THE IMPACT OF LEADERSHIP ON TECHNOLOGY INTEGRATION PRACTICES IN K-12 SCHOOLS

by

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A QUALITATIVE MULTIPLE STUDY ANALYSIS

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DEDICATION

I would like to take this opportunity to dedicate this work to my family. Momma, Daddy and the rest of the Walker and Hailey clans did not have the opportunity to attain an education past high school. Yet they all embraced learning passionately and through their encouragement and insistence, I embarked on this incredible learning journey through childhood, adolescence and into adulthood. I still feel their loving presence guiding my steps daily.

My extended Baha'i family has motivated and invigorated me to succeed, to be at peace and joyful in all adversity. The task has been difficult but immensely rewarding and I thank you all for caring.

My seven children and their children and grandchildren have afforded me the opportunity to learn service and a depth of passion that is a knowledge unparalleled in any school or university curriculum. I owe a debt of gratitude to each and every one of them for challenging me to complete the journey.

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In closing, my Papaw Walker would always ask, "How's your rinctum dinctum, boy?" I can truly answer now, it's fantastic!

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The Impact of Leadership on Technology Integration Practices in K-12 Schools:

A Qualitative Multiple Study Analysis

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ABSTRACT

Despite the omnipresent appearance of technology in societies around the world, academics and educational leaders continue to struggle with how best to make use of the positive benefits of information and communication technology in K-12 educational environments and how to plan for the long-term influences of technology integration on the field of education. Assuredly, the future requires that educational technology leadership be cognizant of the fast- breaking and evolutionary culture distinguishing educational innovations advancing within the structure of the morphing information technology system, compelling educational leaders to respond creatively and decisively to educational technology initiatives.

The purpose of this study was to analyze three studies examining the characteristics demonstrated through positive, innovative educational technology practices and the requisite leadership styles and systems utilized to promote successful, efficacious technology leadership in K-12 school districts promote school productivity and enhance student learning. Individually authored studies from New York, New Jersey and Wisconsin were analyzed for this study. A traditional leadership hierarchy, effective communication, efficacious leadership characteristics and pressures on technology integration were recognized as significant commonalities of the studies. Through triangulation of data, a grounded theory emerged. Recommendations for further research included

the need to assess all stakeholder constituent roles in the technology integration process and identifying alternative leadership models to include in research studies.

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CHAPTER I: INTRODUCTION

Innovative technologies are continuously altering the cultures and dynamics of our societies across the planet. The Internet, interactive television viewing, smart electronic devices, virtual video platforms and gaming are developing at a pace never before experienced as innovation surpasses innovation. No population has incorporated this whirlwind revolution more fully into their lives than contemporary youth (Prensky, 2010).

Technology pervades almost every aspect of our communal and individual lives. From online banking, home shopping, social media dependency, movies-on-demand, coordinating traffic flow, light rapid transit scheduling, mobile device networking, climate controlling, and medical information access, technology monitors and supports the lives of every citizen of our globe. Despite the omnipresent appearance of technology in societies around the world, academics and educational leaders continue to struggle with how best to make use of the positive benefits of information and communication technology (ICT) in schools and how to plan for the long-term influences of technology on the field of education (Weber, 2005). Educational technology scholars grapple with the concept of technological determinism, asserting that this philosophical perspective assumes that technology is the foundation of unavoidable change in education and society, exercising a force on the social and learning culture, controlling society autonomously, operating outside of human regulation (Best, 2009; Bumett, Senker & Walker, 2009; Carr-Chellman, 2006; Friesen, 2008; Hofmann, 2016; Leonardi, 2008; Lievrouw, 2006; Selwyn, 2010; Wyatt, 2008; Yang, 2009).

Educational leaders and practitioners continually re-evaluate the present-day technological innovations to envisage the changing and increasing extent information technology

will have on the learning climate and culture of upcoming generations. It is evident that schools of the future will be enormously dissimilar to the schools of today. Assuredly, the future will require that educational leadership be cognizant of the fast- breaking and evolutionary culture distinguishing educational innovations advancing within the structure of the morphing information technology system, compelling educational leaders to respond creatively and decisively, exploiting the correlative educational demands of the moment (Dönmez & Sincar, 2008).

Byrom and Bingham concluded in their 2001 research that leadership is the distinctive and imperative factor assuring successful technology integration in school systems (Byrom & Bingham, 2001). School districts have been acquiring innovative technology for decades, improving access to equipment and resources for all students (Culp, Honey, & Mandinach, 2005). School environments have shepherded professional development programs to improve the capacities of classroom educators to use and integrate technology within teaching strategies and curriculum development (Culp, Honey, & Mandinach, 2005; Ford, 2000). Although access to technology and professional enhancement are crucial for classroom teaching, a significant element has yet to be properly recognized, educational technology leadership (Cameron, Mora, Leutscher, & Calarco, 2011). Macleod disclosed that district level technology leaders do not have adequate support and resources (Macleod, 2005). This may in fact be due to the lack of technology leadership skills and technology knowledge acquired by top leadership in districts across the nation. Wollosoff further posited that educational technology leaders lack standardized higher education credentials, titles and job descriptions indicating a gross inconsistency of knowledge regarding educational technology as it fits into the structure of

hierarchical school leadership (Wollosoff, 2007).

Learners of all ages are exploring and manipulating the information environment through texting, instant messaging, social networking, gaming, blogging, and downloading and uploading and creating music and videos. These are a small percentage of the daily entertainment and communication methods utilized by youthful students (Roberts & Foehr, 2008). Bransford, Brown and Cocking, Collins and Halverson and Friedman all support the findings that secondary pupils are disproportionately consumed by technology and remain unmitigated consumers. Countless educational researchers and change agents attest that mastery of technological tools in classroom settings will better prepare students for post-secondary academics, workforce service, and global social responsibilities (Bransford, Brown, & Cocking, 2004; Collins & Halverson, 2009; Friedman, 2007).

The researcher envisioned an analysis of three case studies examining the characteristics demonstrated through positive, innovative educational technology practices and the requisite leadership styles and systems utilized to promote successful, efficacious technology leadership in districts and individual schools to promote school productivity and enhance student learning.

1.1 Statement of the Problem

Administrators and teachers must construct and apply knowledgeable choices concerning the use of integrated technology as an instructional tool and pedagogical perspective. Additional research is necessary in order to better comprehend the relationship between technology integration and student achievement (Chen & Price, 2006; Margerum-Leys & Marx, 2004; Warschauer, 2002; Wenglinsky, 1998; Wollosoff, 2007). Moreover, research by Glennan and Melmed suggests that technology is only utilized in classrooms in limited ways, and educators

do not appreciate the range of concepts or the potential of technology and avoid confronting challenges to integration (Glennan & Melmed, 1996). The challenges include limited leadership by the principal, limitations in time necessary for trying new skills, depth of training, lack of collaboration and adequate support and opportunities to apply new learning (Anderson & Dexter, 2005; Brockmeier, Pate, & Leech, 2005).

With the onset of high accountability standards, leaders are searching for instructional practices that meet standards and promote high levels of student achievement for all students. With that charge, instructional leaders and practitioners must look to technology as a tool to transform what schools do instead of just improving the effectiveness of what is already taking place. The greatest benefits of technology come from the opportunity it provides a learning community to transform current practices in new ways of teaching characterized as constructivist, or actively-engaging learning (Jones, Valdez, Nowakowski, & Rasmussen, 1994). Through the analysis of the impact of technology leadership on student achievement, leaders are more equipped to transform the current practices in their schools and meet the learning needs of all students. The research provides information to school leaders regarding their impact on educational technology through a diversity of rich experiences that promote intellectual curiosity, improved achievement and establishes a pattern and method of life-long learning for learners of any age. Through ongoing and consistent use, the value of educational technology may be measured by the educational goals it helps students achieve (National Study of School Evaluation, 1997; Halverson & Gomez, 1998; Partnership for 21st Century Skills, 2007; Friedman, 2007).

1.2 Background of the Problem

Almost 35 years ago, with the publication of A Nation at Risk (United States National Commission on Excellence in Education, 1983), America engaged in an education reform movement that called instructional leaders to participate in a quest for instructional practices all aimed at the improvement of student achievement outcomes. The ensuing public attention precipitated a wealth of research focused on what actually made students learn best. Conversations and research took place regarding teaching and learning and ultimately to reform current practices of instruction.

