<td>---------------</td>
<td>--------</td>
<td>-------</td>
</tr>
<tr>
<td>other teachers who are utilizing technology effectively in a lesson</td>
<td>301</td>
<td>22.3%</td>
<td>25.6%</td>
<td>24.3%</td>
<td>18.9%</td>
<td>3.0%</td>
<td>5.0%</td>
<td>1.0%</td>
</tr>
<tr>
<td>Update school plans and budgets to reflect ongoing as well as growing costs of technology in all areas of learning</td>
<td>310</td>
<td>21.3%</td>
<td>22.3%</td>
<td>26.8%</td>
<td>18.1%</td>
<td>6.8%</td>
<td>3.5%</td>
<td>1.3%</td>
</tr>
<tr>
<td>Reallocate school resources to provide professional development opportunities for staff members</td>
<td>301</td>
<td>3.3%</td>
<td>56.5%</td>
<td>16.3%</td>
<td>13.3%</td>
<td>2.7%</td>
<td>3.7%</td>
<td>4.3%</td>
</tr>
<tr>
<td>Ensure staff and students are aware of Internet Safety, and acceptable use policies (i.e. Fair use, Copyright)</td>
<td>301</td>
<td>11.0%</td>
<td>13.6%</td>
<td>50.8%</td>
<td>21.5%</td>
<td>1.4%</td>
<td>1.7%</td>
<td>0%</td>
</tr>
<tr>
<td>Teachers meet with school leadership to discuss technology integration</td>
<td>354</td>
<td>11.0%</td>
<td>13.6%</td>
<td>50.8%</td>
<td>21.5%</td>
<td>1.4%</td>
<td>1.7%</td>
<td>0%</td>
</tr>
<tr>
<td>Teachers who are exemplar instructional technology users have shared what they have learn with the entire school staff</td>
<td>354</td>
<td>2.8%</td>
<td>13.3%</td>
<td>64.4%</td>
<td>17.5%</td>
<td>1.7%</td>
<td>3%</td>
<td>0%</td>
</tr>
<tr>
<td>Establish and implement policies that promote share cultural understanding and exposure to different cultures</td>
<td>301</td>
<td>15.0%</td>
<td>27.6%</td>
<td>26.6%</td>
<td>14.3%</td>
<td>5.6%</td>
<td>5.3%</td>
<td>5.6%</td>
</tr>
<tr>
<td>Ensure ethical use of technology by staff members</td>
<td>302</td>
<td>4.0%</td>
<td>52.6%</td>
<td>11.3%</td>
<td>14.2%</td>
<td>4.6%</td>
<td>6.3%</td>
<td>7.0%</td>
</tr>
<tr>
<td>Discuss data security and handling best practices with staff members related to confidential student information</td>
<td>305</td>
<td>6.9%</td>
<td>29.5%</td>
<td>23.9%</td>
<td>17.7%</td>
<td>8.2%</td>
<td>10.2%</td>
<td>3.6%</td>
</tr>
<tr>
<td>Share and lead discussion on recent educational research</td>
<td>313</td>
<td>10.9%</td>
<td>16.0%</td>
<td>30.0%</td>
<td>24.0%</td>
<td>6.7%</td>
<td>10.2%</td>
<td>2.2%</td>
</tr>
</tbody>
</table>
Table 11 Continued

<table>
<thead>
<tr>
<th>Activity</th>
<th>N</th>
<th>Never</th>
<th>Yearly</th>
<th>Once a Quarter</th>
<th>Monthly</th>
<th>Twice a month</th>
<th>Weekly</th>
<th>Daily</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meet with staff members to discuss methods currently in place to ensure effective integration of digital resources</td>
<td>319</td>
<td>6.3%</td>
<td>13.2%</td>
<td>32.6%</td>
<td>32.3%</td>
<td>5.3%</td>
<td>8.8%</td>
<td>1.6%</td>
</tr>
<tr>
<td>Review existing lesson plans, student work, and/or other documentation to determine how collaboration and digital learning are addressed</td>
<td>322</td>
<td>10.9%</td>
<td>11.2%</td>
<td>26.7%</td>
<td>26.4%</td>
<td>6.5%</td>
<td>15.5%</td>
<td>2.8%</td>
</tr>
<tr>
<td>Ensure proper alignment of my school’s improvement plan with the district’s adopted strategic plan</td>
<td>320</td>
<td>2.2%</td>
<td>10.0%</td>
<td>32.2%</td>
<td>37.8%</td>
<td>4.4%</td>
<td>9.4%</td>
<td>4.1%</td>
</tr>
<tr>
<td>Evaluate the success of your efforts on a specific initiative</td>
<td>320</td>
<td>1.9%</td>
<td>9.7%</td>
<td>35.9%</td>
<td>30.0%</td>
<td>5.3%</td>
<td>12.5%</td>
<td>4.7%</td>
</tr>
<tr>
<td>Model proper technology use for my staff</td>
<td>313</td>
<td>10.2%</td>
<td>11.8%</td>
<td>19.5%</td>
<td>26.8%</td>
<td>5.1%</td>
<td>14.1%</td>
<td>12.5%</td>
</tr>
<tr>
<td>Communicate with parents/stakeholders via social-media</td>
<td>318</td>
<td>22.3%</td>
<td>2.8%</td>
<td>8.2%</td>
<td>8.8%</td>
<td>7.5%</td>
<td>28.9%</td>
<td>21.4%</td>
</tr>
<tr>
<td>Use results from your own data analysis to make school-level decisions</td>
<td>304</td>
<td>2.0%</td>
<td>3.3%</td>
<td>24.0%</td>
<td>27.3%</td>
<td>10.2%</td>
<td>22.4%</td>
<td>10.9%</td>
</tr>
<tr>
<td>Conduct unannounced classroom walkthroughs to look for student collaboration and digital learning</td>
<td>314</td>
<td>10.2%</td>
<td>4.1%</td>
<td>18.5%</td>
<td>15.0%</td>
<td>9.2%</td>
<td>27.4%</td>
<td>15.6%</td>
</tr>
<tr>
<td>Use online services to share meeting agendas, and supporting documents with staff (e.g., Google documents, Dropbox, Evernote)</td>
<td>317</td>
<td>7.9%</td>
<td>3.5%</td>
<td>10.1%</td>
<td>20.5%</td>
<td>8.5%</td>
<td>34.1%</td>
<td>15.5%</td>
</tr>
</tbody>
</table>

Note: Table sorted descending by aggregation of Never and Yearly
**Frequency of school staff completing specified tasks**

Three survey questions focused on how frequently school staff beyond the Principal or Assistant Principal complete specified tasks at participants’ schools (see Table 12). Among these recommended practices, the most common practice was for exemplary teachers to share their technology best practices with peer teachers at their school, followed by teachers meeting with school leaders to discuss technology integration at least once per quarter for most. The least common practice was for teachers to observe exemplary technology teachers utilizing technology in their classrooms, probably owing to the lack of time in the school day for teachers to step out of their classrooms for such observations. According to leaders, almost a quarter of teachers never have this opportunity to observe exemplary teachers.

Table 12 Frequency of School Staff Completing Specified Tasks

<table>
<thead>
<tr>
<th>Frequency</th>
<th>N</th>
<th>Never</th>
<th>Yearly</th>
<th>Once a Quarter</th>
<th>Monthly</th>
<th>Twice a month</th>
<th>Weekly</th>
<th>Daily</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teachers meet with school leadership to discuss technology integration</td>
<td>370</td>
<td>10.8%</td>
<td>13.5%</td>
<td>49.5%</td>
<td>21.9%</td>
<td>2.2%</td>
<td>1.9%</td>
<td>0.3%</td>
</tr>
<tr>
<td>Exemplary instructional technology teachers have shared their best practices with the entire school staff</td>
<td>370</td>
<td>2.7%</td>
<td>13.2%</td>
<td>63.5%</td>
<td>17.6%</td>
<td>1.9%</td>
<td>0.5%</td>
<td>0.5%</td>
</tr>
<tr>
<td>School staff members have the opportunity</td>
<td>369</td>
<td>24.4%</td>
<td>21.4%</td>
<td>32.2%</td>
<td>13.6%</td>
<td>1.6%</td>
<td>3.5%</td>
<td>3.3%</td>
</tr>
</tbody>
</table>
Table 12 Continued

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Never</th>
<th>Yearly</th>
<th>Once a Quarter</th>
<th>Monthly</th>
<th>Twice a month</th>
<th>Weekly</th>
<th>Daily</th>
</tr>
</thead>
<tbody>
<tr>
<td>to observe exemplar</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>instructional</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>technology teachers</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>while they utilize</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>technology in their</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>classrooms</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Perception of importance of instructional technology tasks**

Five questions focused on the technology beliefs of the survey participants. The scale for these questions was: 1=Strongly Disagree, 2=Disagree, 3=Neither/Neutral, 4=Agree, 5=Strongly Agree. Table 13 provides the results of the technology beliefs section of the survey and is sorted by mean from lowest to highest. Results show leaders agree that technology makes learning more engaging for students, and increasing technology use for instruction is a goal for their schools. In practice, though, leaders were more neutral in regard to seeing improvement in teachers technology integrations and most reserved with regard to sustaining the momentum at their school for district technology initiatives.

Table 13 Technology Beliefs

<table>
<thead>
<tr>
<th>I believe we will be able to sustain the momentum at my school created by current district technology initiatives</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>I have seen significant</td>
<td>3.44</td>
<td>.887</td>
<td>368</td>
</tr>
<tr>
<td>I have seen significant</td>
<td>3.48</td>
<td>.973</td>
<td>368</td>
</tr>
</tbody>
</table>
Table 13 Continued

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>improvement in my teachers' ability to effectively integrate technology into their instruction</td>
<td>3.72</td>
<td>.816</td>
<td>369</td>
</tr>
<tr>
<td>Professional Development on Instructional technology is valuable</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Increasing effective and appropriate technology use into instruction is a goal or key strategy for our school</td>
<td>4.11</td>
<td>.804</td>
<td>367</td>
</tr>
<tr>
<td>Effective use of technology resources by teachers makes learning more engaging for students</td>
<td>4.42</td>
<td>.630</td>
<td>368</td>
</tr>
</tbody>
</table>

**PD Differences Among Groups**

Research Question 2 focused on whether professional development needs differed based on the leadership position of the school leaders, the grade span of the school, the poverty level of the school, the amount of experience the school leader had, and the self-assessed computer skill-level of the school leader. One-way Analysis of Variance (ANOVA) tests were conducted for each previously discussed variable and professional development needs that were found to have statistically significant differences \((p < .05)\) based on the corresponding variable (i.e. leadership position, years of experience, and etc..) are reported in
table format below. For each professional development need, which had statistically significant difference, the following data points will be reported: sum of squares, degrees of freedom (df), mean squared, F-statistic (F), and p-value (Sig.). For the characteristics that had more than two choices/categories, REGWQ (Ryan/Einot/Gabriel/Welsch) post-hoc tests (Howell, 2002) were conducted to make pairwise comparisons between the different data categories.

**Leadership Positions**

Research question 2a asked whether professional development needs of school leaders differed between positions (i.e. Assistant Principal, Principal). Since this comparison only contained two groups (e.g. principals and assistant principals) post-hoc testing was not needed. Principals showed greater knowledge on four tasks that included reallocating school resources (mean=4.29), updating plans and budgeting (mean=4.27), establishing a technology refresh plan (mean=3.98), and ensuring staff are aware of Internet safety/acceptable use policies (mean=4.43). The two tasks that assistant principal had greater knowledge were modeling proper technology use (mean=4.13) and managing an online meeting (mean=3.39). Table 14 provides the six professional development needs which showed statistically significant differences between leadership positions.

Table 14 PD Needs by Position

<table>
<thead>
<tr>
<th>Mean (Standard Deviation)</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reallocate school resources to provide professional development opportunities for staff members</td>
<td>AP = 3.68 (0.862)</td>
<td>4.29 (0.536)</td>
<td>27.347</td>
<td>2</td>
<td>13.674</td>
</tr>
<tr>
<td>Lead and manage an online meeting with other professionals</td>
<td>AP = 3.39 (1.105)</td>
<td>3.05 (1.204)</td>
<td>8.557</td>
<td>2</td>
<td>4.279</td>
</tr>
<tr>
<td>Model proper technology use for my staff</td>
<td>Mean (Standard Deviation)</td>
<td>Sum of Squares</td>
<td>df</td>
<td>Mean Square</td>
<td>F</td>
</tr>
<tr>
<td>----------------------------------------</td>
<td>---------------------------</td>
<td>----------------</td>
<td>----</td>
<td>-------------</td>
<td>-------</td>
</tr>
<tr>
<td>AP</td>
<td>4.13 (.659)</td>
<td>3.627</td>
<td>2</td>
<td>1.814</td>
<td>3.449</td>
</tr>
<tr>
<td>P</td>
<td>3.91 (.817)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Update school plans and budgets to reflect ongoing as well as growing costs of technology in all areas of learning</td>
<td>3.49 (.659)</td>
<td>45.451</td>
<td>2</td>
<td>22.726</td>
<td>29.829</td>
</tr>
<tr>
<td>Establish a long-term technology refresh plan</td>
<td>3.49 (1.039)</td>
<td>19.192</td>
<td>2</td>
<td>9.596</td>
<td>10.434</td>
</tr>
<tr>
<td>Ensure staff and students are aware of Internet Safety, and acceptable use policies (i.e. Fair use, Copyright)</td>
<td>4.26 (.707)</td>
<td>2.857</td>
<td>2</td>
<td>1.429</td>
<td>3.495</td>
</tr>
<tr>
<td></td>
<td>4.43 (.528)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: AP=Assistant Principal, P=Principal

**Grade Span of the school**

Research question 2b asked whether professional development needs of school leaders differed between school gradespans (elementary, middle, high). Table 15 presents the eight professional development needs which showed statistically significant differences based on the grade span of the school. Where post-hoc testing identified differences among groups, generally the difference was consistently between elementary and high school with middle school alignment being mixed between the upper and lower grade spans. Elementary school leaders believed that instructional technology professional development was more valuable (mean=3.85) than high school leaders (mean=3.35) and middle school leaders (mean=3.66) more strongly believed they would be able to sustain the momentum of recent instructional technology initiatives at their schools compared to elementary school leaders (mean=3.43) and high school leaders (mean=3.23).

Compared to elementary and middle school leaders, high school leaders reported lower knowledge on all of the identified variables with statistically significant difference,
indicating perhaps a higher need for professional development among this group. Elementary and alternative school leaders typically reported higher knowledge of these variables, indicating perhaps less need for professional development relative to other grade spans.