According to Mayo (2012), the reform movement addressed two varying concerns that included both the need to address school improvement from within the current system and also the need to restructure parts of the education system away from a textbook-based curriculum, thus focusing on new alternative methods of delivering student-centered learning. Computer technology had begun to emerge as a critical part of this kind of learning and teaching.

The student-centered classrooms began to evolve into environments in which the students became active participants and decision makers in their own learning. In these classrooms, higher order thinking skills were stressed and developed through student centered learning, and they are ones in which the teacher took a facilitator role in advancing student learning (Caine & Caine, 1990; Marzano, Pickering, & Pollock, 2001; Rochelle et al., 2000). Traditional teaching roles where the teacher assumed a didactic, information disseminating approach were abandoned or modified to allow for a facilitative teacher role sensitive to student needs and reaching higher levels of achievement and attained success (2000).

Through current research, the aforementioned methods of teaching have been recognized to reach students individually in the ways each learns best while also providing the most sense in constructing bridges to real world knowledge. The newly acquired knowledge attained through these kinds of learning situations is most apt to be transferred into real world applications (Caine & Caine, 1990; Marzano et al., 2001; Rochelle et al., 2000).

This evolution of instructional practice then naturally led to the integration of technology as a teaching tool to help create these kinds of constructivist classrooms. Technology was introduced as a way to help students take a more active role in the classroom, make real world connections in their learning, and construct knowledge in more meaningful ways. During the time of the publication of A Nation at Risk (United States National Commission on Excellence in Education, 1983), computers were evident and available in classrooms; however, effective ways to integrate technology in classrooms has remained a current and ongoing topic for reform efforts.

As far back as 1996, the U.S. Department of Education report, cited by Noble (1996), claimed that as the nation transitioned into the 21st century, a student's ability to integrate rich and robust learning benchmarks would be inextricably connected to the student's ability to understand and access a wide array of technology. No longer was it acceptable to experience merely basic exposure to computer functions, it became fundamental for educational leaders and their educationalists to prepare learners for the future world where information and communication technology would structure the way individuals thought and lived.

With the onset of widely proclaimed technology expectations extensively developed by the International Society for Technology in Education (ISTE) through the National Educational

Technology Standards (NETS) in the early 1990s, the use of technology integration as an instructional standard became a priority for teachers to assist in meeting the diverse and contemporary learning needs of their students (Caine & Caine, 1990). Embedded in the constructivist learning pedagogy, and prominently declared in the ISTE literature, instructional and communications technology (ICT) became confirmed as a primary contributing factor in student-centered learning and critical- thinking development as an imperative instructional component of deeper learning. The ISTE student standards included the all-encompassing areas of creativity and innovation, communication and collaboration, research and information fluency and critical thinking, problem solving and decision making (*ISTE technology standards for students*, 2007). Additionally, research asserts that technology integration within constructivist school settings eventually leads to advanced levels of student achievement by providing the students with opportunities for active participation and real life application in their learning environments (Kulik, 2003).

During the next decade, with the impetus of No Child Left Behind (NCLB), and the establishment of increased accountability and progressively higher standards regarding student achievement, the constructivist practices became synonymous with attaining high results concerning student-learning outcomes (U.S. Government Accountability Office, [GAO], 2004). Currently, research continues to stipulate that teachers must utilize technology to activate student success. Therefore, education practitioners should be led by administrators who plan for, utilize and support technology practices in districts and schools that address the multitude of ways students learn best and attain increasingly robust levels of achievement required by federal, state and local educational accountability systems (Margerum-Leys & Marx, 2004).

1.3 Purpose of the Study

Educational leaders must constantly re-evaluate the present to predict the changing and increasing extent information technology will have on the educational climate and school culture. It is clear that future schools will be very different from schools of the present. Therefore, the future demands that school administrators be cognizant of the mobile and constantly evolving sophistication that will arise within the framework of the ever-changing information technologies and the leadership response is critical in every activity utilizing a meaningful technology framework (Anderson & Dexter, 2005; Otero et al., 2005).

1.4 Significance of the Study

Teachers often come under fire for their failure to fully integrate technology into their classrooms. Until recently, however, very little has been researched regarding the role of district and school level administrators in technology integration. Cathy Chamberlain, technology consultant for Oswego City School District, New York advises that technology integration and student success are highly influenced by district and building administrators personally involved and excited about technology and the inherent possibilities technology presents (Star, 2009).

With the onset of high accountability standards, leaders are searching for instructional practices that meet standards and promote high levels of student achievement for all students. With that charge, instructional leaders and practitioners must look to technology as a tool to transform what schools do instead of just improving the effectiveness of what is already taking place. The greatest benefits of technology come from the opportunity it provides a learning community to transform current practices in new ways of teaching characterized as constructivist, or actively-engaging learning (Jones, Valdez, Nowakowski, & Rasmussen, 1994).

Through the analysis of the impact of technology integration on school environments as well as student achievement, educational leaders are better qualified to transform current practices in schools and meet the learning needs of students, colleagues and the community.

Common language and best practices regarding the importance of constructivist e-leadership is limited (Chen, 2003). The numerous learning environments where leader-practitioners participate include schools where students are active contributors and decision-makers in their own learning, where higher order intellectual proficiencies are advanced through student-centered learning environments instead of the traditional didactic leadership and teaching roles (Marzano et al., 2001; Rochelle et al., 2000).

Leonard and Leonard report that in the 2004-2005 school year, seven billion dollars had been spent on technology related expenditures and infrastructure. Educational leaders must shoulder the responsibility of elevating student learning while preparing students for a technologically rich workplace (Leonard & Leonard, 2006).

Current research lists expectations of school administrators' responsibilities to include visionary, effective problem-solver, consensus builder, and role model of appropriate practices. These expectations exist for technology integration as well as for the other facets of school leadership. Teachers are guided by the ISTE NETS-T technology standards that include four major areas. These include facilitate and inspire student learning, design and develop digital age learning experiences and assessments, model digital age learning, model digital citizenship and engage in ongoing professional growth (*ISTE technology standards for teachers*, 2007). Concurrently, these ideals are clearly reflected in relevant and nationally recognized leadership criterions such as the ISTE-NETS-A school administrator standards. Reflecting this trend, most

states have adopted these standards for school leadership as well. The NETS-A leadership competencies encompass five key administrator capacities including visionary leadership, digital age learning culture, excellence in professional practice, systematic improvement and digital citizenship (*ISTE technology standards for administrators*, 2007). In addition, most of the literature on leadership and technology either explicitly or implicitly places the ultimate responsibility for the use of educational technology within the scope of the educational leader (Anderson & Dexter, 2005). A gap exists in the literature regarding technology leadership best practices and the subsequent impact leadership may have on successful technology implementation and innovation in K-12 school districts.

1.5 Theoretical Framework

The current research focus acknowledges the general theoretical area of leadership and more specifically, technology leadership within schools and school districts. There already exists an extensive body of knowledge pertaining to leadership principles and best practices in business and other disciplines in general. Mitchell et al. described the process of leading educational technology, supported by the 1967 research of Fiedler's Contingency Model of Leadership Effectiveness (CMLE), concentrating primarily on leadership efficacy (2001). Mitchell et al. evaluated the CMLE, observing that there was corroboration of the model but that ongoing and updated research was necessary. The CMLE afforded the foundation for countless leadership models including the ones used for this study. Kouzes and Posner (2010) postulated a generalized framework for leadership. Fernandez (2005) and Marzano, Waters, and McNulty (2005) afforded broadened understanding of the educational leadership.

Current theory was crafted to satisfy a gap regarding an understanding of educational technology leadership. Kouzes and Posner (2010) considered leaders in diverse educational environments, over a number of years, and delineated five practices of exemplary leadership. Through extensive qualitative and quantitative triangulation of data, Kouzes and Posner produced the Leadership Practices Inventory, an instrument used to identify the efficacy of a leader relevant to the extent to which administrator demonstrates the assessed positive leadership behaviors. "Exemplary leaders excelled in the designated practices: 1) modeling the way, 2) inspiring a shared vision, 3) challenging the process, 4) enabling others to act, and 5) encouraging the heart" (Kouzes & Posner, 2010, p. 13). Contingent to each of the five practices, two commitments additionally express exemplary leadership (2010).