Table 15 PD Needs by Grade Span

<table>
<thead>
<tr>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
<th>Mean (5-point Likert Scale) (Standard Deviations)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>Elem</strong></td>
</tr>
<tr>
<td>Professional Development on Instructional Technology is valuable</td>
<td>12.823</td>
<td>4</td>
<td>3.206</td>
<td>4.725</td>
<td>.001</td>
</tr>
<tr>
<td>I believe we will be able to sustain the momentum at my school created by current district technology initiatives</td>
<td>7.596</td>
<td>4</td>
<td>1.899</td>
<td>2.397</td>
<td>.050</td>
</tr>
<tr>
<td>I have seen significant improvement in my teachers’ ability to effectively integrate technology into their instruction</td>
<td>13.416</td>
<td>4</td>
<td>3.354</td>
<td>3.420</td>
<td>.009</td>
</tr>
<tr>
<td>Reallocate school resources to provide professional development opportunities for staff members</td>
<td>7.257</td>
<td>4</td>
<td>1.814</td>
<td>2.857</td>
<td>.024</td>
</tr>
<tr>
<td>Use results from your own data analysis to make school-level decisions</td>
<td>2.928</td>
<td>4</td>
<td>.732</td>
<td>2.507</td>
<td>.042</td>
</tr>
<tr>
<td>Discuss data security and handling best practices with staff members related to confidential student information</td>
<td>4.166</td>
<td>4</td>
<td>1.042</td>
<td>2.340</td>
<td>.05</td>
</tr>
<tr>
<td>Update school plans and budgets to reflect ongoing as well as growing costs of technology in all areas of learning</td>
<td>12.691</td>
<td>4</td>
<td>3.173</td>
<td>3.626</td>
<td>.007</td>
</tr>
<tr>
<td>Ensure ethical use of technology by staff members</td>
<td>4.283</td>
<td>4</td>
<td>1.071</td>
<td>3.055</td>
<td>.017</td>
</tr>
</tbody>
</table>

Note: Means with the same letter in the subscripts do not significantly differ from one another at the .05 level according to REGWQ tests.
**Professional Development Needs and Poverty**

Research question 2c asked whether professional development needs of school leaders differed based on the student poverty-level of the school. Survey participants were asked to provide the percentage of students at their school who qualified for Free and/or Reduced Lunch Services (FRL) based on their income level. This percentage is based on the 2013-14 school year and is self-reported. Prior to ANOVA testing, participants were categorized into six different categories based on their self-reported school FRL percentages (0-10%, 11-20%, 21-40%, 41-60%, 61-80%, and greater than 80%). Modeling proper technology use was the only task that showed statistically significant differences based on the poverty-level of the school and post-hoc testing determined that each of the six different school poverty categories were homogeneous to each other (see Table 16).

**Table 16 PD Needs based on Poverty-Level of the School**

<table>
<thead>
<tr>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
<th>Mean (5-point Likert Scale) (Standard Deviations)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0-10% 11-20% 21-40% 41-60% 61-80% 80% or Greater</td>
</tr>
<tr>
<td>Model proper technology use for my staff</td>
<td>5.941</td>
<td>5.188</td>
<td>2.337</td>
<td>.042</td>
<td>4.18^A (.772) 4.05^A (.688) 4.10^A (.635) 4.07^A (.739) 3.71^A (.864) 4.33^A (.516)</td>
</tr>
</tbody>
</table>

**Years’ Experience**

Research question 2d asked whether professional development needs of school leaders differed based on the years of experience a school leader has in K-12 education. Survey participants were asked to select an experience category (0-5, 6-10, 11-15, 16-20 or 20+ years) that represented the years of educational experience they had. Table 17 presents the six professional development needs that emerged with statistically significant differences
based on the years of experience of the school leader. Post-hoc testing (REGWQ) showed that group differences generally existed between the two least experience groups (e.g. 6-10 and 11-15 years) and the two most experience groups (e.g. 16-20 and 20+).

Table 17 PD Needs by Years of Experience

<table>
<thead>
<tr>
<th></th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
<th>Mean (5-point Likert Scale)</th>
<th>(Standard Deviations)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>6-10 Years of Experience</td>
<td>11-15 of Experience</td>
</tr>
<tr>
<td>Use online services to share meeting agendas, and supporting documents with staff (e.g. Google documents, Dropbox, Evernote)</td>
<td>9.065</td>
<td>3</td>
<td>3.022</td>
<td>5.511</td>
<td>.001</td>
<td>4.57&lt;sup&gt;B&lt;/sup&gt;</td>
<td>(.647)</td>
</tr>
<tr>
<td>Communicate with parents/stakeholders via social-media</td>
<td>7.418</td>
<td>3</td>
<td>2.473</td>
<td>3.038</td>
<td>.029</td>
<td>4.43&lt;sup&gt;A&lt;/sup&gt;</td>
<td>(.603)</td>
</tr>
<tr>
<td>Lead and manage an online meeting with other professionals</td>
<td>25.775</td>
<td>3</td>
<td>8.592</td>
<td>6.774</td>
<td>.000</td>
<td>3.92&lt;sup&gt;B&lt;/sup&gt;</td>
<td>(.841)</td>
</tr>
<tr>
<td>Model proper technology use for my staff</td>
<td>8.047</td>
<td>3</td>
<td>2.682</td>
<td>5.247</td>
<td>.002</td>
<td>4.24&lt;sup&gt;B&lt;/sup&gt;</td>
<td>(.548)</td>
</tr>
<tr>
<td>Update school plans and budgets to reflect ongoing as well as growing costs of technology in all areas of learning</td>
<td>8.378</td>
<td>3</td>
<td>2.793</td>
<td>3.151</td>
<td>.025</td>
<td>3.65&lt;sup&gt;A&lt;/sup&gt;</td>
<td>(.824)</td>
</tr>
<tr>
<td>Establish a long-term technology refresh plan</td>
<td>9.880</td>
<td>3</td>
<td>3.293</td>
<td>3.454</td>
<td>.017</td>
<td>3.65&lt;sup&gt;A&lt;/sup&gt;</td>
<td>(.889)</td>
</tr>
</tbody>
</table>

Note: Means with the same letter in the subscripts do not significantly differ from one another at the .05 level according to REGWQ tests.

*Computer skill-level*

Research question 2d asked whether professional development needs of school leaders differed based on the self-assessed computer skill-level of the school leader. Survey participants were asked to rate their skill level as either beginner, intermediate, advanced, or
expert. Computer skill-level produced the most tasks with significant differences. Table 17 provides the 12 professional development needs that emerged with statistically significant differences based on the self-reported computer skill-level of the survey participant. Post-hoc testing (REGWQ) showed that group differences generally existed between the bottom two skill-levels (beginner and intermediate) and the top two skill-levels (advanced and expert). Three different tasks (online meeting, utilizing online sharing tools, and modeling proper technology use) show additional differences between the advanced and expert computer skill-levels under the “I know how to” series of questions (see Table 18).

Table 18 PD Needs by Computer Skill-Level (I know how to)

<table>
<thead>
<tr>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
<th>Beginner</th>
<th>Intermediate</th>
<th>Advanced</th>
<th>Expert</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Mean (6-point Likert Scale) (Standard Deviations)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Mean (6-point Likert Scale) (Standard Deviations)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Beginner</td>
<td>Intermediate</td>
<td>Advanced</td>
<td>Expert</td>
</tr>
<tr>
<td>Ensure proper alignment of my school’s improvement plan with the district’s adopted strategic plan</td>
<td>4.251</td>
<td>3</td>
<td>1.417</td>
<td>4.685</td>
<td>.003</td>
<td>3.50(^A)</td>
<td>4.08(^A)</td>
<td>4.23(^A)</td>
</tr>
<tr>
<td>Evaluate the success of your efforts on a specific initiative</td>
<td>3.461</td>
<td>3</td>
<td>1.154</td>
<td>3.694</td>
<td>.012</td>
<td>4.00(^{AB})</td>
<td>3.99(^A)</td>
<td>4.18(^B)</td>
</tr>
<tr>
<td>Meet with staff members to discuss methods currently in place to ensure effective integration of digital resources</td>
<td>6.532</td>
<td>3</td>
<td>2.177</td>
<td>6.064</td>
<td>.001</td>
<td>4.00(^{AB})</td>
<td>3.79(^A)</td>
<td>4.03(^B)</td>
</tr>
<tr>
<td>Conduct unannounced classroom walkthroughs to look for student collaboration and digital learning</td>
<td>5.097</td>
<td>3</td>
<td>1.699</td>
<td>4.257</td>
<td>.006</td>
<td>4.00(^A)</td>
<td>4.21(^A)</td>
<td>4.41(^B)</td>
</tr>
<tr>
<td>Use online services to share meeting agendas, and supporting documents with staff (e.g., Google documents, Dropbox, Evernote)</td>
<td>35.870</td>
<td>3</td>
<td>11.957</td>
<td>25.894</td>
<td>.000</td>
<td>3.75(^A)</td>
<td>3.84(^A)</td>
<td>4.41(^B)</td>
</tr>
<tr>
<td>Communicate with parents/stakeholders via social-media</td>
<td>39.525</td>
<td>3</td>
<td>13.175</td>
<td>18.545</td>
<td>.000</td>
<td>3.25(^A)</td>
<td>3.71(^A)</td>
<td>4.31(^B)</td>
</tr>
<tr>
<td>Lead and manage an online meeting with other professionals</td>
<td>48.577</td>
<td>3</td>
<td>16.192</td>
<td>13.535</td>
<td>.000</td>
<td>3.25(^{AB})</td>
<td>2.77(^A)</td>
<td>3.36(^B)</td>
</tr>
<tr>
<td>Model proper technology use for my staff</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 18 Continued

<table>
<thead>
<tr>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
<th>Mean (6-point Likert Scale)</th>
<th>(Standard Deviations)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Beginner</td>
<td>Intermediate</td>
</tr>
<tr>
<td>29.875</td>
<td>3</td>
<td>9.958</td>
<td>22.610</td>
<td>.000</td>
<td>3.67&lt;sup&gt;AB&lt;/sup&gt;</td>
<td>3.66&lt;sup&gt;A&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(.577)</td>
<td>(.812)</td>
</tr>
<tr>
<td>Share and lead discussion on recent educational research</td>
<td>9.602</td>
<td>3</td>
<td>3.201</td>
<td>5.743</td>
<td>.001</td>
<td>3.75&lt;sup&gt;A&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(.500)</td>
<td>(.855)</td>
</tr>
<tr>
<td>Use results from your own data analysis to make school-level decisions</td>
<td>3.136</td>
<td>3</td>
<td>1.045</td>
<td>3.600</td>
<td>.014</td>
<td>4.25&lt;sup&gt;A&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(.500)</td>
<td>(.486)</td>
</tr>
<tr>
<td>Discuss data security and handling best practices with staff members related to confidential student information</td>
<td>5.932</td>
<td>3</td>
<td>1.977</td>
<td>4.515</td>
<td>.004</td>
<td>4.50&lt;sup&gt;B&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(.577)</td>
<td>(.719)</td>
</tr>
<tr>
<td>Establish and implement policies that promote share cultural understanding and exposure to different cultures</td>
<td>5.890</td>
<td>3</td>
<td>1.963</td>
<td>2.902</td>
<td>.035</td>
<td>4.25&lt;sup&gt;A&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(.500)</td>
<td>(.928)</td>
</tr>
</tbody>
</table>

Note: Means with the same letter in the subscripts do not significantly differ from one another at the .05 level according to REGWQ tests.

**Qualitative Findings: Phase II**

The second phase of this study consisted of semi-structured interviews of six district leaders from the school district. The interviews were transcribed by the researcher and pseudonyms were created to protect the identity of interview participants. The presentation of Phase II results are organized into themes and themes are presented after descriptions of the six interview participants.

**Interview participants**

**Interview Participant 1**

Interview Participant 1 majored in Music Education and received a Bachelor of Music in 1996. He/She taught middle school band for 8 years before receiving a MAEd in Instructional Technology. After that, he/she worked at all levels (elementary, middle, high)
as a technology facilitator, and currently serves as a coordinating teacher for the school district being studied.

**Interview Participant 2**

Participant two worked as both a tutor and middle grades language arts teacher, including teaching in a one-to-one computing district before joining the district emphasized in this study. This participant serves as a coordinating teacher with the school district of focus providing training for teachers on proper integration of digital resources and content.

**Interview Participant 3**

Interview Participant 3 holds a PhD in Instructional Technology and has over ten years of K-12 education experience. Eight of these years, Interview Participant 3 served at the district level as an Instructional Technology consultant, trainer, and administrator.

**Interview Participant 4**

Interview Participant 4 is a Nationally Board Certified teacher who holds a Doctorate of Education in Educational Leadership. Interview Participant 4 has over 10 years of teaching experience at the elementary, middle, and high school level. After completing a master’s degree in Instructional Technology, he/she served as a tech facilitator for a one-to-one school district at the high school level. After five years of service as a tech facilitator at the school level, Interview Participant 4 was hired as a Coordinating Teacher for the school district being studied where she provides training on the appropriate and effective use of digital learning resources in K-12 classrooms.

**Interview Participant 5**

Interview Participant 5 has almost 21 years in K-12 education for four different school districts in the southeastern United States. Interview Participant 5 has served in school
districts of all different sizes including a 20 school K-12 district, a 35 school K-12 district, a 80 school K-12 district, and a school district with over 170 schools. Interview Participant 5 started out as a kindergarten and first grade teacher until Interview Participant 5 became a tech facilitator at the school level and eventually at the district level. Interview Participant 5 has served on multiple state working groups focused on instructional technology, support groups around digital initiatives, and is currently serving on multiple company advisory boards as an instructional technology consultant.

**Interview Participant 6**

Interview Participant 6 is a non-traditional K-12 district leader. He/She began her career working at General Mills Inc. He/She holds a bachelor's degree in industrial and systems engineering from North Carolina A&T and a master's degree in engineering from Purdue University. After transitioning from the private sector to K-12 public education, Interview Participant 6 served as a district-level director and senior director in multiple district-level departments in the school district.

**Interview themes**

After interview transcription and data analysis was complete, four major themes and fourteen categories emerged. In total, 137 different codes were extracted from the interviews conducted in the second phase of this study. The four different themes will be presented based on their prevalence in the interviews (number of codes) from lowest to most prevalent. Table 19 provides the themes, categories, number of codes per theme, and the number of interview participants who discussed the theme during their interview.
Table 19 Interview Themes Overview

<table>
<thead>
<tr>
<th>Theme</th>
<th>Categories</th>
<th># of Codes</th>
<th>* Number of Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Importance of Leadership</td>
<td>• School leadership buy-in,</td>
<td>6</td>
<td>3 of 6</td>
</tr>
<tr>
<td></td>
<td>• Accountability for school leadership</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Importance of technology facilitator,</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Technology facilitator as an Assistant Principal,</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Technology facilitator as part of school leadership</td>
<td>14</td>
<td>4 of 6</td>
</tr>
<tr>
<td></td>
<td>• Recommendations for universities</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Technology Facilitator</td>
<td>• How to address professional development needs</td>
<td>21</td>
<td>6 of 6</td>
</tr>
<tr>
<td></td>
<td>• Delivery Model</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Professional Learning Teams</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Professional Development</td>
<td>• Visionary leadership</td>
<td>96</td>
<td>6 of 6</td>
</tr>
<tr>
<td></td>
<td>• Digital-age learning culture</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Excellence in professional practice</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Systemic improvement</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Digital citizenship</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: * represents the number of interview participants who discussed the theme

**Importance of Leadership**

Two different categories emerged under the importance of leadership theme. Both of these categories focus on the importance of school leadership (e.g. Principal and Assistant Principal) as well as holding these educational leaders accountable for effective and appropriate use of instructional technology within their schools.

**School leadership buy-in**

Interview participants emphasized the importance of buy-in from school leadership when school districts implement district wide technology or computing initiatives. Interview
Participant 5 stated that school leadership buy-in was the key to the success of a computing initiative:

so where the leader buys in technology issues work, without the leadership support technology initiatives generally do not work...even if it is a leader who doesn't understand but gets out of the way it is still not as successful as a leader who buys in and understands the importance of the initiative (Personal Communication, 5-13-2015).

Interview Participant 6 predicted that school leadership support and buy-in across a large urban school district would follow the standard bell curve: “I think the support at school level is probably that standard bell curve where you have 20% early adopters who are very open and understanding of the importance of the initiative” (Personal Communication, 5-14-2015). While buy-in and support from the Principal of a school is very beneficial, Interview Participant 5 believed that computing initiatives could be lead by an Assistant Principal of a school, but the same buy-in requirements would exist: “technology initiatives can be led by an Assistant Principal but they must also buy into the initiative for it to be successful” (Personal Communication, 5-13-2015). Interview Participant 5 provided evidence from a recent district-wide technology initiative to support her claim about the buy-in requirement for Assistant Principals: “…at the 1 school where the Assistant Principal was not interested...we have barely even seen them at meetings or received feedback from them...they are also the only School where we have not seen an increase in the usage...” (Personal Communication, 5-13-2015)
Accountability for school leadership

The second category under “importance of leadership” focuses on the need for school leadership to be held accountable for the implementation of district-wide initiatives, especially initiatives where the school district has allocated a significant amount of time, resources, and funding or initiatives that have the potential to have a significant impact on student achievement. Two of the interview participants highlighted the need for school leaders to be evaluated on the same standards that school leaders evaluate classroom teachers on when they observe their classes:

I think there needs to be some accountability for Principals….somehow we need to say that school leaders are liable for what is and what is not taking place in the classrooms in their schools especially in a district that has site based management and is very large (Interview Participant 4, Personal Communication, 5-12-2015).

Interview Participant 2 also expressed the need for school districts to hold school leaders accountable for the teaching and learning taking place in the classrooms of their schools and expressed how she thought it would impact teacher’s evaluations:

“I think it would change teacher evaluations tremendously because….I think teachers are being ineffectively evaluated using technology… I know one time a teacher in the district was evaluated as proficient for demonstrating how to turn on a smartboard” (Personal Communication, 5-12-2015).

Technology Facilitator

The technology facilitator theme contains four different categories that emerged focusing on the importance of the school-level technology facilitator position and what this position’s role in a school should be. All six interview participants made reference to the
results from Phase I of this study as the most significant rationale for school districts and state educational agencies allocating enough annual resources to ensure every school has at least one full-time instructional technology facilitator. The final category focuses on the recommendations interview participants had for University preparation programs who offer graduate-level instructional technology preparation programs.

**Importance of technology facilitator**

The first category focused on the importance of the technology facilitator and the position’s role in a computing initiative. Interview Participant 3 expressed this importance and connection the position can be between the district office and the individual schools of the district: “I think it is impossible to overstate the importance of the tech facilitator at the school level. This position is our conduit into the schools (from the district office)” (Personal Communication, 5-12-2015). Interview Participant 4 expressed the importance of the technology facilitator position as long as the position was used effectively and appropriately:

> It is a vital position if it is used correctly … so when I look at these positions that are flexible scheduled in a school like an academic coach or facilitator, they need to be focused on classroom instruction….not providing class coverage or scheduling tests….they can’t be part time secretary, part-time administrator, part-time fill in …so making sure that leadership understand that these positions are instructional positions and they should be in the classrooms are working directly with teachers (Personal Communication, 5-12-2015)

Interview Participant 5 suggested that while a majority of educational leaders and school districts agreed on the importance of the position, only a few school districts had committed the funds needed to fund the position for every school:
we have had Principals who have done a great job with technology leadership and acquiring an instructional facilitator but again it has to be a priority... all school years believe that every school should have an instructional facilitator full time but only a few districts and schools have put their money where their mouth is and have traded positions converted dollars to make that idea a reality (Personal Communication, 5-13-2015).

Interview Participant 5 further explained why the requirements of the technology facilitator position was too demanding for the instructional technology professional to serve more than one more school effectively:

...the instructional technology facilitators that we have currently have are half- time or shared between schools…they are really advocating to become full time at one school...they say the need is there and they have more than enough work at one school more in less at two...is very hard to balance the needs of two different goals as an instructional facilitator...it is also very hard for this position to tell a teacher know when they need you to come fix something because you are also the technology teacher and have a class schedule you must abide by...the actual position and importance can be watered down as a half-time position... (Personal Communication, 5-13-2015).

*Technology facilitator as an Assistant Principal*

The second category that emerged under the technology facilitator theme was the proposal that school-level technology facilitators be reclassified as an Assistant Principal position. Interview Participant 2, who holds a Master of Education in Instructional
Technology, discussed the growing need for leadership skillsets in the area of instructional technology:

I think it is funny you talk about this … because I’m actually going back and adding my Principal licensure … I feel like you are going to get more say in the structure of everything and in the teacher evaluations because APs are doing evaluations … so you actually have the ability to make lasting and more change directly and influence the instruction of children directly…. I think having an instructional technologist as a school leader or part of the leadership team would be huge…I feel like a lot times, instructional tech facilitators are asked to perform some the functions of an administrators now without any of the benefits (Personal Communication, 5-12-2015).

Interview Participant 6 agreed with the need for an Assistant Principal position to be dedicated to instructional technology at every school, however, he/she expressed the difficulty of this idea becoming reality, especially at the elementary or primary school level due to these schools traditionally only having one assistant principal compared to larger secondary schools where the school could have multiple assistant principals. Principals of smaller schools would be challenged to devote their only assistant principal strictly to instructional technology leadership.

Technology facilitator as part of school leadership

While all interview participants agreed on the importance of the technology facilitator position and the increasing demands of the position, two interview participants did not agree with the proposal that these positions should be reclassified as an Assistant Principal position:
I think these roles should be quasi-administration, but not an AP because it sends the message that I am here to evaluate you not here to help and support you. It’s the Instructional facilitator job to push the teachers forward and lift them up, and when they were unwilling it would be turned over to the administration of the school (Interview Participant 4, Personal Communication, 5-12-2015).

Interview Participant 4 explained their rationale for their stance against the reclassification of school-level technology facilitators to Assistant Principals:

If you are seen as a AP ...it creates a us against them mentality ...it prevents the building of trust and support between the instructional tech facilitators and teachers...these positions do hold some administrative roles and duties.....if the instructional tech facilitator find a lack of cooperation from specific teachers then that information should be shared with school leadership… An AP needs to be assigned to manage the technology budget, technology discipline, and other administrative roles focus on technology but the tech facilitator role needs to stay in instructional support role. (Personal Communication, 5-12-2015).

Interview Participant 6 agreed that reclassification of the position to an Assistant Principals would be a great idea, but he/she did not think it would ever become a reality due to the costs involved specifically in elementary schools where instructional technology positions are traditionally used as a resource teacher.

**Recommendations for universities**

The final category under the technology facilitator theme was recommendations that interview participants had for Universities who offer Instructional Technology graduate degrees and whom prepare certified instructional technology professionals for this very
important role. All six interview participants referenced the need for reform to both leadership and instructional technology preparation programs based on the results of Phase I of this study. Interview participants discussed the need for educational leadership programs to address building instructional technology skillsets more effectively as well as instructional technology preparation programs adding more leadership components and/or development to their preparation programs. Interview Participant 3 highlighted the issues with the current degree framework:

it's a human capital issue…..I do not know if there is enough skilled APs to be technology leaders and I do not know if there is enough technology facilitators that are ready to be educational leaders….Universities would need to make changes to their preparatory programs…You cannot overstate the importance of school leadership support in a one-to-one or technology immersed school (Personal Communication, 5-12-2015)

Interview Participant 2 stated that the problem lies with the lack of dual-degree programs between instructional technology and school administration:

I think the lack of a combined degree and the need to get both a masters without that much of a reward…No one is going to pay for this add-on or if I take an AP job that is not 12 months I might actually take a pay cut to do this (froma district office position)...Financially there is no benefit…there is no incentive...so I think there should be a leadership component to a masters in instructional technology… it’s really like were asking instructional technology facilitators to do two different jobs or a job and a half (Personal Communication, 5-12-2015).
Interview Participant 3 believed that preparation programs needed to be updated or revised, but did not think, however, that Universities should have to take on this problem alone:

Some Principals I have met at meetings do not value technology integration or instructional technology…it is like school districts need to have a set of standards or training that closely aligns with what Universities are doing for administrators who have little or no instructional technology background at all (Personal Communication, 5-12-2015).

**Professional Development**

The third theme that emerged from the second phase of this study was focused on professional development for school leaders or how to address the needs identified by the first phase of this study. This theme was broken into three different categories: how to address professional development needs, delivery model, and professional learning teams (PLTs).

**How to address professional development needs**

The first category that emerged under the professional development theme centered on how school districts should design and implement professional development programs to address the needs identified in phase one of this study:

I would teach them as I would teach anyone…I would start with what (this specific technology) that would look in the classroom …Very job embedded training…how I could use this or what this would look like…I would want them to be hands on….I would let them practice as teachers and have them demonstrate using the resource so
they could be prepared to evaluate someone else's effectiveness of use of the product (Interview Participant 2, Personal Communication, 5-12-2015).

Interview Participant 4 provided a unique recommendation for professional development providers who are providing training to school leaders on the effective and efficient use of instructional technology. He/She stated that if they were in charge of training for school leaders, he/she would ask them to leave to their computers, and personal devices outside of the classroom. It was Interview Participant 4’s belief that these school leaders utilize these devices to check out of training and check in to their work back at their school. Interview Participant believed that technology training would be more effective and beneficial for participants when trainers could eliminate distractions for participants or offer training during times when students were not in school (i.e., summer, teacher workdays).

Delivery model

The second category of the professional development focused on the delivery model that interview participants believed would be the most effective to design, develop, and implement to meet the professional development needs identified in the first phase of the study. Interview Participant 4 believed the only way to train large numbers of educational professionals within a large school district is to implement the “train the trainer” model: “If you want something more systematic, you have to do it that way I think (train the trainer model)…You have to build these pockets of knowledge, with a district of this size you have to do it this way” (Personal Communication, 5-12-2015).

Interview Participant 1 also discussed the train the trainer model, but stated that large school districts need to move to new methods of providing professional development to large numbers of educational professionals:
we do a lot of maybe this is due to the size of a district ...we do a lot of this train the trainer model... where we take a small group, train them and them have them take what they learned and train their staffs at their school..a lot of times especially in the schools that are not the exuberant groups...okay we have like this stuff now we have to go back and teach you what we have learned...so if we could do something to just get rid of that idea and make people think or realize that is not what we are asking you to do and maybe be a little more clear about what we are asking them to do (Personal Communication, 5-11-2015).

Interview Participant 1 stated the reasoning behind the popularity of the “train the trainer” model was due to the fact that “when a teacher needs to know something they seek out someone who has experience doing the task that they need to complete...this shows the importance of a technology facilitator in every school” (Personal Communication, 5-11-2015). Interview Participant 5 stated that even though he/she was in charge of digital learning and instructional technology in a large urban district, that he/she did not learn well online. Interview Participant 5’s struggles were due to lack of social engagement during online trainings which they believe were also important to the effective training of educators.

Interview Participant 3 theorized the reasoning why educators tend to prefer face-to-face learning was due to the lack of experience participating in well-designed online classes: “first of all I don't think that on any level there is not a difference between face to face and online…People might prefer one to other, but if they are both well designed…they are going to learn” (Interview Participant 3, Personal Communication, 5-12-2015). Interview Participant 5 stated that educational leaders should take into account the topic or goals of the training before deciding which delivery model they choose to deliver the professional
development as well as making sure that school district trainers are offering trainings in a variety of formats and delivery models to ensure they are meeting the needs of all their target audience.

Interview Participant 3 also agreed that a mixture of different professional development delivery methods might be the best course of action to train school leaders: “I think the delivery is not as important as how it is organized….I think maybe a boot camp, intense training during the summer then followed with online learning” (Personal Communication, 5-12-2015). Interview Participant 1 stated that professional development resources for most instructional technology topics already existed online and maybe the district’s focus should be on organizing these resources onto one website or online library that could be a “one-stop shop” for school leaders who needed training on a particular topic: “...maybe it is just seeing these videos into folders or onto one site...the other thing is technology is constantly changing and so school districts need to be constantly adding to the library...” (Personal Communication, 5-11-2015).

Professional learning teams

The final category under the professional development theme is focused on the effective use of professional learning teams as a way for large school districts to addresses the professional development needs of school-based leadership in preparation for a district-wide one-to-one computing initiative. Interview Participant 2 discussed developing a systematic method to match school leaders with a school district who are early adopters of technology and have emerged as effective technology leaders with school leaders within the district who are considered laggard adopters of technology and have limited background/education in the effective integration of technology:
we could really set up PLT's with school leaders … We could set up times and meetings for Principals to share out what teachers are doing at their school with instructional technology...it would be a great opportunity for school districts to push in and fill needs (Personal Communication, 5-12-2015).

While Interview Participant 2 discussed the implementation of professional learning teams within a school district, Interview Participant 4 believed that school district leaders should send their school leaders to visit other school districts to observe best practices of technology integration and continue this relationship via an online professional learning team. Interview Participant 4 believed that state education leaders should develop or adopt an existing technology leadership self-evaluation assessment that could possibly help match strong technology leaders with weak technology leaders at the school across the state:

I would also send school leadership to other school districts, other schools to view best practices and the positive impact that technology can have on learning within the school. Possibly a good idea would be to have a self-evaluation of technology leadership for educational leaders and pair individuals with school leaders from across the state that pairs individual strengths with other leaders weaknesses (Personal Communication, 5-12-2015).

**ISTE-A Standards**

The final coded theme reflected the skills needed for school-based leadership to be successful in a computing or technology initiative. While the previous three themes were coded using inductive reasoning methods, the ISTE-A Standards’ theme was coded using deductive reasoning methods. Interviews were coded on the five ISTE-A standards which formed the theoretical framework for the study.
**Visionary leadership**

Visionary Leadership, the first ISTE-A standard, contains 21 different codes that emerged from the semi-structured interviews. Due to the large number of quotes that emerged under the Visionary Leadership standard, themes for this standard was organized by the topic of the quotes. Table 20 provides each of the five topics that emerged under the Visionary Leadership standard, the number of quotes under each category, as well as an example quote from each category.