Through positive role modeling, leaders evolve a distinctive expression of leadership and clarify their individual principles and subsequently exemplify them publicly by aligning actions with values. Kouzes and Posner (2010) also extended the idea of leaders inspiring a shared vision by demonstrating visualization of prospective system needs by envisioning, stimulating and empowering opportunities for success in followers, colleagues and stakeholders. The concluding practices emphasize developing positive relationships between administrators and subordinates. To enable followers to work in a nurturing culture, leadership assumes a supportive trust and encourages joint goal setting, while acknowledging shared power. In summation, Kouzes and Posner's protocols focus on uplifting the heart. To cultivate this practice, administrators celebrate contributions through publicly acknowledging appreciation for individual accomplishments and reveling in shared successes of the learning community. Although these practices and commitments are not specific to educational technology leadership,

a common framework for exemplary leadership has emerged (2010).

Fernandez's charter (2005) informed the construct of educational leadership addressed in the current study by including aspects necessary for successful leadership in public educational administrations. Fernandez (2005) continued testing the leadership paradigm quantitatively against data collected in public educational settings. Based on the inclusive context Fernandez researched, he posited that educational leadership performance was correlated positively or negatively to the amount of time consumed supervising internal and external aspects of the organization, encouragement from the board of education and the surrounding community, assignment difficulty, and a leadership style that actively endorsed change. The Fernandez charter informed the construct of educational leadership addressed in the current study by providing aspects necessary for successful leadership in public educational environments.

Marzano, Waters, and McNulty (2005) conducted a meta-analysis of over 35 years of research on school leadership behaviors that positively impacted administrator efficacy, school system success and student achievement. The Marzano, Waters, and McNulty meta-analysis concluded with a list of 21 attitudes based on research data recorded from successful school leaders. The documented principles of leadership that positively influence school achievement include:

> Affirmation; change agent; contingent rewards; communication; culture; discipline; flexibility; focus; ideals and beliefs; input; intellectual stimulation; involvement in curriculum, instruction, and assessment; knowledge of curriculum, instruction, and assessment, monitoring and evaluating, optimizer, order, outreach, relationships, resources, situational awareness, and visibility (pp. 42-43).

Although the aforementioned leadership theories concentrated on the effects of school leaders' responsibilities on student achievement, the outcomes may be utilized to afford a spectrum of leadership responsibilities and practices that positively inspire student and staff achievement and therefore indicate positive, successful technology leadership.

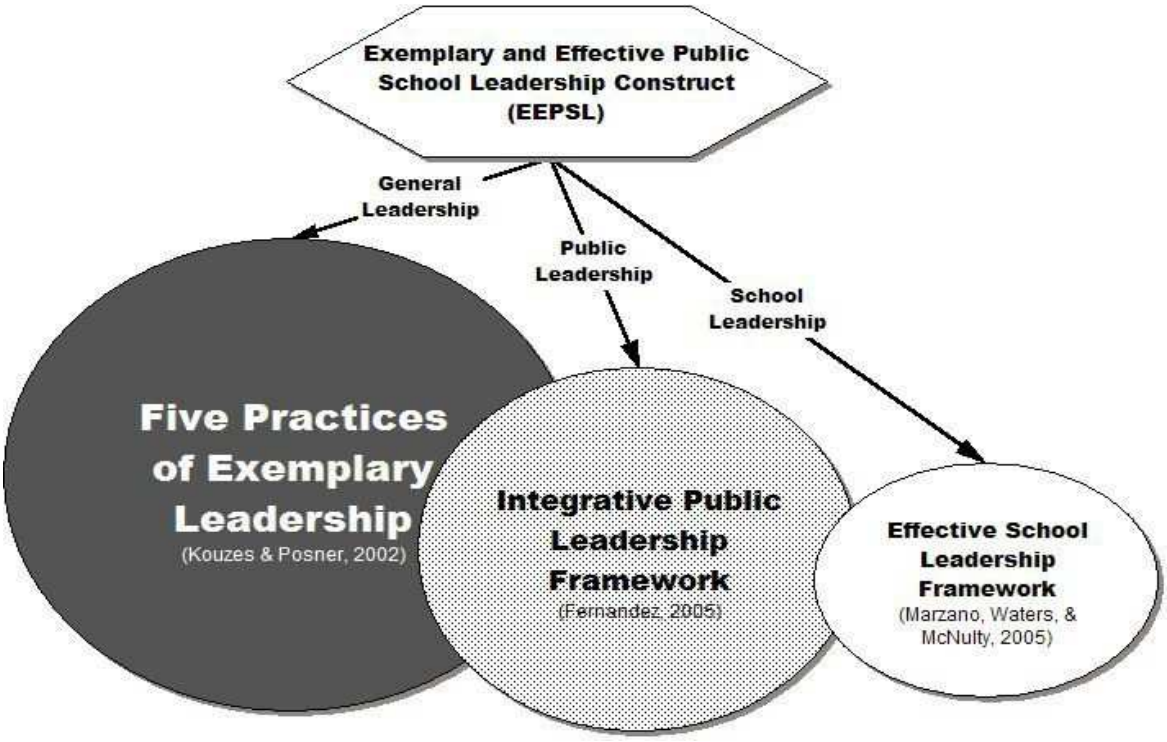

Figure 1. Exemplary and effective public school leadership construct based on theoretical frameworks of Kouzes and Posner (2010), Fernandez (2005), and Marzano, Waters, & McNulty (2005).

1.6 Methodological Context

Quantitative research is positivist in nature, thereby focusing on testing theory, whereas qualitative theory research predominately focuses on generating theories (Goulding, 2005). Goulding (2002) posits, "many qualitative researchers stop short at the descriptive level rather

than lifting the analysis to the next level of abstraction and explanation" (p. 36). Grounded theory provides a methodology encouraging the origination of theory as a portion of the process (Egan, 2002; Glaser & Strauss, 2006; Goulding, 2002). Glaser and Strauss (2006) presented the importance of defining the differences between recounting what occurs during an event and theorizing how or why events transpired. Glaser and Strauss suggested the subsequent strategies for generation of grounded theory should:

> Enable prediction and explain behavior; advance theory; be applicable in practice; provide a perspective on behavior; and provide clear enough categories and hypotheses that crucial data is verifiable in present and future research (pp. 84-87).

According to Corbin and Strauss (2015), theory includes a credible statement regarding the frequent relationships between concepts established by the data. Ultimately, the focus is on process and the "patterns of action and interaction among various types of social units or actors" (Goulding, 2002, p. 45). Through the generation of a grounded theory, the researcher must both explain and describe a phenomenon (Corbin & Strauss, 2015). Furthermore, Creswell (2009) posits that grounded theory is "a qualitative strategy of inquiry in which the researcher derives a general, abstract theory of process, action, or interaction grounded in the views of participants in a study" (p. 13).

The grounded theory process involves using multiple stages of data collection, the refinement of similarities and differences and the categorization of interrelationships of information (Charmaz, 2006; Corbin & Strauss, 2015). The goal of the grounded theory approach is to generate a theory that explains how an aspect of the social world or phenomenon "works". The primary goal is to develop a theory that emerges from and is therefore connected to the very real world situations that the theory is developed to explain. Two primary characteristics of

grounded theory research design are:

> The constant comparison of data with emerging categories and, theoretical sampling of different groups to maximize the similarities and differences of information (Creswell, 2009, p.13).

The benefits of using grounded theory include a degree of validity described as the extent to which research findings accurately represent real-world settings. Grounded theories are therefore usually

1) Ecologically valid because they are similar to the data from which they were established. Although the constructs in a grounded theory are applicably abstract, since the goal is to explain similar phenomenon, they are context-specific, detailed, and tightly connected to the data. 2) Because grounded theories are not tied to any preexisting theory, grounded theories are often novel or fresh and new and have the potential for innovative discoveries in science and other areas. 3) Grounded theory engages parsimony, using the simplest possible definition to explain complex phenomenon" (p. 229). The resulting grounded theories aim to provide practical and simple explanations about complex phenomena by converting them into abstract constructs and positing discovered relationships.