Table 20 Visionary Leadership Quote Summary

<table>
<thead>
<tr>
<th>Visionary Leadership Topic</th>
<th># of Quotes</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>School Leadership</td>
<td>10</td>
<td>“there is a strong relationship between technology usage and technology leadership at the school level”</td>
</tr>
<tr>
<td></td>
<td></td>
<td>“I think school administrators need to sit down with their technology leaders in their school sand get the key people at the table who know what is going on and what this world needs technology wise”</td>
</tr>
<tr>
<td>Shared Leadership</td>
<td>2</td>
<td>“I do not think that many schools feel they have much to offer a local business….many partnerships that I have worked with within this district were recommended to the school…it was not something they sought out”</td>
</tr>
<tr>
<td>Public-Private Partnerships</td>
<td>3</td>
<td>“I think if each school was encouraged to develop their own brand around the technology or unique services they offer….many leaders do not understand the importance of branding when using their twitter accounts….they could post images or videos about what is happening in the school”</td>
</tr>
<tr>
<td>Branding</td>
<td>2</td>
<td>“we're kind of all over the place when it comes to technology refresh plans... we used to do a 5 year plan those are not appropriate anymore because technology changes so much.... or school district could do a set of 1 to 3 year refresh planes with 3 year goals and then we can work towards those goals...3 year goals that are adjusted each year they some funding and other important factors”</td>
</tr>
<tr>
<td>Technology Refresh Plans</td>
<td>4</td>
<td></td>
</tr>
</tbody>
</table>
School leadership was the largest topic to emerge under the visionary leadership category. Quotes under this topic focused on the importance of effective school leadership on the success of a computing or technology initiative at a school: “there is a strong relationship between technology usage and technology leadership at the school level” (Interview Participant 1, Personal Communication, 5-11-2015). Interview Participant 5 stated the importance of school leaders and discussed how effective school leaders find ways to sustain and support technology initiatives:

it goes back to leadership's priorities in a school...if a school leader values technology then they find funding or support to provide that technology to their students...a lot of our Principals are very creative on how to find ways to find technology funding...whether it is using a specific fund or applying for different grants or working with businesses to create partnerships (Personal Communication, 5-13-2015).

_Digital-age learning culture_

The second ISTE-A standard, digital-age learning culture, was associated with 18 different codes in the second phase of this study. The focus of the codes in this category centered on the new learning environment that a district-wide computing or technology initiative creates as well as policy changes that might be needed to ensure the effective and appropriate integration of these personal learning devices into every classroom. Interview Participant 4 discussed that school districts must ensure that school leaders fully understand the goals and the potential benefits of the technology initiative:

I do not know how district leadership could mandate that Principals allow teachers to observe classrooms utilizing technology or that Principals must allow or arrange
training for staff on use of digital learning and technology….You must make sure Principal's vision aligns with the district vision and appropriate use of technology (Personal Communication, 5-12-2015).

Once school districts can ensure that school leader’s vision align with the district vision, it is imperative that district leaders ensure that school leaders are consistently communicating the same message district leaders are clearly:

So when looking at a learning environment where there is a 3:1 to 1:1 student to computer ratio…you have to have strategies on how can I use this or the best method for integrating this…Instructional technology is not about the technology it is about the instruction and school leaders must clearly communicate this message to all stakeholders (Interview Participant 5, Personal Communication, 5-13-2015).

The second topic under digital-age learning culture was the importance of school leaders building a culture around digital learning and leading changes that promote 21st century skills development. Interview Participant 4 discussed the importance of school leaders communicating a clear message that district-wide computing initiatives were not an educational fad or trend, but a permanent change to teacher’s pedagogy.

Excellence in professional practice

The third ISTE-A standard, excellence in professional practice, was associated with nine different quotes. These quotes were sorted under two different topics: teacher support and communication. Interview Participant 1 stated the importance of how school leaders communicate their support of the computing initiative with their teachers and the potential impact this support could have on student achievement:
If a school leaders clearly states I believe in this and I want this to be successful…I would bet that the ones (school leaders) who believe in the product or this initiative are the ones whose numbers are going to be through the roof and they are going to have confidence in what they are doing and their abilities as well as technology usage will go up (Personal Communication, 5-11-2015).

Along with communicating their support to the teachers at their schools, Interview Participant 1 stated that merely communicating your support for teachers was not the same as aligning these messages with actions that ensure teachers feel fully supported from the administration of the school:

it makes all the difference in the world if your administrator supports you in what you are doing…and I do not mean they allow you to do what you are doing, but I mean full support…there's a big difference in practice and for the most part I think great school leaders have a way of doing this for their teachers...there is a big difference between I am required to do this by the district, so we are going to do it and I believe in this initiative and the potential impact it can have on student achievement (Personal Communication, 5-11-2015).

Another topic under the excellence in professional practice standard focused on external communication with stakeholders, colleagues, and staff members via 21st century tools (i.e. meeting online, social media and etc…). Interview Participant 6 stated that effective 21st century communication is not about learning one particular tool, but the ability to learn and understand new communication tools as they emerge. He/She stated that technology communication was not about learning a new tool but knowing how to ask the right questions about the technology.
One of the current emerging tools are online meeting services or online meeting tools which allows school leaders to meet virtually with stakeholders, colleagues within or outside of their school district, and/or district leadership. Interview Participant 2 did not believe that school leaders currently need to be experts in the use of these tools, but should have a solid understanding of these tools in case they need to utilize these tools in specific situations:

I think it is important for all school leaders to have a base knowledge that is needed to connect that way they could….if they had a bad weather day or in the case of an emergency…. I think it is important that they have a way and different levels or means to communicate…Then they can pick and choose when to use specific tools (Personal Communication, 5-12-2015).

The final topic under communication was focused on social media. Many school districts have been reluctant to develop and enforce new social media policies: “I can see why many school districts have been reluctant to do that because you do not want to hinder a person's right to freedom of speech …school leaders are not prepared to communicate with stakeholders in non-traditional means” (Interview Participant 2, Personal Communication, 5-12-2014). Interview Participant 5 believed that the topic of social media use was a polarizing topic in most school districts “certainly social media can be a great tool or it could go terribly wrong...if they utilize technology with the benefit and growth of students in mind...that is the piece that is so important.” (Personal Communication, 5-13-2015).

Two of the interview participants believed that issues with social media were due to a lack of understanding about the appropriate and effective use of social media as well as a lack of available professional development offered by school districts or local universities:
I don't think many school leaders understand that what you say on social media should have the same boundaries as what you would say in public….so I would think it would be the same as a public meeting or public forum...i think school districts need to provide this type of training to protect themselves legally and to be responsible citizens on social media (Interview Participant 2, 5-12-2015).

Interview participant 3 believed that school leaders should partner with local university communication departments or, in large school districts, partner with the school district’s communication department to develop training for school leaders. Interview Participant 5 discussed the school district being studied current status on the development of a district social media policy as well as the struggles the school district’s policy committee is having during the development phase of the policy in relation to providing appropriate guidelines for staff yet not installing a policy that could limit the potential of social media in student learning and communication between schools and their stakeholders.

Systemic improvement

The fourth ISTE-A standard, systemic improvement, was associated with ten different quotes under two different topics: self-evaluation and development, and public-private partnerships. Interview Participant 1 discussed the importance of systemic improvement of school leaders to the success of a computing initiative: “so for initiatives to be successful we must empower school leaders to help change the culture...to the change the school culture, they must be willing to change themselves first” (Personal Communication, 5-11-2015).

The self-evaluation and development category centered on the need for school leaders to be open to learning new tool and skills as well as taking chances and being vulnerable in front of their staff:
Basically we need leaders who can be taught and are willing to learn...instructional technology tools are always going to be hanging...technology will always be changing… so skills in individual tools are not as important as the ability to learn new tools as they emerge (Interview Participant 6, Personal Communication, 5-14-2015).

Interview Participant 6 also stated that leaders having a base knowledge about the different technology tools or devices is not as important as knowing the right questions to ask as well as how to leverage your colleagues to address their individual professional development needs. Interview Participant 6 also stated that school leaders must be willing to embrace change and have a willingness to put themselves out there in regards to learning something new or being vulnerable in front of their staff.

The second category under the systemic improvement category is public-private partnerships. Any computing initiative, no matter the ratio, is a very expensive initiative to implement and sustain. Three of the interview participants discussed the importance of school leaders seeking and sustaining public-private partnerships that will help with constantly growing costs of increasing the number of computing devices within a school. Interview Participant 5 discussed how previous school districts, she has worked for, has been successful building and sustaining these partnerships:

I have been in school districts where partnerships are vital to the success and work in the district...I have witnessed in previous roles how innovation can take place due to those partnerships...when I talk about these partnerships I am NOT talking about having McDonald's night or chick-fil-a night...I am talking about serious partnerships...I think as a district it is something that we have not put forward as
something that was important...I do not think that it means that administration does not think it is important (Personal Communication, 5-13-2015).

Two of the interview participants believed that the burden of public private partnerships lays with the school district not the individual school. Interview Participant 5 believed that many schools do not attempt to build these partnerships because they believe it is not a focus or a priority from district leadership. Interview Participant 4 discussed how district policies in large school districts can limit a school leader’s ability to build these partnerships:

I think there is a lot of district policies in large school districts that limit how many partnership or types a partnerships a school might pursue or have….It is too general to say whether or not this is a good thing or bad thing overall…..I think it does limit the Principal's ability to reach out to their local communities and tap in to potential alternative funding sources….Especially in a very bureaucracy filled district, that environment limits what Principals are willing to do …because anything you do that is questionable is going to be caught by the media (Personal Communication, 5-14-2015).

Interview Participant 2 discussed a previous school where she worked which she believed was a great of example of how public-private partnerships can have a positive impact on a technology initiative:

A great example was the middle school I was at where they had partnerships with both a major software company and a local research university…while I do not think would be a normal situation but maybe a model …when it comes to partnerships, I do not think that many schools feel they have much to offer a local business….many
partnerships that I have worked with within this district were recommended to the school…it was not something they sought out ….it wasn't something that the administrator looked for and made a partnership with…it was more a district leader made the partnership and pushed the school in that direction…I don't think they know they have the ability to make these type of partnerships (Personal Communication, 5-12-2015)

Interview Participant 4 discussed the theory that many school leaders did not realize that they had any benefits to offer a company in a partnership, but actually there are a lot of mutual benefits in a public-private partnership including the opportunity for the software or hardware company to foster brand or device loyalty with students so when they become consumers they would be more likely to purchase the products they are familiar with.

Interview Participant 4 went on to discuss how school districts should be cautious on selecting one device for student use across the entire district as it could possibly be harmful to the marketability of their graduates due to the current job market where most employers are searching for employees who can move from device to device no matter the operating system or platform.

*Digital citizenship*

The fifth ISTE-A standard of digital citizenship was associated with four different quotes centered on equity and responsible use of technology. Interview Participant 4 discussed equity issues observed in the school district: “A lot of classrooms that I visit, only the teacher has a laptop….There is no other technology in the classroom….How do you encourage student technology use if they do not have access to it” (Personal Communication,
Interview Participant 4 also discussed how increasing the number of computer labs is not the answer to addressing technology equity issues:

The computer lab model does not work because you could have multiple teachers vying for the same computer lab time and who decides who gets access and who does not...Teachers are not worried about utilizing technology effectively but ensuring they get the most bang for their buck when they do have access (Personal Communication, 5-12-2015)

The second category under the digital citizenship category was focused on the responsible use of technology by school leaders and the need for these leaders to promote and model responsible technology use within their school. Interview Participant 1 provided the example of how educational leaders within the district are failing to promote responsible technology use:

State law requires that school leaders show an Internet safety video to their staff each year...Principals are required to check a box and say they have shown the video...once they have check the box many think that they are done with the Internet safety...if this is a priority for leadership this is not something that is only emphasized once a year...it has to be a continuous focus of the leadership (Personal Communication, 5-11-2015).

Ideal Device for a Computing Initiative

Research participants, in both phases, were asked to identify the best device for their current school to implement as part of a computing initiative. Phase I participants were asked to select one device from a list of devices that included: PC computers, MacBooks, Netbooks, iPads, Tablets other than iPad, Smartphones, or Other (Open-Ended). Participants
who selected Other from the list were given the opportunity to provide the ideal device for their school via an included textbox. Overall 12 participants provided open-ended responses in Phase I of this study. Other device submissions included chromebooks (5), PC Laptops (3), Microsoft Surface Pro (2), tablet PC (1), and one participant stated that they did not feel qualified to select a device for their school. Results are presented by gradespan (see Table 21), by position (see Table 22), and by poverty level of the school (see Table 23).

Table 21 Ideal Device by Grade Span

<table>
<thead>
<tr>
<th>Gradespan</th>
<th>N</th>
<th>PC Computers</th>
<th>MacBooks</th>
<th>Netbooks</th>
<th>iPads</th>
<th>Tablets (other than iPad)</th>
<th>Smartphones</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elementary</td>
<td>15</td>
<td>17.6%</td>
<td>10.1%</td>
<td>13.8%</td>
<td>45.3%</td>
<td>6.3%</td>
<td>.6%</td>
<td>6.3%</td>
</tr>
<tr>
<td>Middle</td>
<td>76</td>
<td>25.0%</td>
<td>10.5%</td>
<td>15.8%</td>
<td>28.9%</td>
<td>17.1%</td>
<td>1.3%</td>
<td>1.3%</td>
</tr>
<tr>
<td>High</td>
<td>70</td>
<td>21.4%</td>
<td>20.0%</td>
<td>14.3%</td>
<td>24.3%</td>
<td>10.0%</td>
<td>5.7%</td>
<td>4.3%</td>
</tr>
<tr>
<td>Other</td>
<td>5</td>
<td>60.0%</td>
<td>0.0%</td>
<td>40.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
</tr>
<tr>
<td>Alternative</td>
<td>3</td>
<td>33.3%</td>
<td>0.0%</td>
<td>66.7%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
</tr>
<tr>
<td>Overall</td>
<td>31</td>
<td>21.0%</td>
<td>12.1%</td>
<td>15.6%</td>
<td>35.6%</td>
<td>9.5%</td>
<td>1.9%</td>
<td>4.4%</td>
</tr>
</tbody>
</table>

Table 22 Ideal Device by Position

<table>
<thead>
<tr>
<th>Position</th>
<th>N</th>
<th>PC Computers</th>
<th>MacBooks</th>
<th>Netbooks</th>
<th>iPads</th>
<th>Tablets (other than iPad)</th>
<th>Smartphones</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assistant Principal</td>
<td>179</td>
<td>17.3%</td>
<td>14.5%</td>
<td>14.5%</td>
<td>37.4%</td>
<td>8.9%</td>
<td>3.4%</td>
<td>3.9%</td>
</tr>
<tr>
<td>Principal</td>
<td>129</td>
<td>25.6%</td>
<td>9.3%</td>
<td>16.3%</td>
<td>32.6%</td>
<td>10.9%</td>
<td>0.0%</td>
<td>5.4%</td>
</tr>
<tr>
<td>Principal Intern</td>
<td>5</td>
<td>40.0%</td>
<td>0.0%</td>
<td>20.0%</td>
<td>40.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
</tr>
</tbody>
</table>
Table 23 Ideal Device by School Poverty Level

<table>
<thead>
<tr>
<th>Poverty Level</th>
<th>N</th>
<th>PC Computers</th>
<th>MacBooks</th>
<th>Netbooks</th>
<th>iPads</th>
<th>Tablets (other than iPad)</th>
<th>Smartphones</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-10%</td>
<td>29</td>
<td>13.8%</td>
<td>10.3%</td>
<td>13.8%</td>
<td>51.7%</td>
<td>6.9%</td>
<td>0.0%</td>
<td>3.4%</td>
</tr>
<tr>
<td>11-20%</td>
<td>44</td>
<td>25.0%</td>
<td>11.4%</td>
<td>4.5%</td>
<td>38.6%</td>
<td>15.9%</td>
<td>2.3%</td>
<td>2.3%</td>
</tr>
<tr>
<td>21-40%</td>
<td>116</td>
<td>24.1%</td>
<td>13.8%</td>
<td>19.8%</td>
<td>29.3%</td>
<td>5.2%</td>
<td>2.6%</td>
<td>5.2%</td>
</tr>
<tr>
<td>41-60%</td>
<td>70</td>
<td>18.6%</td>
<td>11.4%</td>
<td>15.7%</td>
<td>35.7%</td>
<td>11.4%</td>
<td>0.0%</td>
<td>7.1%</td>
</tr>
<tr>
<td>61-80%</td>
<td>44</td>
<td>13.6%</td>
<td>11.4%</td>
<td>15.9%</td>
<td>38.6%</td>
<td>15.9%</td>
<td>2.3%</td>
<td>2.3%</td>
</tr>
<tr>
<td>80% or greater</td>
<td>6</td>
<td>33.3%</td>
<td>0.0%</td>
<td>16.7%</td>
<td>50.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
</tr>
</tbody>
</table>

Note: Poverty is self reported and is based on the 2013-14 school year

**Ideal Device Themes from Interviews**

Research participants from the second phase of the study were also asked to provide their thoughts on the ideal computing initiative for a large urban school district to implement as part of a district-wide computing initiative. All the participants stated that a large urban school district should not select one device for the entire school district, yet should provide a specific device list or combination of devices based on the grade level of the students receiving the computing device. Four of the six interview participants believed that students in grades Kindergarten through second grade should be provided iPads due to the ease of use and touch interface: “in grades kindergarten through second grade a tablet is perfect...you are dealing with motor skills and motor skills development...students are already used to the touch operation so I tablet works really well” (Interview Participant 5, Personal...
Communication, 5-13-2015). All six participants believed that high school students should be provided a laptop (see Table 24).

Table 24 Ideal Device by Interview Participant

<table>
<thead>
<tr>
<th>Interview Participant</th>
<th>K-2</th>
<th>3-5</th>
<th>Middle</th>
<th>High</th>
<th>District-Wide</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interview Participant 1</td>
<td>NP</td>
<td>NP</td>
<td>Laptop</td>
<td>Laptop</td>
<td>Schools select from district selected devices</td>
</tr>
<tr>
<td>Interview Participant 2</td>
<td>iPad</td>
<td>Netbook with cloud storage</td>
<td>Netbook with cloud storage</td>
<td>Laptop</td>
<td>Combination of Devices</td>
</tr>
<tr>
<td>Interview Participant 3</td>
<td>iPad</td>
<td>Laptop</td>
<td>Laptop</td>
<td>Laptops</td>
<td>Ensure 3:1</td>
</tr>
<tr>
<td>Interview Participant 4</td>
<td>NP</td>
<td>NP</td>
<td>Laptop (3:1)</td>
<td>Laptops</td>
<td>Combination of Devices</td>
</tr>
<tr>
<td>Interview Participant 5</td>
<td>iPads</td>
<td>Laptops</td>
<td>Laptops</td>
<td>Laptops</td>
<td>Laptops</td>
</tr>
<tr>
<td>Interview Participant 6</td>
<td>NP</td>
<td>NP</td>
<td>Chromebook</td>
<td>Laptops</td>
<td>Combination of Devices</td>
</tr>
</tbody>
</table>

Note: NP=No Preference

Interview participants also discussed the need for operating system conformity across a large school district in order to provide better district-level support for schools:

As a school district I think we need to be as standard as possible in order to provide better support better costand better equity across the school district especially in a larger district...I think when we provide choice in allowed Principals to buy whatever they want then we lose some control and we spend more money...now I am all for trying new things and keeping devices updated but I do not know what that looks like right now...in this school district we are now going to one laptop which is fine but I
can see you eventually maybe that opening up to 2 to 3 different laptops with the same operating system (Interview Participant 4, Personal Communication, 5-12-2015).

Interview participants also emphasized the importance of providing students cloud storage (i.e. google drive, dropbox) so students can save and have access to their work from multiple locations: “the kids could have their own storage…if it was BYOD, they could use whatever device they have to make the video or take a picture…save them to their google drive and then access them on their google drive” (Interview Participant 2, Personal Communication, 5-12-2015).

Summary

Chapter 4 presented both the quantitative and qualitative findings of this study of the professional development needs of school-based leadership in preparation for a one-to-one initiative in a large urban school district. The study implemented explanatory-sequential mixed methods approach, with two distinct phases, to answer the study’s three research questions. In Phase I of the study, Principals and Assistant Principals in a large urban school district were surveyed using a likert-scale survey which asked survey participants to rate their level of agreement on their ability to complete specific tasks based on the ISTE-A standards as well as how often, if at all, they completed the same specific tasks.

During the second phase of the study, six district leaders, from the school district being studied, who serve in the district’s Instructional Technology and Academics departments were interviewd individually in semi-structured sessions. Interview participants were asked to discuss their thoughts on the results of Phase I of this study and to propose any recommendations that they had for how to address the professional development needs identified in Phase I. In chapter 5 of this study, I will discuss the findings of this study,
provide detailed answers for each research question, discuss limitations of this study's findings and provide recommendation for practice as well as recommendations for future research. Chapter 5 will conclude with a summary of chapter 5 and the study as a whole.
Chapter 5

Discussion

In this chapter, I discuss the findings of the study, provide detailed answers for each research question, discuss limitations of the study's findings, and provide recommendations for practice as well as recommendations for future research. The final aspects of this chapter focus on a summary of the study as a whole.

Purpose of the Study

The need for creating a strong school-based leadership team is heavily cited in educational research (Fullan, 2014; Elmore, 2003; Marzano et al., 2005; Sergiovanni, 2005; Marzano & Waters, 2009; Dufour & Marzano, 2011) and the importance of leadership is crucial to the implementation and sustainability of a large one-to-one initiative (Oliver Molletee, & Corn, 2012; Penuel, 2006; Holcomb, 2009; Hew & Brush, 2006). A flaw in technological expertise, at the school-based leadership level, not only affects the individual, but the school, the staff, and the students of the school as well. Many educational administrators, who are uncomfortable with technology, typically lack the visionary leadership to plan, implement, and lead a technological innovation (Gibson, 2001).

Instructional technology professional development for educational leaders has improved over recent years, but training is still lacking compared to teachers (Picciano, 2010; Brooks-Young, 2006; Allen, 2003; Gibson, 2001). The implications of ignoring training needs can affect student achievement and college or career ready graduates for years to come. The purpose of this study was to identify the professional development needs of school-based leadership in preparation for a district-wide one-to-one initiative as well as discover what potential solutions district instructional technology administrators believe could address the identified needs in the first part of this study.
Discussion of Findings

In this research study, three prescribed research questions helped to guide the description of the phenomenon being studied--professional development needs of school-based leaders preparing for a district-wide one-to-one computing initiative. In this section, I review and discuss the findings for each individual research question. When discussing the frequency of school leaders completing specific tasks or the frequency of specific events taking place at the school-level, further research and input from educational leaders is needed to determine how often school leaders should be completing these specific tasks while leading an one-to-one initiative. I expect that educational leaders, who are leading one-to-one initiatives at their school, will need to complete certain tasks less frequently than others, but further research is needed to determine the appropriate frequency for each specific task that has been identified as crucial tasks/actions for educational leaders to complete while preparing to lead or leading an one-to-one initiative.

Research Question 1

1. What are the professional development needs of school-based leaders preparing for a one-to-one computing initiative?

Results from Chapter 4 of this study show that school leaders, who are preparing to lead one-to-one computing initiatives at their schools need training to both lead the change at their schools as well as facilitate the personal changes needed to lead these new learning enviroments. To discuss the findings, research question 1 will be separated into three different categories: funding issues, technology modeling, and change management and evaluation. To conclude the discussion of the professional development needs that emerged
in the findings of the study, professional development needs that emerged will be discussed based on the five pillars of this study’s theoretical framework, the ISTE-A standards.

**Funding**

Implementation of a one-to-one computing initiative is a large financial investment. Prior research suggests that one-to-one computing initiatives should be funded and sustained by a portfolio of funding sources not just one single funding source (Greaves et al., 2012; Sorenson & Goldsmith, 2013; Simmons, 2014; Boser, 2014; Rhor, 2014). One-to-one funding portfolios should include funds from recurring state and local appropriations (Sorenson & Goldsmith, 2013; Simmons, 2014; Boser, 2014), cost saving budgeting (Sorenson & Goldsmith, 2013; Simmons, 2014; Sergiovanni, 2009), grassroot fundraising (Simmons, 2014; Fullan, 2014), and public-private partnerships (Simmons, 2014; Fullan, 2014; Sergiovanni, 2009; Damron & Hall, 2010; Khadaroo & Paulson, 2010). Results from this study show that school leaders need professional development in the following areas:

- fund reallocation and cost saving budgeting
- public-private partnership formation and development
- financial planning for long-term technology refresh/needs.

While prior research has found that successful one-to-one computing initiatives have been funded and sustained through multiple separate funding sources, multiple studies have suggested that primary funding for computing initiatives come from reallocating existing/recurring funds from other priorities within the school (i.e. copy/printing budgets, textbooks, supplies) (Sorenson & Goldsmith, 2013; Simmons, 2014; Sergiovanni, 2009). These reallocations require the school leader and/or school leadership team to effectively manage their school’s budget as well as develop and maintain long term funding projections.
and plans (Hayes & Greaves, 2013; Simmons, 2014). Hayes and Greaves (2013) suggest that school leaders develop financial plans for instructional technology and computing for at least three years in advance. The findings from both phases of this study (survey and interviews) show that school leaders need training and professional development in this area to be adequately prepared to successfully complete these new requirements that a computing initiative will require.

While primary funding for computing initiatives should come from reoccurring funds, research has shown that reliance primarily on reoccurring funds alone will not be sufficient to sustain and maintain a school or district-wide computing initiative (Simmons, 2014; Fullan, 2014; Sergiovanni, 2009; Hayes & Greaves, 2013). School leaders should look to other funding sources to supplement their reoccurring school funds as well as to make one-time purchases (i.e. software licenses, hardware). One source of funding that is suggested in prior research is public-private partnerships where individual schools and/or school districts partner with corporations or local businesses to provide funding and/or services for specific purposes at the school (Simmons, 2014; Fullan, 2014; Sergiovanni, 2009; Damron & Hall, 2010; Khadaroo & Paulson, 2010). One the lowest results from The One-to-One Computing Leadership Assessment (Phase I of this study) was the ability to seek out and form public-private partnerships. Interviews from Phase II of this survey show that school leaders have not generally been provided training, guidance, or parameters from school district or state educational agencies on what appropriate and beneficial public-private partnerships should consist of. If future school leaders are expected to utilize this potential funding source, the professional development needs that emerged from this study must be addressed.
Just as important as providing training opportunities for educational leaders on public-private partnerships, is the design and methods training leaders utilized to provide this training. The needs of every school district as well as number and size of the available partnerships will be varied. It is important that case study research is conducted to provide guidance to school districts with varying access to industry partners and to districts of all sizes. The North Carolina New Schools Organization (NCNS) is a great example of an educational organization leading, fostering, and managing public-private partnerships between North Carolina School Districts and North Carolina businesses/industries (Reich, n.d.). NCNS fosters school and industry partnerships to create industry-based professional development opportunities for teachers, provide career-relevant learning experiences for students and channel the energy and expertise of industry leaders. NCNS’s work could provide a exemplar framework for other school districts to follow when looking to utilize public-private partnerships as a potential funding source for their one-to-one initiative.

**Technology Modeling**

School leaders of a one-to-one school should model technology through their daily actions, electronic communications, and the demonstration of technology skills (Anderson & Dexter, 2005; Brooks-Young, 2006; Rudnesky, 2006; Edwards, 2013). School leaders should never ask a teacher to model or demonstrate a technology skill or concept which they have not already completed themselves (Rudnesky, 2006; Simmons, 2014). The importance of technology modeling by school leaders in the literature demonstrates the importance, in a computing initiative, of starting any instructional technology professional development with the leaders of the school before beginning training with teachers.
Results from the One-to-One Computing Leadership Assessment show that school leaders need professional development and training in multiple areas. While school leaders who responded to the leadership assessment scored themselves relatively high on questions focused on modeling proper technology use for my staff (mean=4.04), one area of concern is how infrequently respondents believed they modeled proper technology (i.e., 41.5% of school leaders reported modeling once a quarter or less). For a district-wide or school-wide one-to-one computing to be successful, school leaders must model proper technology use on a daily basis.

The importance of technology modeling is often downplayed because the daily technological uses for administrators are quite different from the daily technological uses of teachers (Brooks-Young, 2013). Prior research has proven that the actual daily technological uses by leadership of the school is not as important as the daily modeling of proper technology use that sets the standard for teachers to follow (Brooks-Young, 2013). Even though the daily tasks of teachers and school administrators differ, the commitment to utilizing technology to improve one’s professional efficiency and effectiveness is the same. If teachers see the commitment to continuous improvement in their school leaders (via technology modeling), then they will have a standard to follow in their own daily technology modeling for their students (Brooks-Young, 2013).

**Change Management and Evaluation**

The integration of technology into instruction requires change, which can be resented by some staff members and stakeholders (Edwards, 2013; Sheninger, 2014). Therefore a vital skill a school leader should possess, in order to move their school into the realm of an 21st century educational setting, is understanding change, the change process, and becoming the
catalyst for the desired change. As part of this change management, school leaders will need to be able to effectively plan for long-term needs of the initiative and communicate this plan to all stakeholders of the school. A big part of this planning and communication will be technology refresh plans (69.5% agreement), long-term financial planning such as fund reallocation (79.5% agreement), public-private partnerships (40.5% agreement), and communication via social media (81.1% agreement). Results from this study suggest that some school leaders need professional development in these areas before they are expected to effectively lead these technology-immersed learning environments.