The grounded theory construct offers helpful and relatively easy-to-remember designs utilized to understand the world in a different retrospect. The research author chose a qualitative grounded theory model for the case study analysis to produce rich, thick data to develop a theory of effective leadership of technology integration practices utilizing the three chosen case studies.

1.7 The Researcher As Research Instrument

Guba and Lincoln (1981) and Piantanida and Garman (1999) espoused a qualitative research inquiry technique utilizing the researcher as research instrument. The qualitative research method allows the researcher to be an integral part of the research inquiry process by recognizing the researcher's part in the study, taking a prominent role in the entirety of the proceedings. The recognition of the researcher is unique to qualitative research, allowing for a richness emerging from the researcher, from the knowledge, professional experiences and personal insights the researcher brings to the project (1999).

1.8 Delimitations

The comparative case study analysis is limited to three case studies that focus specifically on experiences in educational technology leadership. The demographic variables for this study are defined leader populations as noted in the three case studies. The case study analysis is also limited to the qualitative data extrapolated from the three case studies. Leadership responses for the analysis came from the three selected case studies and further delimitations also exist due to the scope and limitations of the case study analysis process and the qualitative methodology, making generalizability of the results and replication of the study a further limitation.

1.9 Definition of Key Terms

Throughout the research study, the researcher utilized a number of terms that need further elaboration. The terms are used consistently in order to provide congruence and content alignment.

Administrators

Principals and assistant principals of elementary, middle, and high schools, central office leaders, school district superintendents and associates (Prestine & LeGrand, 2013).

Case Study

A case study is a form of qualitative, descriptive research that is used to develop an in-depth analysis of a single or multiple phenomena. The case study describes individuals, a small group of participants, or a phenomenon as a whole.

Researchers collect data about contributors using participant and direct observations, interviews, protocols, tests, examinations of records, and collections of writing samples. Themes and assertions are devised based on triangulation of data (Creswell, 2009).

Comparative Qualitative Study Analysis

Comparative studies were developed to analyze and synthesize data within and across contexts. Comparative qualitative studies explore the similarities, differences and patterns across two or more case studies that share a common focus or goal (Goodrick, 2014).

Constructivist Learning Theory

L. S. Vygotsky's sociocultural theory connected the praxis of schooling with constructivism, which was defined as a reaction to didactic approaches such as behaviorism and programmed instruction. Constructivism states that learning is an active, contextualized process of constructing knowledge rather than acquiring it. Knowledge is constructed based on personal experiences and hypotheses of the environment (Jariamillo, 1996).

Demographic Variables

Ethnicity, gender, and economically disadvantaged status are demographic variables (Field, 2005).

Digital divide

The term used to describe the growing gap, or social exclusion, between those who have access to the new services of the digital information age, and those who do not. This can include equipment, or lack of access because of the problems obtaining the required communications links or services to get on line (Hoffman, Novak, & Schlosser, 2001).

Digital immigrant

A digital immigrant is an individual who was born before the widespread adoption of digital technology. The term digital immigrant may also apply to individuals who were born after the spread of digital technology and who were not exposed to it at an early age ("Digital immigrant defined," 2014).

Digital native

A digital native is an individual who was born after the widespread adoption of digital technology. The term digital native doesn't refer to a particular generation. Instead, it is a phrase encompassing individuals who have grown up using technology like the Internet, computers and mobile devices. This exposure to technology in the early years is believed to give digital natives a greater familiarity with and understanding of technology than people born before technology's widespread use ("Digital native defined," 2014).

E-leadership

Refers to the ability of an administrator to influence the behavior of colleagues in a digitally and technologically mediated environment, accentuating the leading process empowered by technology (Blau and Presser, 2013; Gurr, 2004).

Economically Disadvantaged

Students can be identified as economically disadvantaged by an independent school district if they are eligible for free or reduced-price lunch, meet requirements for Title II of the Job Training Partnership Act (JPTA), receive food stamp benefits, or qualify for other public assistance. In addition, if students are under the parental or custodial care of a family with an annual income at or below the official federal poverty line regardless of public assistance, they, too, can be identified as economically disadvantaged (United States Small Business Administration [SBA], 2016).

Higher Order Thinking

Higher order thinking refers to the top levels of Bloom's taxonomy of thought – knowledge, comprehension, application, analysis, synthesis, and evaluation. The categories of application through evaluation are operationally defined as high order thinking (Moersch, Moersch, & Saunders, 2011).

Information and Communication Technology

Information and communications technology (ICT) refers to all the technology used to handle telecommunications, broadcast media, intelligent building management systems, audiovisual processing and transmission systems, and network-based control and

monitoring functions ("ICT defined," 2014).

Multiple Qualitative Study Analysis

In a multiple qualitative study analysis, the research has already been performed. The researcher triangulates the multiple themes, noting converging and diverging concepts and other components, creating a scaffolding of these substantive topics and emergent reflective explanations for the explored phenomenon (Leedy & Ormrod, 2013).

Student Achievement

Nationally standardized assessments are divided into three levels of achievement:

Advanced is a highly challenging and exemplary level of achievement indicating outstanding accomplishment in meeting the needs of students.

Proficient is a realistic and rigorous level of achievement indicating proficiency in meeting the needs of students.

Basic is a level of achievement indicating that more work is needed to attain proficiency in meeting the needs of students (greatschools, 2014).

Technology

Technology is the practical use of devices or programs utilizing digital knowledge, especially in a particular area or on a given device or program. Examples of technology include computer workstations, laptops, handheld devices, smart phones, digital cameras, probes, scanners, digital video cameras, analog video cameras, televisions, smart boards, digital projectors and 3D printers; however, this list is not all-inclusive of the diversity of technology available today ("ICT defined," 2014).

Technology integration

Technology integration is the incorporation of technology resources and technology-based practices into the daily routines, work, and management of schools. Technology integration occurs when technology is used as an integral component together with other instructional methods to support students' learning of the designated curriculum. For this study, technology integration referred to using the computers and hand-held electronic devices to support student achievement with either curriculum-based software, tool-based software or teacher/student devised applications (National Center for Education Statistics [NCES], 2009).

Socio-economic status (SES)

Socio-economic status (SES) designates the level of access family access to resources. Typical measures include family income, parents' education, parents' occupation, and educational resources in the home (Lubienski, Lubienski, & Crane, 2008).

1.10 Summary

In summary, Chapter I advanced the focus of the multiple study analysis intended to examine empirical research and literature indicating that efficacious leadership best practices in K-12 school districts positively impacts technology implementation, as well as the efficacy of students and community technology success. The chapter also provided a background of the stated problem, the purpose of the problem, the theoretical framework, the significance of the study, research delimitations and key terms definitions. In addition, the qualitative analysis systematically compares and contrasts three related empirical studies, while offering suggestions

and recommendations for future research.

CHAPTER II: LITERATURE REVIEW

The following chapter will include a review of the literature examining the impact of leadership in K-12 school districts and the impact these practices have on technology implementation and staff, students and community technology success. Educational technology leadership practices and their revealed connections divulged while promoting current federal policies designed to enhance student achievement, teacher, staff, parent and community self-efficacy are examined. The leadership theories of Kouzes and Posner (2010), Fernandez (2005) and Marzano, Waters, and McNulty (2005) provide a lens for conceptualizing educational technology leadership and how more generalized leader practices impact technology in K-12 school systems. Finally, literature regarding grounded theory and multiple case study analysis were explored.

2.1 Impact of Leadership on Educational Technology

The influence of the digital society on learners, from infancy throughout the rest of their lives, is more apparent every day. The institution of public education is under tremendous demands from the digital culture to transform.

The pervasive nature of personal computing and networked communication coupled with extreme levels of participation prompted by access to technologies in societies worldwide has created an endemic alteration in the way individuals and groups are acculturated and educated, and has been documented by educators and social scientists alike (Marzano, Pickering, & Pollock, 2001).