In education, school leaders are considered the catalyst for change due to their impact on all aspects that are important to the success of a change initiative (i.e. vision, stakeholder buy in, leadership, etc…) (Anderson & Dexter, 2005; Brooks-Young, 2006; Rudnesky, 2006; Edwards, 2013). Their usage of technology should be a “model” for other staff members within the school to follow or mimic (Fullan, 2014; Sheninger, 2014). Interview data showed that school leadership buy-in/support and proper technology modeling can be the most important factor in the success of the computing initiative. Interview participants in this study noted that when school leaders do not fully support a technology initiative, utilization of technology in their schools is below average. The lack of technology utilization prevents school districts from seeing a return on the large financial and human resources investment that they have made to facilitate the implementation of the computing initiative. Interview data from this study re-emphasizes the importance of school leadership in the effective implementation and sustainability of a computing initiative. To ensure full technology utilization at the school level, district leaders should ensure they have full support and buy-in from school leaders before implementing a computing initiative at the school level.
In a district-wide computing initiative, educational leaders should hold themselves accountable for their contributions to the overall success of the initiative as well as the progression toward meeting the long-term goals of the initiative and increasing student achievement. District leadership should hold themselves accountable around whether or not they are providing the level of support and professional development that each school leader needs to successfully be the change catalyst at their school (i.e. addressing PD needs that emerge). Research has shown that school leaders should be considered the “lead learner” (Quinn, 2002; Wilmore, 2000; Marzano et al. 2005; Fullan, 2014) and this study supports prior research by emphasizing the need for district leaders to provide comprehensive professional development to school leaders in preparation for an one-to-one initiative.

Needs Identified by ISTE-A standards

ISTE-A standards (originally called NETS-A) were developed to fill the need found in the research for a leadership framework for school leaders in a technology immersed school setting. These standards represent a national consensus between researchers and practitioners of what administrators need to know and do to support, as well as lead, effective technology integration in schools (Allen, 2003; Brooks-Young, 2013). The ISTE-A standards comprised the theoretical framework for this study. In the final section of discussion on research question 1, I will discuss the findings based on the five pillars of the ISTE-A standards.

Visionary Leadership

The first standard of the ISTE-A framework is Visionary Leadership. A technology leader has the ability to inspire a shared vision among stakeholders and foster changes that maximize the use of technology resources to support instruction, learning, and student
performance. The two major professional development needs that emerged from this study under visionary leadership were the ability to communicate/foster a shared vision among stakeholders of the schools (i.e. parents, community members) and the needs of long-term planning.

As the leaders of the school, school administrators must clearly, effectively, and efficiently communicate the reasoning for the implementation of the one-to-one computing initiative. The vision they communicate must align with the district’s overarching goals for the initiative as well as clearly state the future impact the initiative can have on student achievement going forward. To regularly communicate the daily happenings related to the initiative, various student achievements, and support needed to ensure the sustainability and success of the initiative, school leaders should utilize twenty-first century social media tools (Brooks-Young, 2013; Anderson, 2014; Simmons, 2014). Survey results of this study show that almost twenty-five percent of school leaders had never communicated with stakeholders via social media. Significant training is needed along with new policy implementation by districts that encourage and foster this new type of communication between schools and stakeholders.

Another “visionary leadership” need identified from this study was the need for training in the area of long-term planning, primarily in the areas of financial budgeting (76.3% agreement), public-private partnerships (40.5% agreement), fund reallocation (79.5% agreement), and the development of technology refresh plans (69.5% agreement). Some K-12 educators look at the new technology implementations as simply fads or short term initiatives that will soon be replaced by the next initiative or technology advancement (Fullan, 2014; Anderson, 2013; Simmons, 2014). For a computing initiative to be successful and
sustainable, school and district leaders will need to develop, implement, and communicate both long-term financial plans and technology refresh plans to ensure that all stakeholders are confident that the computing initiative will be sustained long term.

School leaders need to engage in long-term financial and strategic planning that communicates the message to all staff, parents, and stakeholders that the current technology initiative is not simply a fad or a temporary initiative that will soon be replaced, but an investment in the future of the students of the school and an educational tool that is vital to the success of future career or college-ready graduates.

_**Digital Age Learning Culture**_

The second standard of the ISTE-A framework addressed the need for educational leaders to promote a "Digital-Age Learning Culture" (ISTE, 2009, p 1). For the educational administrator, this standard is multi-faceted including modeling effective and appropriate technology use for learning, providing learning environments that meet the diverse needs of their students, and participating in professional learning communities (PLCs) that stimulate innovation, creativity, and digital-age collaboration (Brooks-Young, 2013, Anderson, 2013). The findings of this study show that most school leaders are not fostering or establishing this culture in their schools. Survey respondents stated that they only completed the following tasks less than once a year: provided opportunities for teachers to observe other teachers utilizing technology (55.9%), met with teachers to discuss technology integration (24.6%), and reviewed existing lesson plans or artifacts (21.1%). For a district-wide one-to-one initiative to be successful and sustainable, these events must take place more often than just yearly, they must be an integral part of the administrator’s weekly duties (Brooks-Young, 2013; Fullan, 2014; Hayes & Greaves, 2013).
Excellence in Professional Practice

The third standard of the ISTE-A framework is Excellence in Professional Practice and addresses the need for administrators to manage and facilitate professional development for their staffs, lead or participate in PLCs with other school leaders, carry out effective and appropriate communication with all staff and stakeholders, and be aware of educational research, best practices, and potential uses for emerging technologies in education (Brooks-Young, 2006, 2013).

Results from this study show that school administrators need training as well as professional development opportunities on how to communicate and collaborate via 21st century tools which research shows is essential to the development of both the school leaders and staff in the ever changing digital world (Anderson, 2013; Fullan, 2014; Simmons, 2014; Hayes and Greaves, 2013). School leaders should be encouraged and opportunities should be provided for school leaders to participate in online PLT or PLCs focused on topics relevant to their daily work. Survey results show that slightly over half of all survey participants had never led or facilitated an online meeting with other school leaders (64.2%) and received the second lowest mean of agreement in the “know how to” section of the survey (mean=3.25). The demands of both the assistant principal and principal are too high to allow these professionals to regularly leave campus to meet with other administrators from their district or to travel regularly to conferences where they can have professional development opportunities. The most efficient mode to provide these opportunities is through 21st century tools (e.g., online meetings, social media, virtually attending conferences, etc.) which will allow school leaders to participate in professional development and still be present at their school campuses.
**Systemic Improvement**

The fourth standard of the ISTE-A framework is Systemic Improvement. Central to this standard is data-driven decision-making, recruiting and retaining technology-savvy teachers/staff, and creating partnerships outside of the school that support the work of teachers/staff at the school (Brooks-Young, 2013). Findings from this study show that extensive work is needed in the area of public-private partnerships. This specific task was the lowest score in the knowledge category (mean=3.17, sd=1.002) and the second least frequently completed task (49.0% Never). Interview data stated that one potential reasoning for this issue is due to the lack of guidance from the school district being studied on the parameters a school leader should stay within when seeking these partnerships or due to the fact that many school leaders did not understand that they had anything to offer a company/business in a partnership. To address this identified need, a combination of district policy development and guidance from district leaders on how these partnerships should be sought, formed, approved, and managed by school leaders. These partnerships are vital to the long-term sustainability of district-wide computing initiatives (Hayes & Greaves, 2013).

**Digital Citizenship**

The fifth and final standard of the ISTE-A framework is Digital Citizenship. This standard focuses on the school leaders’ responsibility for ensuring equitable access to digital tools as well as promoting, modeling, and establishing “policies for safe, legal, and ethical use of digital information and technology” (ISTE, 2009, p 1). Digital citizenship also refers to promoting inter-cultural understanding among students (Brooks-Young, 2013). Findings from this study identified both ensuring safe and legal use of technology as well as building cultural understanding as two professional development needs that district leaders must
address before implementing a district-wide one-to-one computing initiative.

As technology access (hardware and software) increases in schools, the importance of ensuring all technology users at the school are utilizing these tools in an ethical, appropriate, and legal manner will become increasingly important. Almost sixty percent of all survey respondents stated that they ensure staff and students are aware of legal and appropriate technology use policies, but only on a yearly basis. During the second phase of this study, district leaders believed that school leaders were referring to the yearly required document that teachers/staff sign to state they have been made aware of technology policies related to technology use while at the school. The act of signing a technology use agreement is not sufficient enough to effectively ensure legal and appropriate use of technology as described in prior research (Hayes & Greaves, 2013; Simmons, 2014; Topper & Lancaster, 2013). To ensure that technology users within the school are using these resources in a legal and ethical manner, school administrators must frequently remind users of technology use rules as well as regularly monitor technology usage by staff and students to ensure all users are abiding by the established policies and procedures.

The second professional development need that emerged under Digital Citizenship was establishing and implementing policies that promote cultural understanding between different cultures. This task had one of the lower means (3.96) in the “I know how to” section of the survey and slightly less than half of all survey respondents stated they completed this task either yearly (27.6%) or never (15.0%). The Internet has removed many of the boundaries that school location has placed on students in the past. This new exposure allows students to interact and collaborate with other students across the world (Brooks-Young, 2013; Fullan, 2014; Topper & Lancaster, 2013) but requires school leaders to implement
policies, programming, and educational opportunities that help students understand and respect cultures that are different from their own. The exposure to different cultures or different parts of the world have both educational benefits and risks, but school leaders should be proactive in promoting cultural understanding with students at their school to ensure issues do not emerge during these collaborative opportunities between students of different ethnic backgrounds, cultures, or languages.

**Research Question 2**

2. Do differences in professional development needs exist among the school leaders based on the following attributes: leadership positions (i.e. Principal, Assistant Principal), grade span of the school, level of the poverty at the school (FRL), years’ experience of the school leader, and the self-assessed computer skill-level of the school leader.

To answer the second research question of this study, one-way ANOVA with REGWQ post hoc testings were conducted on all questions of The One-to-One Computing Leadership Assessment independently to determine if there were any significant differences between school leaders based on survey respondent characteristics.

**Leadership Position**

When statistical tests were completed to determine if statistically significant differences existed among survey respondents based on their current position (e.g. principal, assistant principal), six different components of the One-to-One Computing Leadership Assessment were found to have significant differences. Principals were found to know more about reallocating school resources, updating plans and budgeting, establishing a technology refresh plan, and ensuring staff are aware of Internet safety/acceptable use policies. Assistant
principals were found to know more about modeling proper technology use and managing an online meeting.

While these findings could help to design more tailored professional development for assistant principals around planning and budgeting or for principals around modeling and using online meeting tools, more research is needed to determine why these differences exist and what are the best strategies to address these identified needs. It is possible the greater skills in planning and budgeting displayed by principals are skills they pick up through experience, and that assistant principals will likewise pick up through experience and mentoring from their principal, so perhaps professional development is not needed in these areas. On the other hand, it is also possible that these differences reflect real gaps in knowledge that both positions could benefit from, and professional development may be required.

**Grade Span of the School**

When statistical tests were completed to determine if statistically significant differences existed among survey respondents based on the grade of the school they currently lead, eight different components of the One-to-One Computing Leadership Assessment were found to have significant differences. Elementary school leaders reported greater understanding of reallocating school resources, engaging in data-based decision making, and in data security best practices. Middle school leaders reported greater belief that they could sustain the momentum of recent instructional technology initiatives at their schools as well as that they have seen improvement in their teachers’ abilities to integrate technology into their classrooms after completing previous district-wide instructional technology professional
development. In each of the eight different tasks, high school school leader means were lower than both middle and elementary.

REGWQ post hoc testing show differences are present between elementary and high school leaders on whether prior instructional technology professional development had been valuable, the belief they would be able to sustain future technology inititiatives, and how often the school leader communicated with stakeholders via social media. For the other five tasks, post-hoc tests determined that the six different FRL categories where homogeneous to each other.

Interview data suggest that these differences could be due to the fact that elementary school teachers and staff at schools in the district tend to be more collaborative due to more teachers teaching similar grade level courses (i.e. 1st grade, 2nd grade and etc…). High schools (approximately 2,600 students) are typically much larger than elementary schools (700-800 students) within the district. Larger schools and the increase of different course offerings cause high schools teachers to work more in silos due to the specialization of the teaching positions that high schools require. These findings show that educational leaders need to place more emphasis on tailoring instructional technology training in the upper grades and increasing the catalog of professional development offerings to meet the diverse needs of high school teachers/school administrators.

In the “how often” series of questions, post-hoc testing showed that significant differences existed between high and elementary grade spans with elementary leaders generally communicating more with stakeholders via social media as well as more frequently updating their school plans and budgets to meet the growing costs of technology. Interestingly, high schools offer far more events and after-school activities (i.e. sports, clubs
and etc…) about which principals might communicate with stakeholders using social media, but that does not appear to be happening. It is also unclear why elementary leaders might be updating plans and budgets more than high school leaders. Further research is needed to determine the reasoning for the difference between these two grade spans.

**Level of Poverty**

When statistical tests were completed to determine if statistically significant differences existed among survey respondents based on the level of poverty of the school they serve (self-reported FRL percentages), only modeling proper technology use was found to have significant differences. REGWQ post hoc tests determined that the six different FRL categories were homogeneous to each other. An interesting finding from the comparison of means of school leaders was the fact that school leaders with the highest level of poverty (80% or higher) had the highest mean compared to the school leaders with smaller levels of poverty at their school. This finding is the reverse of what prior research has found (Sheninger, 2014; Creighton, 2003; Simmons, 2014) and further research is needed to determine why the findings of this study are different. One interpretation is the school district in which this study took place has taken steps to place highly qualified leaders in high-need schools. Thus, this finding might not hold if the survey were taken outside of this particular district where less qualified leaders are often found in high-need schools.

**Administrator’s Years of Experience**

When statistical tests were completed to determine if statistically significant differences existed among survey respondents based on the years of educational experience the school leader had, six different components of the One-to-One Computing Leadership Assessment were found to have significant differences. Post-hoc testing (REGWQ) showed
that group differences generally existed between the two least experienced groups (e.g. 6-10 and 11-15 years) and the two most experienced groups (e.g. 16-20 and 20+).

The age of a school leader (i.e. the years of experience) can affect their self-efficacy in completing specific technology related tasks (Simmons, 2014; Fullan, 2014; Sheninger, 2014). The findings of this portion of the study show that school leaders with more years of experience needed more comprehensive training on tasks that utilized more modern technology tools (i.e. online meetings, using online services to share files, overall computer skill-level) as well as easy to access “how to” resources so they can improve their understanding and confidence in completing specific technology related tasks.

**Computer Skill-Level**

When statistical tests were completed to determine if statistically significant differences existed among survey respondents based on their self-reported computer skill-level, twelve different components of the One-to-One Computing Leadership Assessment were found to have significant differences. Computer skill level had the largest number of survey components that had statistically significant differences. The results of this portion of the study show the importance of improving and frequently developing the computer skill-level of school leaders in preparation for leading these technology immersed learning environments.

Post-hoc testing (REGWQ) showed that group differences generally existed between the beginner computer skill-level and the expert skill-level. One could hypothesize that the reasoning behind many professional development needs identified in this study is the computer skill-level of the school leaders who are being asked to lead immersive technology environments. These differences emphasize the importance for school districts to provide
adequate support for school leaders who need help improving their overall computer skill set as well as training on completing specific technology related tasks that are vital to the success of the one-to-one initiative.

Three different tasks (online meeting, utilizing online sharing tools, and modeling proper technology use) showed additional differences between the advanced and expert computer skill-levels. This additional difference grouping shows that some tasks are still difficult for even the advanced computer user. If a school district or educational agency is developing or designing professional development for school leaders, these tasks should be placed toward the ending sections of the training. Professional development facilitators should look at these tasks as tasks that training should be building toward not starting the training with.

**Research Question 3**

3. What potential solutions do educational leaders believe could be implemented to addresses the professional development needs identified in this study?

A major component of the second phase of this study was gaining insight from district leaders on potential strategies and solutions to the professional development needs that emerged during the first phase of this study. While multiple different solutions were proposed, all six district leaders agreed that any professional development that was planned for teachers in preparation for a district-wide one-to-one initiative should be first delivered to the leadership of the school so school leaders can become a resource for teachers as well as a catalyst for the change that is being facilitated in their schools. Interview participants also agreed that due to the busy schedules and sometimes overwhelming demands on leaders of a school, that any professional development strategy should be a blended strategy (mix of
virtual and face-to-face). In discussion of the results relevant to research question 3, I will discuss the different blended learning strategies that emerged from the semi-structured interviews as well as the importance of the instructional technology facilitator in the implementation and success of one-to-one initiatives.

**Blended Learning**

To address the professional development needs that emerged during phase I of this study, all six interview participants believed that one single professional development method would not be sufficient to meet the varying needs of every school leader, but multiple professional development strategies would be needed. Due to the demands of the school leadership position, it would not be possible for school leaders to be absent from their schools for extended periods of time or for multiple days on a regular basis (i.e. multiple days per month). This reasoning led to two different variations of blended learning with both consisting of two phases:

- short face-to-face trainings (phase I) followed by extensive virtual training and collaboration (phase II) or
- extensive multiple day face-to-face trainings during the summer (summer boot camp) (phase I) followed by extensive virtual training and collaboration (phase II).

The first recommendation that emerged from interviews was the idea of minimizing school leaders time away from school with minimal systematic face-to-face trainings (i.e. one day a month or quarter) supported by multiple virtual synchronous trainings, and online resources (i.e. online how to video library, online course site). Corresponding to these resources would be district organized professional learning teams (PLTs) that would meet
virtually and would act as a support system for school leaders as they face similar challenges during implementation. The benefits of PLTs are cited heavily in educational research (Dufour, 2003; Voelkel, 2011; Dumas, 2010) and this study shows the importance of PLTs to the successful implementation and sustainability of an one-to-one initiative.

The second professional development variation that emerged from the interviews of this study was the configuration of offering summer boot camps for school leaders that consisted of multiple days of extensive technology training followed by frequent virtual trainings, an online course for organization of how-to videos and resources, and virtual professional learning team meetings. One issue that could prevent this option from being a good fit for the school district being studied is the impact for principals who lead year around schools. These schools do not have a traditional summer vacation for students and if this option was chosen, training dates would need to be adapted for school leaders who are at year around schools.

**Instructional Technology Facilitator**

Having an instructional technology facilitator at every school was the second major solution that emerged from interview data of the second phase of this study. Prior research shows that one-to-one computing initiatives need dedicated project managers (Hayes & Greaves, 2013), extensive professional learning for all staff members (Storz & Hoffman, 2013; Hayes & Greaves, 2013; Kiel, 2013), and consistent instructional technology coaching for teachers (Hayes & Greaves, 2013; Kiel, 2013). Interview participants stated that instructional technology facilitators within the district are currently shared between multiple schools and many had expressed that the demand of serving multiple schools was becoming overwhelming. The demands of the the position are increased expotentially in a one-to-one
computing school and serving multiple one-to-one schools by one instructional technology facilitator would not be realistic.

Having an instructional technology facilitator at every school could also be a solution to meeting the professional development needs of their school’s leadership team. Interview participants proposed that having an instructional technology facilitator at every school would provide a valuable resource for school leadership teams who need personalized training or need help with completing specific technology related tasks. This position would act as a “conduit” between district instructional technology leaders and school administrators. These positions could attend regular face-to-face trainings for school leaders and then return back to the school to train school administrators before conducting training with the staff of the school, eliminating the issue of school leaders being away from the school campus on a regular or frequent basis.

Limitations

Limitations are potential weaknesses in one’s study and are out of one’s control (Leedy & Ormrod, 2011; Simon, 2011). Throughout the duration of this study, several barriers and limitations were encountered by the researcher. The limitations that I faced were:

- **Access to district leadership:** Interview requests were made with several district leadership members in both the Instructional Technology and Academics departments with six members agreeing to participate in interviews. This is primarily due to a lack of relationship with these non-participating members as well as how busy their schedules are.
• **Time:** The researcher was limited by the timeframe available for completion of this study as well as when the researcher could work on this study or collect data for this study.

• **Size of the district:** The size of the district and the rate that the district is growing (almost 4,000 students per year) makes the results of this study hard to generalize for other large urban school districts across the United States.

• **Finance:** The researcher had no outside financing for this project.

• **Location:** The location of the school district combined with the size of the school district limit the generalizability of the findings of this study to other large urban school districts in the United States.

• **Socially acceptable answers:** The researcher works for the school district where the research was conducted. Hence, the relationship between the researcher and interview participants could be considered a limitation for the study. When discussing survey results with interview participants, participants might be tempted to provided responses that are socially acceptable or answers that they believe the researcher agrees with.

**Recommendations for Practice**

Based on the results of this study, the following nine recommendations are being made to large school districts that are planning to implement or currently implementing a district-wide one-to-one computing initiative to meet the professional development needs of their school’s leadership teams:
**Full-time Instructional Technology Facilitator:** School districts need to ensure every school that is implementing an one-to-one initiative has a full-time instructional technology facilitator at their school.

**Begin with leadership First:** Any training that is going to be mandated for teachers, should first be mandated for district and school leadership especially principals. This allows the leadership to be prepared to answer teacher questions and allows the trainer to receive feedback before delivery to teachers.

**School Leaders cannot Look Inadequate:** School leaders cannot look or feel inadequate in their capabilities to lead a one-to-one school. They need to model proper and effective daily technology use. Training and online resources should be made available for all district and school leadership to ensure that leaders of all technology skill levels are receiving the training they need to be successful.

**Partner with Local Universities for Training:** School districts should partner with local or state universities to provide face-to-face trainings, online trainings, online video resources, and implementation instruments that could be used during the implementation of a district-wide one-to-one initiative.

**Professional Learning Teams:** Educational agencies who are preparing for district-wide one-to-one initiatives should organize professional learning teams for their individual school’s leadership teams and require these teams to meet frequently to discuss issues and best practices during the implementation of an one-to-one initiative.

**Advanced Financial Management Training:** For an initiative to be sustainable, primary funding must be made through reallocation of reoccurring funding. Grants, partnerships, and grassroots fundraising are not guaranteed year to year and should be avoided for key
components of the initiative, but targeted to supplement the annual needs of the initiative. The complexity of multiple funding sources will require school leaders to receive advanced financial management training that will prepare them for the increase demands in an one-to-one initiative and ensure efficient/effective management of financial resources.

**Public-Private Partnerships:** School districts should develop policies and framework for school leaders to follow when seeking, forming, and managing public-private partnerships at their individual schools.

**Technology Refresh Plans:** School districts should develop district-wide technology refresh plans for both hardware (i.e., computers, servers, printers) and software as well as an approved framework for schools to follow in the development of their individual school’s technology refresh plan. Results from the second phase of this study show that the school district being studied did not have a long-term technology refresh plan. Schools should be aligning their individual plans to the district plan instead of individual schools developing plans on their own, but before schools can align their plans, a long-term district technology refresh plan or framework must be established.

**Provide an Implementation Framework:** In large school districts, a one size fits all solution might not be the best option for all parties involved. Instead of having schools conform to the district-wide model, school districts should provide a implementation framework that school-based leadership can customize to meet the needs of their students in the most effective and efficient manner possible.

**Recommendations for Future Research**

Based on the results of this study, the following recommendations are being made for future research by educational researchers, educational research organizations, and/or school
districts. These research recommendations are particularly focused on the need for research, on these topics, in large school districts that are planning to implement or currently implementing a district-wide one-to-one initiative:

**Role of the Instructional Facilitator:** While results of this study emphasize the importance of the instructional technology facilitator and the need to have a full-time instructional facilitator at every school, interview participants were mixed on the position classification of the position (i.e. assistant principal, quasi-administration, or coordinating teacher). Research is needed to determine the best role for instructional technology facilitators to serve at the school level.

**Best Practices for Public-Private Partnerships:** Public-Private partnerships were identified as both a professional development need (phase I) and an important source of one-to-one initiative funding for school districts and individual schools to pursue. More research is needed on the best practices of public-private partnerships formation, district policies development, and appropriate agreements.

**Teachnology Self-Assessment and Corresponding Training:** Results of this study (phase I) show that professional development needs vary greatly among school leaders. School districts preparing for district-wide implementation for an one-to-one initiative need to provide technology self-assessments for all school leaders to determine what the individual professional development needs are and align training as well as professional development resources to meet the identified needs to ensure all leaders are adequately prepared to lead these technology-rich learning environments.
Summary and conclusion

The purpose of this study was to identify the professional development needs of school-based leadership in preparation for a district-wide one-to-one initiative. The explanatory sequential mixed method study, consisting of two distinct phases, sought to identify professional development needs of school leaders based on the ISTE-A standards as well as discover what potential solutions district instructional technology leadership believed could address the identified needs in the first part of this study. Overall, three research questions were developed and applied including identifying professional development needs of school leaders, determining if differences existed based on different characteristics of the school leader and the school they lead, as well as determining what potential strategies or solutions that district leaders believed could be implemented to address the professional development needs identified during the first phase of this study.

The results of the first phase of this study (survey of school leaders) showed that the recruitment and retention of public private partnerships, leading an online meeting, establishing long-term technology refresh plans, and updating school budgets as the four most needed areas of professional development for school leaders in preparation for an one-to-one initiative. When determining if differences existed based on the characteristics of the school leader (i.e. years of experience, position, computer skill-level) or characteristics of the school they lead (i.e. student poverty level, grade span), the most significant differences existed based on the self-assessed computer skill-level of the school leader. Poverty-level of the school had the least number of significant differences.

In the second phase of the study, district leaders suggested that school districts in preparation for an one-to-one initiative should ensure that every school had a full-time
instructional technology facilitator to help coordinate the initiative as well as be a dedicated resource for school leaders to use when they needed help with a specific technology task, evaluation of a classroom technology, and/or help with various technology leadership tasks. District leaders also suggested that school districts should provide professional development to school leaders via a blended learning model where school leaders would attend face-to-face trainings during summer break or on dedicated teacher workdays (i.e. when students are not in the school building) followed by extensive online follow-up trainings, mandatory professional learning team participation, and online resources for school leaders who might need help on a specific technology task.

The results of this study show that school leaders need training and professional development to ensure they are fully prepared to lead one-to-one initiatives at their schools. In an one-to-one environment, for the initiative to be impactful and sustainable, school leaders must become the lead learner in their schools and continuously look for more effective or efficient ways of meeting the ever changing needs of their students. In a world which is filled with technology and constantly changing, school leaders must dedicate themselves to self-improvement to ensure today’s students are fully prepared to meet the demands of tomorrow’s world.
References


http://www.academia.edu/8173891/The_Beliefs_Practices_and_Computer_Use_of_Teacher_Leaders1


http://www.usm.maine.edu/cepare/pdf/Mathematics_Final_cover.pdf


http://www.bryan.k12.oh.us/Forms/MLTIPhaseOne.pdf


Wired Schools. (2000). *A technology revolution is about to sweep America's classrooms.*


Appendices
Appendix A

Survey Protocol

Brandon Simmons Dissertation Survey

Informed Consent for Research Participation

Title of Study: The Professional Development Needs of School-Based Leadership in Preparation for a One-to-One Computing Initiative in a Large Urban School District

Principal Investigator: Brandon Simmons, (bdsimmon@ncsu.edu) under the supervision of Dr. Kevin Oliver (Kevin_oliver@ncsu.edu). I am conducting a research study to determine the professional development needs of school-based leadership in preparation for a one-to-one computing initiative.

Information: In this study, you will be asked to complete an online survey. You will need approximately 20 minutes to complete the online survey.

Risks: No foreseeable risks or discomforts are expected from your participation in this study. Survey and observation data will be summarized and no data will be identifiable by your name. The name of the school district being studied will also be kept confidential.
**Benefits:** Findings from this study will be used to identify the professional development needs of both Principals and Assistant Principals in preparation of leading a school which every student has a personalized learning device. This data will be used to develop future training, and professional development opportunities for school-based leadership.

**Confidentiality:** The information in the study’s records will be kept strictly confidential. Survey and interview data will be stored securely in password-protected folders. No reference will be made in oral or written reports which could link you to the study.

**Contact:** If you have questions at any time about the study or the procedures, you may contact the researcher, Brandon D. Simmons, at 818 Nathan Dudley Road Clinton, NC 28328, or at (910) 990-5015. If you feel you have not been treated according to the descriptions in this form, or your rights as a participant in research have been violated during the course of this project, you may contact Deb Paxton, Regulatory Compliance Administrator at dapaxton@ncsu.edu or by phone at 1-919-515-4514.

**Participation:** Your participation in this study is voluntary; you may decline to participate without penalty. If you decide to participate, you may withdraw from the study at any time without penalty and without loss of benefits to which you are otherwise entitled.

1. **Consent:** "I have read and understand the above information. My decision to participate is as follows:_______"

Yes, I agree to participate with the understanding that I may withdraw at any time.
No, I decline to participate.