Rochelle et al. (2000) suggest that current educational leaders need to review their school pedagogical practices to accommodate the newest learner paradigm and develop systems and structures that excite, engage and motivate the current learners. Schools are obliged to use technology to accommodate new learning styles to lead schools through the integration of technology challenges that administrators face while changing the very framework of education.

Professional organizations, academic associations, and accrediting agencies consistently advocate well-founded support for pertinent technology applications in educational environments. The National Education Association (NEA), the International Society for Technology in Education (ISTE), the National Staff Development Council (NSDC), the Education Leadership Constituent Council (ELCC), and the National Council for Accreditation of Teacher Education (NCATE) presently prescribe the appropriate application of technology in educational settings of all types (Hew & Brush, 2007). Students of today are so influenced by technology that they learn differently from their parents. Learners are digitally literate and socially aware, preferring group work and tasks.

Contemporary young students have short attention spans, are experiential, visual and kinesthetic in the ways they learn. The students' world exists in information technology and digital media, communicating via smart phones using twitter and social media sites. Even young children have developed the ability to multi-task and move seamlessly from one activity to another with minimum readjustment (Chen & Price, 2006).

Despite the omnipresent appearance of technology in cultures around the world, researchers and academics continue to grapple with how to make use of the positive benefits of information and communication technology in educational systems and how to assist leaders to

manage the enormous changes that will inevitably occur and plan for the long-term impact of technology on the learning culture (Rochelle, Pea, Hoadley, Gordin, & Means, 2000). The credibility and effectiveness of technological leadership is one of the most critical issues facing current educational leaders chosen to improve student academic success in K-12 educational institutions throughout the United States.

Current educational leaders therefore must enduringly pursue the superlative practices necessary to ready students for the 21st century careers while society and technology continue to amalgamate and pervade the school, becoming the medium of intellectual exchange for all students. The organization of the knowledge continuum is fluid and purposefully evolving, gathered from a diversity of sources, and relevant in a variety of settings. Undeniable change is the new norm, and leaders refashion their comprehension of educational technology, as they similarly amend their consideration of many dynamics that influence teaching and learning. Within the process, educational leaders advance a collective knowledge through practice (Shulman, 1987). E-leaders should support teachers to engage their students through the use of new technologies such as the Blackboard learning environments or social media software that is freely available from the Internet. Another innovation is the BYOD or bring-your-own-device movement that encourages students to use personal electronic devices such as tablets.

Administrators and teachers must construct and apply knowledgeable choices concerning the use of integrated technology as an instructional tool and pedagogical perspective. As stated earlier, additional research is necessary in order to better comprehend the relationship between technology integration and student achievement (Chen & Price, 2006; Margerum-Leys & Marx, 2004; Warschauer, 2002; Wenglinsky, 1998). Moreover, research by Glennan and Melmed

suggests that technology is only utilized in classrooms in limited ways, and educators do not appreciate the range of concepts or the potentials of technology and avoid confronting challenges to integration (Glennan & Melmed, 1996). The integration challenges include limited expert technology leadership by administrators, limitations in the amount of time necessary for practicing new skills, the depth of necessary training, lack of collaborative learning community and inadequate support and opportunities to apply the new learning (Anderson & Dexter, 2005; Brockmeier, Pate, & Leech, 2005).

Additionally, Otero, Peressinni, Meymaris, Ford, Garvin, Harlow and Mears note that administrators progress through various stages of technology use in their own professional advancement. From learning basic technology skills, to seeing value in using technology as a learning tool, to rethinking the structure and goals of complex projects, the progression of stages takes many forms. In order for leaders to sustain any kind of transformational learning for students through integrated technology, administrators must rethink their own current leader practices and continually reconsider the learning environment and how the school may utilize technology most effectively (Otero et al., 2005).

Although computers have been utilized in classrooms for decades, there is not a wealth of information regarding the way the use of technology correlates with student achievement outcomes, resulting in a need for specific research in this area (Cradler, McNabb, Freeman, & Burchett, 2002). Furthermore, the current research available varies extensively according to grade levels, content area focus, specificity of technology applications, and overarching purpose causing the findings to be limited and not easily generalized throughout the field (Glennan & Melmed, 1996; Jones et al., 1994).

Day (2002) suggests that one essential concern in understanding the repercussions of technology integration in current educational settings is to establish a clear recognition of how technology impacts all manner of student learners. In the modern system, educational accountability encourages the academic accomplishment of all students in major demographic subgroups. In accomplishing this aim, it is imperative to evaluate the way that suitable technology integration committed as an instructional tool explicitly profits students of color and students of poverty. The research proposes that students in these demographic groups acknowledged as "at-risk" for failure or attrition from school are intrinsically motivated through learning that utilizes instructional technology and the evocative perspective it provides in this populations' learning as well as the multifaceted thinking skills they employ (Day, 2002). Additionally, studies support assertions that in many cases, inequalities in student academic success are the direct result of a disproportionate teacher or leader ability or readiness to use technology for student learning (Chen & Price, 2006). To date, most of the research and ensuing discussion has focused on instructional practices, leaving the vital subject of technological leadership or e-leadership and the ensuing organizational theory substantively unexplored (Franciosi, 2012).

2.2 Technology Leadership, Student and Staff Efficacy

Another current issue established in the educational research regarding technology integration and student achievement is the equity issue concerning the "digital divide," or the disparity in achievement by low socioeconomic students due to a perceived lack of exposure, high quality teaching strategies, and resource allocation in the area of technology (Warschauer et al., 2004). With the implementation of the No Child Left Behind legislation, education systems

are called to a higher level of accountability for all students in the classroom, focusing specific attention to the gaps in achievement evident in minority and low socio-economic populations in the schools. The disparity that was evident preceding this legislative accountability is still evident in achievement data, as well as technology opportunity in schools across the country.

Causes of the noted disparities are commonly cited as frustrations in schools with high numbers of economically disadvantaged students, minimal opportunities for quality staff development and a lack of resources focused on the integration of technology into instruction. Research does suggest that these students would benefit from instruction that was changed as a result of high quality teacher training in the appropriate strategies to integrate technology (Chen & Price, 2006) and from leadership at schools focused on this kind of technology implementation (Anderson & Dexter, 2005).

For educators to make appropriate decisions about utilizing technology in the most beneficial ways to impact student learning, it is critical to understand some of the key findings in the body of research. First, research does indicate that successful technology-rich schools generate impressive results for students including improved achievement, higher test scores, improved student attitude, and engagement in school (Anderson, & Dexter, 2005; Glennan & Melmed, 1996).

Leonard and Leonard stated that in a study of 149 schools in twelve districts in Louisiana, forty-three percent of school administrators considered themselves unprepared to lead technology reforms in their schools and eighty-seven percent indicated they required more in-depth preparation to be an effective technology leader (Leonard & Leonard, 2006). The research suggests that school systems and educational leadership training programs must accept an

increasingly aggressive role in the preparation and ongoing development of technology leaders to keep pace with current and future demands.

Blau and Presser (2013) offer that e-leadership refers to the ability of an administrator to influence the behavior of colleagues in a digitally technology-mediated environment, accentuating the leading process empowered by technology, instead of the essential focus on technology. Concluding their research, Blau and Presser surmised that successful implementation of the school data management system allowed e-leadership that increased the effectiveness of their schools. The effort was accomplished utilizing data-driven decision-making, monitoring curriculum implementation, student learning performance and staff functionality, e-communication with the educational staff, students and parents, delegating responsibilities, and improving the overall school culture.

Gurr (2004) refers to e-leadership in a context where the technological saturation of cultures has placed concentrated responsibility on school leaders to integrate digital technologies into educational curricula. Gurr also suggests the influence of the digital culture on education requires that the field become more dynamic and fast-changing, so rigid traditional models of leadership that emphasize the delegation of power should be rejected for more fluid leadership frameworks focusing on communication and human relationships. The transformation requires moving away from a leader-centric organizational framework toward a decentralized model.

In the arena of educational innovation, new movements, structures and theories to describe how learning occurs or how teaching should be conducted, are constantly emerging. The variations that occur in current teaching, learning and leadership practices are being assisted by an ever-increasing variety of technological tools, and by the world-wide web, which itself has

created a new paradigm in the delivery of learning (Papert, 1998).

Research, professional development and training in educational e-leadership skills are lagging far behind the reality of speedy technological advances. The research literature powerfully demonstrates that there is a need for educational leaders to become personally committed to e-leadership as a strategic imperative for meaningful, successful technological developments to take place in school districts throughout the world. Although similarities exist across all contexts of leadership, it is clear from the review of prior research that e-leadership of educational technology demands additional skills, new understandings and an innovative capacity for rapidly absorbing, prioritizing and responding to massive amounts of knowledge. The newly assessed skills cannot simply be repackaged from existing leadership attributes since e-leaders need to be instantly responsive to highly complex, emergent adaptive systemic changes in education that are currently occurring as a result of constant technological advances (Gurr, 2004). Unconventional capacities are now needed in distributed and collaborative leadership that blends collegiality with authority, accountability with quality and innovation, student-learning priorities with marketing and finance capabilities.

Malcolm Gladwell (2000) refers to such paradigm shifts in educational leadership as those strategically planned or serendipitous occurrences described as a “tipping point”, the moment when a model or theory reaches a level of acceptance; a critical mass. Described as the threshold, or the boiling point, the juxtaposition of random events converge to create a dynamic force of change. Technology leaders must be cognizant of the signs that lead to the tipping point and take full advantage of the many changes occurring during the time of flux and advantageous innovations creating an epidemic of ideas.

Three standards identified by Gladwell (2000) regarding these epidemics are the Law of the Few, also known as the 80/20 Principle which posits that eighty percent of the work of innovation or change will be accomplished by twenty percent of the participant community. The twenty percent are predominantly one of three categories of workers: 1) Connectors- individuals that are well linked to large numbers of people across a varied and distinct array of cultural, social, professional and economical communities and are able to bring these diverse contingencies to the conversation. 2) Mavens- information gurus whose expertise is collecting and disseminating knowledge in the community-at-large. 3) Salespersons- those people who are master persuaders, charismatic individuals astute in the art of negotiation and persuasion.

The second standard is the Stickiness Factor, a particular concept or idea whose content or means of delivery renders its impact memorable or desirable to individuals and the community's subgroups, hence the concept or idea is accepted or "sticks".

The third standard is identified as the Power of Context, a notion that change behavior is strongly influenced by environmental factors such as time and place and conditions and circumstances (Gladwell, 2000). Gladwell also theorizes that the tipping point is highly situational, strongly correlating with the situational leader model of Phillips and Sianjina and Blanchard and Hersey (Phillips & Sianjina, 2013; Blanchard & Hersey, 1996; Gates, Blanchard, & Hersey, 1976).

Another theoretical lens directly aligned with the rapid deployment of technological change in education is the Uhl-Bien, Marion and McKelvey (2007) complexity leadership theory. The authors posit that 21st century organizations, including education structures are confronted by a diverse, competitive environment compelled fundamentally by globalization and

the technological and knowledge revolution. The current technology era is indicative of a world where knowledge is a fundamental commodity and the prominent necessity of knowledge and innovation is crucial to an educational organization's continued efficacy. The complexity leadership model spans beyond outdated top-down bureaucratic leadership principles and employs the interactions of complexity science, framing leadership in a multifaceted collaborative dynamic where the aftereffects including learning, innovation, and adaptability emerge. The emergent conceptual framework includes three fluid leadership roles: adaptive leadership, administrative leadership, and enabling leadership, reinforcing a vibrant relationship between the bureaucratic, administrative functions of the organization and the emergent, informal motivations of a complex, fast-changing technology environment (Uhl-Bien, Marion & McKelvey, 2007).

In conclusion, innovations in educational technology, including email, virtual conferencing, social media usage, massive open online courses (MOOCs), blogging, learning analytics and learning design are gradually making a critical impact on the way leadership is conceptualized and practiced in educational leadership. The complex interaction between leadership and advanced information technology is influencing and being influenced by emerging new organizational behaviors interconnected with technology in multifaceted ways within complex school systems. E-leadership demands are also emerging for refined levels of interpersonal and intercultural skills utilizing the competence to create high levels of trust in learning communities essential for successful leadership.

E-leaders also now need to be able to apply rigorous levels of critical analysis, quality standards and selectivity in distinguishing the most applicable innovations, choosing among

varieties of available educational technology opportunities for improved learning and teaching. Appreciably more research into e-leadership educational best practices is suggested to enrich the development of educational technology leadership requisite for the ultimate enhancement of student achievement and staff self-efficacy.

2.3 Grounded Theory

Grounded theory was developed by sociologists Barney Glaser and Anselm Strauss in the 1960's and has since been recognized as a classic qualitative methodology in social science research (Corbin & Strauss, 2015). Functionally, "grounded theory is used to generate a theory about a research topic through the systematic and simultaneous collection and analysis of data" (Milliken & Schreiber, 2012, p. 685). In general, the steps of grounded theory research are to identify an area of interest; collect data often through observations, interviews, public documents, media or records; code the data, noting potential interconnections between coded elements; organize codes; conduct a review of literature; and finally write the emergent theory (Scott, 2009). What makes grounded theory dissimilar from other qualitative methodologies is the developmental nature of how the theory is conceptualized from the data collected by the researcher. Creswell (2013) defines grounded theory research as the researcher endeavors to originate a broad, conceptual theory of a process, action, or interaction grounded in the observations of individuals participating in the study.

2.4 Qualitative Study Research

A study is an empirical inquiry that investigates a contemporary phenomenon within its real life context especially when the boundaries between phenomenon and context cannot be drawn clearly or without ambiguity (Goodrick, 2014). Yin (2004) further articulates that the

strength of the qualitative study methodology is to allow the researcher to examine a real-life situation or phenomenon in depth. Furthermore, data collection and analysis are pursued simultaneously in a grounded theory study research, producing a significantly richer and more comprehensive understanding of people or events investigated (Yin, 2004; Creswell, 2009). Stake (1995) communicates that a qualitative study is "a bounded system" (p. 2) research should focus on the phenomena "as an object rather than a process" (p. 2) determining further that a study is "a specific, a complex, functioning thing, an integrated system" (p. 2). Stake further posits that qualitative study research is best utilized to analyze programs and people. The four defining characteristics according to Stake are that qualitative study research is 1) holistic, 2) empirical, 3) interpretive and 4) emphatic.

Sharan Merriam (Merriam, 1998) divulges the purpose of contributing to the qualitative study literature is to elucidate a topic that "still lags behind [literature on] other types" of research (p. 19). Merriam essentially centers her investigation on universal principles and usages of qualitative research with an ancillary emphasis on how the tenants are applied to study research as one of the qualitative methods. She targets the extant vague areas involved in study methods. The purpose of Merriam's work is to clear the confusion regarding study methodology in qualitative research and to clarify "what constitutes a grounded theory study, how it differs from other qualitative research methods and when it is most appropriate to use it" (p.19).

2.5 The Researcher as Research Instrument

Guba and Lincoln (1981) and Piantanida and Garman (1999) set forth a qualitative research practice identifying the researcher as research instrument. The researcher is recognized as an integral aspect of the research process that also includes the intent and design of the study.

The researcher as instrument acknowledges that the researcher contributes to the relevance and direction of the project, adding to the richness of the data established through the qualitative progression (1999). The recognition of this concept includes the perceptions, professional and personal knowledge and expertise of the research author and designer. The viewpoints, assumptions and use of the review of the literature are based on the researcher and the discipline the project represents (1999). The continuum for developing the extent of the researcher's involvement in the process can be represented visually as shown in the diagram below.

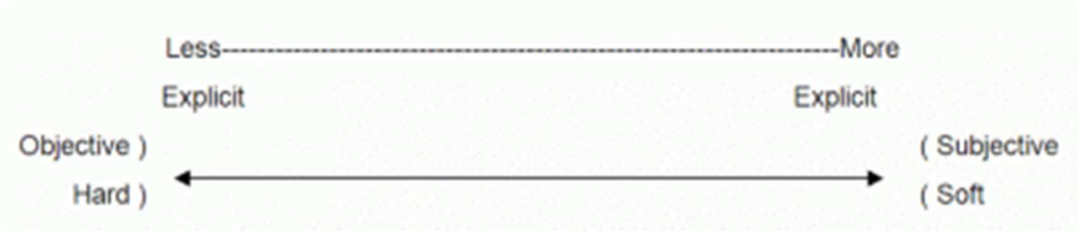

Figure 2. The Continuum of Involvement for the Researcher as Instrument

The researcher falls somewhere on the continuum based on the position as more or less hidden, exemplified by the extent of overt decision-making and how explicitly the research is conducted and data collected and analyzed (Merriam, 2002). The researcher also makes various decisions regarding how the research is reported. Therefore, the concept of researcher as research instrument is implicit in the parameters of recognized and acceptable qualitative research (2002).