### Visionary Leadership Construct

<table>
<thead>
<tr>
<th>Visionary Leadership Construct</th>
<th>In your current role, to what extent do you:</th>
<th>In the near future, how easy do you believe it would be to:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Evaluate existing school mission and vision statements to determine whether they address all major instructional strategies</td>
<td>1   2   3   4   5</td>
<td>not at all   minimally   somewhat   significantly   fully</td>
</tr>
<tr>
<td>Develop school-level SMART goals</td>
<td>1   2   3   4   5</td>
<td>not at all   minimally   somewhat   significantly   fully</td>
</tr>
<tr>
<td>Discuss with staff how your school budget is allocated</td>
<td>1   2   3   4   5</td>
<td>not at all   minimally   somewhat   significantly   fully</td>
</tr>
<tr>
<td>Discuss with stakeholders how your school budget is allocated</td>
<td>1   2   3   4   5</td>
<td>not at all   minimally   somewhat   significantly   fully</td>
</tr>
<tr>
<td>Suggest a change in district’s procedure or policy with the goal of increasing student achievement</td>
<td>1   2   3   4   5</td>
<td>not at all   minimally   somewhat   significantly   fully</td>
</tr>
<tr>
<td>Discuss with local community leaders the needs of your school</td>
<td>1   2   3   4   5</td>
<td>not at all   minimally   somewhat   significantly   fully</td>
</tr>
<tr>
<td>Discuss with local business leaders the needs of your school</td>
<td>1   2   3   4   5</td>
<td>not at all   minimally   somewhat   significantly   fully</td>
</tr>
<tr>
<td>Ensure proper alignment of a school’s developed vision and mission statement with the district’s adopted vision and mission statement</td>
<td>1   2   3   4   5</td>
<td>not at all   minimally   somewhat   significantly   fully</td>
</tr>
<tr>
<td>Ensure proper alignment of a school’s developed strategic plan with the district’s adopted strategic plan</td>
<td>1   2   3   4   5</td>
<td>not at all   minimally   somewhat   significantly   fully</td>
</tr>
<tr>
<td>Monitor the progress of your school on a specific SMART goal</td>
<td>1   2   3   4   5</td>
<td>not at all   minimally   somewhat   significantly   fully</td>
</tr>
<tr>
<td>Evaluate the success of your efforts on a specific initiative related to a specific SMART goal</td>
<td>1   2   3   4   5</td>
<td>not at all   minimally   somewhat   significantly   fully</td>
</tr>
</tbody>
</table>

If you rated any tasks as difficult or very difficult, why would these be a challenge for you?

### Digital-Age Learning Culture Construct

<table>
<thead>
<tr>
<th>Digital-Age Learning Culture Construct</th>
<th>In your current role, to what extent do you:</th>
<th>In the near future, how easy do you believe it would be to:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meet with staff members to discuss methods currently in place to ensure effective integration of digital-age resources</td>
<td>1   2   3   4   5</td>
<td>not at all   minimally   somewhat   significantly   fully</td>
</tr>
</tbody>
</table>
Review existing lesson plans, student work, and other documentation to determine how collaboration and digital-age learning are address

<table>
<thead>
<tr>
<th>Not at All</th>
<th>Minimally</th>
<th>Somewhat</th>
<th>Significantly</th>
<th>Fully</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

Conduct random classroom walkthroughs to look for student collaboration and digital-age learning

<table>
<thead>
<tr>
<th>Not at All</th>
<th>Minimally</th>
<th>Somewhat</th>
<th>Significantly</th>
<th>Fully</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

Regularly self-assess your technology skills

<table>
<thead>
<tr>
<th>Not at All</th>
<th>Minimally</th>
<th>Somewhat</th>
<th>Significantly</th>
<th>Fully</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

Use technology to streamline managerial processes

<table>
<thead>
<tr>
<th>Not at All</th>
<th>Minimally</th>
<th>Somewhat</th>
<th>Significantly</th>
<th>Fully</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

Share current educational research with staff through sharing research articles, or during discussions with staff

<table>
<thead>
<tr>
<th>Not at All</th>
<th>Minimally</th>
<th>Somewhat</th>
<th>Significantly</th>
<th>Fully</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

Participate in an online professional learning community (PLC)

<table>
<thead>
<tr>
<th>Not at All</th>
<th>Minimally</th>
<th>Somewhat</th>
<th>Significantly</th>
<th>Fully</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

Review site and district budgets to discover funding available to support staff development

<table>
<thead>
<tr>
<th>Not at All</th>
<th>Minimally</th>
<th>Somewhat</th>
<th>Significantly</th>
<th>Fully</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

Use Google documents to share meeting agendas, and supporting documents with staff

<table>
<thead>
<tr>
<th>Not at All</th>
<th>Minimally</th>
<th>Somewhat</th>
<th>Significantly</th>
<th>Fully</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

Maintain a faculty wiki for important notes, files, and/or communication to school staff as a whole

<table>
<thead>
<tr>
<th>Not at All</th>
<th>Minimally</th>
<th>Somewhat</th>
<th>Significantly</th>
<th>Fully</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

Create a Google form to be used in data collection during teacher observations

<table>
<thead>
<tr>
<th>Not at All</th>
<th>Minimally</th>
<th>Somewhat</th>
<th>Significantly</th>
<th>Fully</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

If you rated any tasks as difficult or very difficult, why would these be a challenge for you

<table>
<thead>
<tr>
<th>Excellence in Professional Practice Construct</th>
<th>In your current role, to what extent do you:</th>
<th>In the near future, how easy do you believe it would be to:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communicate with staff via social-media</td>
<td>1 2 3 4 5</td>
<td>1 2 3 4 5</td>
</tr>
</tbody>
</table>
If you rated any tasks as difficult or very difficult, why would these be a challenge for you?
<table>
<thead>
<tr>
<th>Systemic Improvement Construct</th>
<th>In your current role, to what extent do you:</th>
<th>In the near future, how easy do you believe it would be to:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use excel to analyze data</td>
<td>1 not at all 2 minimally 3 somewhat 4 significantly 5 fully</td>
<td>1 very difficult 2 difficult 3 neutral 4 easy 5 very easy</td>
</tr>
<tr>
<td>Use a statistical software package (i.e. SPSS, Stata, SAS) to analyze data</td>
<td>1 not at all 2 minimally 3 somewhat 4 significantly 5 fully</td>
<td>1 very difficult 2 difficult 3 neutral 4 easy 5 very easy</td>
</tr>
<tr>
<td>Review recently published program evaluation's reports conducted within the district</td>
<td>1 not at all 2 minimally 3 somewhat 4 significantly 5 fully</td>
<td>1 very difficult 2 difficult 3 neutral 4 easy 5 very easy</td>
</tr>
<tr>
<td>Use results from your own data analysis to make school-level decisions</td>
<td>1 not at all 2 minimally 3 somewhat 4 significantly 5 fully</td>
<td>1 very difficult 2 difficult 3 neutral 4 easy 5 very easy</td>
</tr>
<tr>
<td>Discuss data security best practices with staff members related to confidential student information</td>
<td>1 not at all 2 minimally 3 somewhat 4 significantly 5 fully</td>
<td>1 very difficult 2 difficult 3 neutral 4 easy 5 very easy</td>
</tr>
<tr>
<td>Educate staff on data management district policies and related laws</td>
<td>1 not at all 2 minimally 3 somewhat 4 significantly 5 fully</td>
<td>1 very difficult 2 difficult 3 neutral 4 easy 5 very easy</td>
</tr>
<tr>
<td>Provide training for staff members on data handling best practices</td>
<td>1 not at all 2 minimally 3 somewhat 4 significantly 5 fully</td>
<td>1 very difficult 2 difficult 3 neutral 4 easy 5 very easy</td>
</tr>
<tr>
<td>Update school plans and budgets to reflect ongoing as well as growing costs of technology in all areas of learning</td>
<td>1 not at all 2 minimally 3 somewhat 4 significantly 5 fully</td>
<td>1 very difficult 2 difficult 3 neutral 4 easy 5 very easy</td>
</tr>
<tr>
<td>Establish a long-term technology refresh plan</td>
<td>1 not at all 2 minimally 3 somewhat 4 significantly 5 fully</td>
<td>1 very difficult 2 difficult 3 neutral 4 easy 5 very easy</td>
</tr>
<tr>
<td>Formalize processes used to recruit and retain public-private partnerships</td>
<td>1 not at all 2 minimally 3 somewhat 4 significantly 5 fully</td>
<td>1 very difficult 2 difficult 3 neutral 4 easy 5 very easy</td>
</tr>
<tr>
<td>Collect data via a research protocol (i.e. survey, observation rubric, interview transcripts)</td>
<td>1 not at all 2 minimally 3 somewhat 4 significantly 5 fully</td>
<td>1 very difficult 2 difficult 3 neutral 4 easy 5 very easy</td>
</tr>
<tr>
<td>Use the results of evaluations to plan program improvements</td>
<td>1 not at all 2 minimally 3 somewhat 4 significantly 5 fully</td>
<td>1 very difficult 2 difficult 3 neutral 4 easy 5 very easy</td>
</tr>
</tbody>
</table>
Allocate funds that can be used to assist staff members meet their professional development goals

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>very difficult</td>
<td>difficult</td>
<td>neutral</td>
<td>easy</td>
<td>very easy</td>
</tr>
</tbody>
</table>

Involves staff members in the selection of support personnel

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>very difficult</td>
<td>difficult</td>
<td>neutral</td>
<td>easy</td>
<td>very easy</td>
</tr>
</tbody>
</table>

Monitor what types of data was being collected within the school and how they are used

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>very difficult</td>
<td>difficult</td>
<td>neutral</td>
<td>easy</td>
<td>very easy</td>
</tr>
</tbody>
</table>

If you rated any tasks as difficult or very difficult, why would these be a challenge for you?

<table>
<thead>
<tr>
<th>Digital Citizenship Construct</th>
<th>In your current role, to what extent do you:</th>
<th>In the near future, how easy do you believe it would be to:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participate in training involving cultural awareness</td>
<td>not at all minimally somewhat significantly fully</td>
<td>1 2 3 4 5 very difficult difficult neutral easy very easy</td>
</tr>
<tr>
<td>Provide annual training for staff on equity issues</td>
<td>not at all minimally somewhat significantly fully</td>
<td>1 2 3 4 5 very difficult difficult neutral easy very easy</td>
</tr>
<tr>
<td>Determine what percentage of students have a computer access at home</td>
<td>not at all minimally somewhat significantly fully</td>
<td>1 2 3 4 5 very difficult difficult neutral easy very easy</td>
</tr>
<tr>
<td>Determine what percentage of students have Internet access at home</td>
<td>not at all minimally somewhat significantly fully</td>
<td>1 2 3 4 5 very difficult difficult neutral easy very easy</td>
</tr>
<tr>
<td>Develop and a manage a task force to address local technology equity issues</td>
<td>not at all minimally somewhat significantly fully</td>
<td>1 2 3 4 5 very difficult difficult neutral easy very easy</td>
</tr>
<tr>
<td>Ensure staff and students are aware of Internet Safety, and acceptable use policies</td>
<td>not at all minimally somewhat significantly fully</td>
<td>1 2 3 4 5 very difficult difficult neutral easy very easy</td>
</tr>
<tr>
<td>Ensure staff are aware of Copyright law and Fair Use Exemptions</td>
<td>not at all</td>
<td>minimally</td>
</tr>
<tr>
<td>--------------------------------------------------------------</td>
<td>-----------</td>
<td>-----------</td>
</tr>
<tr>
<td>Ensure ethical use of technology by staff members</td>
<td>not at all</td>
<td>minimally</td>
</tr>
<tr>
<td>Ensure ethical and proper use of social media by staff members</td>
<td>not at all</td>
<td>minimally</td>
</tr>
<tr>
<td>Establish and implement policies that promote share cultural understanding and exposure to different cultures</td>
<td>not at all</td>
<td>minimally</td>
</tr>
</tbody>
</table>

If you rated any tasks as difficult or very difficult, why would these be a challenge for you?

Why would the tasks, which you stated would be “difficult” or “very difficult”, be a challenge for you?

6.) How many hours of professional development training have you participated in within the last year?
   a. 0
   b. 1-5
   c. 6-10
   d. 11-20
   e. 21-30
f. 31-45

7.) What is your preferred delivery method for professional development?
   a. Live online trainings
   b. Moodle or Blackboard courses
   c. Face-to-face trainings
   d. A collection of short how-to videos
   e. Blended (mix of face-to-face and online)
   f. Other

8.) Which device would be the best fit for your school to implement at a one-to-one ratio for all students?
   a. PC Computings
   b. MacBooks
   c. netbooks
   d. IPads
   e. Tablets (other than IPad)
   f. Ipod touch
   g. Smartphones
   h. Other

9.) If you were asked to lead a one-to-one computing school next year, to what extent do you believe you would be prepared to do so?
    (1=Not at all, 2= Minimally, 3= Somewhat, 4= Significantly, 5= Fully)

10.) What is your gender?
    Female  Male

11.) Which category below includes your age?
    21-25  26-30
    31-35  36-40
    41-45  46-50
51-55 56-60
60+

12.) I Identify myself as (please check one)
White
Black or African-American
American Indian or Alaskan Native
Asian
Native Hawaiian or other Pacific Islander
Multiracial
Other

13.) What is your highest level of education completed?
Bachelor’s Degree
Bachelor’s Degree plus credits
Certificate of Advanced Study
Master’s Degree
Master’s Degree plus credits
Doctorate

14.) How long have you served in K-12 education
0-1 Years
2-5 Years
6-10 Years
11-15 Years
16-20 Years
21-25 Years
26-30 Years
30 + Years

15.) How long have you served in your current role?
0-1 Years
2-5 Years
6-10 Years
11-15 Years
16-20 Years
21-25 Years
26-30 Years
30 + Years

16.) Please select which position best describes your current role in the district?
Assistant Principal
Principal
Administration Intern
Other (Open-Ended)

17. Please select which option that best describes your school?
Elementary
Middle
High
Other

18.) How would you rate your overall skill level in the use of computers?

**Novice:** I can turn the computer on, but I don’t really know how to use many programs.

**Beginner:** I am able to use some basic functions such as word processing and the Internet.

**Intermediate:** I am able to use many programs, but I don’t have a lot of experience with most of them.

**Advanced:** I am able to use many programs and have had a great deal of experience with them.

**Expert:** I am able to teach others how to use some programs and I am able to fix minor problems with my computer when they happen.
Appendix B

Interview Protocol

(Instructional Technology Department and Assistant Superintendent for Academics)

1. Background questions
   a. What is your current position?
   b. Describe your educational background.
   c. Describe your educational career.
   d. Describe your professional history with instructional technology?
   e. What do you consider to be your expertise related to instructional technology?

After your review of the survey results of “The Professional Development Needs of School-Based Leadership in Preparation for a One-to-One Learning Initiative in a Large Urban School district”:

2. What are your thoughts on the results in the category of Visionary Leadership? What possible solutions do you propose to address this need?

3. What are your thoughts on the results in the category of Digital-Age Learning Culture? What possible solutions do you propose to address this need?

4. What are your thoughts on the results in the category of Excellence in Professional Practice? What possible solutions do you propose to address this need?

5. What are your thoughts on the results in the category of Systemic Improvement? What possible solutions do you propose to address this need?

6. What are your thoughts on the results in the category of Digital Citizenship? What possible solutions do you have to overcome this particular barrier theme?
7. If you were asked to develop a professional development plan to efficiently and effectively prepare school-based leadership for a one-to-one computing initiative,
   • What structure would you propose?
   • How long would you need?
   • How would you deliver this training?

8. Do you have any further comments or thoughts in reference to the results of this study?