2.6 Multiple Qualitative Study Analysis

Examining situational complexity is a vital part of social and behavioral science research. The particular qualitative research process can be used to investigate broadly occurring phenomena without programmatic links, such as leadership. In a multiple study analysis, the

research has already been performed. The researcher triangulates the multiple themes, noting converging and diverging concepts and other components, creating a scaffolding of these substantive topics and emergent reflective explanations for a particular explored phenomenon (Leedy & Ormrod, 2013).

2.7 Summary

Chapter Two explored the significance of technology leadership in enhancing student success, teacher and staff self-efficacy and overall school district efficiency. By presenting three similar studies regarding school technology leadership, Chapter Three allowed the researcher to glean data necessary to develop an in-depth analysis of educational technology leadership best practices through triangulation of data from multiple sources (Leedy & Ormrod, 2013).

CHAPTER III: METHODOLOGY

Overall, qualitative study research provides the reader with rich details on how problems are resolved, outcomes achieved and how investments in professional learning may lead to a positive cultural shift. Currently, many school districts are utilizing technology as a means to enhance student-learning outcomes. Qualitative studies have become an essential tool to illustrate the goals, challenges, solutions and successes that inform the myriad of stakeholders involved in comprehensive long-range, strategic technology planning, empowering educational leaders to create and implement a viable framework for change.

The selection of three existing scholarly, peer-reviewed qualitative studies allowed the researcher to apply a qualitative multiple study analysis utilizing a grounded theory research design. In general, the steps of grounded theory research are to identify an area of interest; collect data often through observations, interviews, public documents, media or records; code the data, noting potential interconnections between coded elements; organize codes; conduct a review of literature; and finally write the emergent theory (Scott, 2009).In a qualitative multiple study analysis, the research has already been performed. The researcher triangulates the multiple themes, noting converging and diverging concepts and other components, creating a scaffolding of these substantive topics and emergent concepts, creating reflective explanations for the explored phenomenon (Leedy & Ormrod, 2013).

3.1 Study One

Hill, L. G. (2011). *Leading effective educational technology in K-12 school districts: A grounded theory* (Doctoral dissertation). Retrieved from http://search.proquest.com/docview/1041268644

Laura Hill (2011) utilized a qualitative grounded theory study investigating the process of effective leadership of educational technology in New Jersey public K-12 school districts. Data were collected from formal or informally recognized educational technology district administrators, central office administration or school building leadership utilizing a semi-structured online questionnaire and an online focus group. As data were collected, all were coded using open, axial, and selective formats (Corbin & Strauss, 2015) to generate a model embodying a grounded theory of quality educational technology administration.

Six premises were recognized: (a) leadership characteristics, (b) leadership proficiencies, (c) administrative accountabilities, (d) organizational configuration of educational technology, (e) broad technology responsibilities, and (f) demands. The research context, a grounded theory, suggested a model of the relationships of the contiguous themes (Hill, 2011). The twenty-one best practices of effective educational leadership posited by Marzano, Waters and McNulty (Waters, Marzano, & McNulty, 2005) framed the study, as well as the leadership work of Kouzes and Posner (Kouzes & Posner, 2010) and the exemplary leadership prototypes identified by Fernandez (Fernandez, 2005).

Saturation of common themes was reached through the use of both a structured questionnaire and an online focus group. Triangulation of results occurred within the theoretical frameworks set forth, through data collected from respondents in diverse roles in leadership represented by the participating New Jersey school districts and methodology concluding in a grounded theory model of technology leadership.

The findings of the research (Hill, 2011) included the identification of several themes. The first theme related positive leadership characteristics including creativity, credibility,

flexibility, focus and life-long learning. The second theme narrated leadership responsibilities recounting the detailed act of leading, building nurturing relationships, collaboration, creating and living a shared vision, managing change, strategic planning, decisiveness and reflecting a positive role model to others. The third theme, leadership skills, included technology expertise, integrating educational leadership with technology leadership, creating a meaningful hierarchy for supervising technology and comprehending and utilizing current leadership best practices. Furthermore, general technology concerns encompassed funding knowledge as well as networking within education communities and the wider technology field. Also keeping abreast of technology innovations was critical to success. Acknowledged leadership pressures and challenges involved lack of knowledgeable administrative support, lack of vendor knowledge regarding educational environments, deficiencies in qualified staff, time management, implementation time for technology roll-out and lack of focused professional development for educational technology leaders and educational practitioners.

The Hill (2011) study suppositions led the researcher to recommend that districts hire at least one educational technology administrator who organizationally directs the school system through the demands and challenges facing the district using the outlined leadership characteristics and leadership skills to realize success. The development of effectual educational technology also necessitates the achievement of broad-spectrum technology responsibilities, and more extensively, the supervisory accountabilities that occur daily. Lastly, within a supportive organizational structure for educational technology, leadership may support comprehended best practices that will ultimately affect the successful process of leading educational technology within the K-12 learning environment.

3.2 Study One Methodology

A systematic grounded theory qualitative study (Hill, 2011) was conducted investigating the processes utilized in successfully administering educational technology in several New Jersey public K-12 school districts. Data were collected from educational technology and district leaders both formally recognized or informally accepted supervisors as well as building level administration through a semi-structured online questionnaire and an online focus group.

The central questions in qualitative studies are essential to the design and methodology of the study (Creswell, 2009). The key question of the research inquired what ideologies; protocols and systems exist in New Jersey K-12 school districts that support district and building leaders in administering highly efficient and productive educational programs with vigorous technology integration to sustain student achievement and staff efficacy. Subsequent questions posed were:

RQ1: What characteristics and expectations exist that support educational technology leadership in K-12 public schools in New Jersey?

RQ2: What responsibilities exist that fulfill the supervisory process in educational technology within K-12 public schools in New Jersey?

RQ3: What technology skills are required of leaders participating in the process of leading educational technology in K-12 New Jersey public schools?

RQ4: What organizational structures animate the process of leading educational technology in K-12 New Jersey public schools? (Hill, 2011).

The significance of the Hill (2011) study was to provide a grounded theory of the process of effective educational technology leadership based on the experiences of leaders in public

schools in New Jersey facing the realities of the 21st Century. The leadership characteristics, responsibilities, and skills, as well as the organizational structure of educational technology were the essential concepts investigated. The findings from the research were documented to provide insight into the New Jersey K-12 public school districts and the process utilized to effectively lead technology and thus provide data and talking points to spark dialogue in other school districts across the nation regarding technology leadership.

3.3 Study Two

Lichucki, M. (2013). *A case study exploring the perceptions of educational technology leadership in a rural school district* (Doctoral dissertation). Retrieved from http://gradworks.umi.com/35/77/3577919.html

Michael Lichucki (2013) conducted a qualitative case study designed to explore the differences in the perceptions of teachers and administrators regarding technology leadership and its impact on technology integration, educator efficacy and student learning in a rural in western Wisconsin school district. The perceptions of technology leadership were investigated by analyzing the responses of focus groups interviewees. Respondents included a focus group comprised of an elementary, middle and high school principal from the rural school Black River Falls School District. There were also two educator focus groups comprised of 10 classroom teachers in each cohort.

The overarching research question asked: What differences or similarities exist between rural principals' and teachers' perceptions of technology leadership as determined by the National Education Technology Standards for Administrators (NETS - A) standards (*ISTE NETS-A*, 2009)? A second question queried the insights of rural classroom teachers regarding

existing educational technology in the district and what role the leadership had in furthering integration. The third question inquired into the discernments of district and school administrators concerning their technology leadership philosophy, skills and praxis (Lichucki, 2013).

The focus of the research (Lichucki, 2013) was to ascertain both classroom practitioners and building and district leadership observations of the existing educational technology in their rural school systems. The study also attempted to assess perceived disparities in understandings of roles and responsibilities of both educational job groups. These opinions were investigated utilizing focus group interviews, document and record collection and analysis and the NETS-A 2009 standards as a reference point.

Five themes emerged during the classroom teacher focus group discussions: 1) ineffective communication deters technology integration, 2) lack of appropriate access impedes usage, 3) technology takes time to learn how to use, 4) learning opportunities are necessary for practitioners, and 5) partnerships can be beneficial to improve technology use. The themes advanced by the school leader group included: 1) technology presents new challenges to the school environment and school culture, 2) partnerships can be beneficial to improve technology use, and 3) principals can facilitate use (Lichucki, 2013).

Five recommendations from the school district leadership focus group included: (a) create a shared vision among all district stakeholders; (b) define fluid communication structures; (c) review technology support for staff and administration inclusively; (d) improve development of professional learning communities for educational practitioners and leadership and specifically target the inclusion of technology concerns; (e) establish working partnerships

among all participants. Five themes also evolved during the classroom educator focus group discussions. These suggestions included: (a) repair ineffective communication to enhance technology integration; (b) lack of technology access impedes technology usage; (c) technology integration requires extra time free of other teaching responsibilities; (d) targeted and meaningful professional development is critical to technology integration success; (e) peer-to-peer and staff-to-administration partnerships are an essential component of successful educational technology assimilation. The premise of beneficial partnerships catalyzing technology integration was a theme common to both focus groups (Lichucki, 2013).

3.4 Study Two Methodology

The purpose of the Lichucki (2013) qualitative case study was to better understand teachers' and school administrators' perceptions of educational technology leadership in rural schools and to examine the perception differences between job types. The perceptions of technology leadership were explored by analyzing the responses of focus group interviews. Respondents in the school administrator focus group included an elementary, middle and high school principal from the rural Black River Falls School District in western Wisconsin where technology integration was relatively recently begun, yet recognized as a significantly long-range and powerful initiative. A purposeful sample of focus group interviewees was comprised of two groups of classroom teachers and one group of participants consisted of building administrators. WEFT QDA qualitative data integration software was utilized to code and organize data into subthemes and then reflectively analyze the information. The commonality of distributed experiences supported the organization and analysis of data.

The use of qualitative data was a noteworthy point of the research since previous studies had included only quantitatively derived data. Additionally, focus group discussions from both designated work classes helped to identify common trends associated with integration of technology in rural school districts and refine the expectations of educational practitioners and leadership regarding technology planning and implementation as well as prioritize and optimize technology leadership practices.

3.5 Study Three

Lodico, G. A. (2013). *Perspectives of key educational leaders on the effective integration of educational technology into the instructional practice of K-12 teachers in Long Island* (Doctoral dissertation). Retrieved from http://search.proquest.com/docview/1650632904

During 2013, researcher Guy A. Lodico conducted a qualitative study to gain an in-depth understanding of the perspectives of educational leaders regarding the effective integration of technology into the instructional practice of teachers in a suburban Long Island K-12 school district with the primary focus of enhancing learning and positively effecting student achievement. The central research question queried: What are the perspectives of key educational leaders, inclusive of principals, directors and superintendents on the effective integration of educational technology into the instructional practices of teachers? Other concerns focused on the effects of technology on student academic success, sustainable funding of technology initiatives and the increased necessity for teachers to integrate technology broadly and effectively into daily educational praxis as well as how leadership might effectively evaluate overall technology initiatives and individual teacher accountability and success.

The findings of the study as well as the preliminary review of the literature confirmed the hierarchically established leadership functions of superintendents as key protagonists with primary responsibility to empower directors and principals to effect educational technology initiatives in teaching and learning environments under their purview. The Lodico (2013) research upheld the supposition that superintendents must support in the efficacy of technology integration, empower effective leadership and provide an overarching vision, goals, and mindsets essential to propagating technology. These leaders must also foster Board of Education encouragement and funding necessary to initiate and sustain district-wide technology strategic plans. Lodico identified the superintendent as the fundamental participant coordinating the vision, financing, timing, tone, and success of ancillary educational leadership roles in executing success. Furthermore, the study underscored the phenomenon of encouraging directors and principals by supportive top leadership that empowers the ultimate academic success of students.

The results of the study (Lodico, 2013) offer educational district-level and building leaders as well as classroom practitioners in-depth insights into the amalgamated perspectives of key school and district leadership regarding their acknowledged roles played in addition to the challenges and barriers faced during the technological innovation and integration processes necessary for effective and positive district changes to occur. Best practices were also documented in districts where the technology integration achieved positive academic and efficacious outcomes for students, teachers and administrators alike.

3.6 Study Three Methodology

The qualitative study (Lodico, 2013) was implemented using data collected from a purposeful sample comprised of a heterogeneous group of key educational leaders performing in

a broad spectrum of six low, middle, and high socio-economically identified suburban K-12 school districts located in the Long Island region of New York State. The methodological approach for the research called for the implementation of a qualitative study design grounded in what Patten (2004) described as a hermeneutic inquiry procedure developed to conduct, analyze, and interpret meaning as applied to the data gathered during the study's exploration of the perspectives of key school leaders that set the environmental tone for the teachers they lead, supervise, and observe. Patten further posited that the use of the hermeneutic theoretical framework was suited when the researcher wished to interpret meaning from a particular standpoint, a praxis or situational context by reporting the perspective of the people or phenomena being studied.

The selection criteria for the research purposeful sample was based on a heterogeneous grouping of multiethnic suburban K-12 educators, with ten through forty-five years of experience in education, that currently serve or formerly served in the hierarchical key educational leadership role of school district superintendent/deputy/assistant, director/district program supervisor and/or principal/building administrator in accordance with Creswell (2013) who proposed "the qualitative researcher purposefully or intentionally selects individuals and sites that are information rich" (pp. 213-214) to help understand and learn about the central phenomenon under study. The purposeful sample size was comprised of a total of eight participants that subsequently met appropriate levels of saturation. Sandelowski (1995) argued the efficacy of sampling in qualitative research was based on the "quality of information per sampling unit as opposed to their number per se" (p.179). Furthermore, Lincoln and Guba (1985) argued that sampling should continue until a point of saturation and redundancy are

achieved. Sandelowski (1995) further explained that theoretical saturation and informational redundancy offer a point of closure in determining appropriate qualitative sampling size. Consequently, theoretical saturation was achieved as collected data began to replicate and no new concepts or information emerged from the sample. Finally, informational redundancy was achieved when no new information was elicited from the sample, concluding the interview process.

As prescribed by Patten (2004) and Creswell (2013), a theoretical sampling approach using both maximum variation and snowball sampling were employed. Maximum variation sampling accepts that the individuals chosen are different by some characteristic or trait. The differentiating characteristic of the sample of key educational leaders was their hierarchical administrative role in their respective school district. The researcher also utilized snowball sampling, described by Creswell (2009) as typically employed after a study has begun and transpires when the researcher requests that participants recommend others who might possibly fit the criteria for or be interested in assisting with the study. Lodico (2013) used snowball sampling by incorporating a question at the end of the interview, suggesting the informant refer possible participants. Leads were pursued if their qualifications coincided with the researchers predetermined participant criteria.

All permissions and ethical considerations were outlined and followed explicitly. Data collection strategies utilized in-depth open-ended questions through one-to-one semi structured interviews while recording respondent's answers with written notes and/or digital audio recordings. Participants were also given the opportunity to provide documents such as reflective journals, anonymously submitted teacher observation reports, and any other documentation that

was determined by the respondents to be a resource illustrative of their individual perceptive answers.

Data analysis followed after transcribing had been accomplished over several months. In order to respond to the stated research questions, all information sources were triangulated with the transcribed data collected from related interviews in addition to any documentation that was provided by the research participants such as reflexive journals and teacher observation reports. Triangulation procedures were employed in the case study by corroborating multiple forms of data collected.

Lichucki (2013) established through his research that effective integration of educational technology into the instructional practices of educators is expedited by educational leaders who take strategic supporting roles that emphasize vision, communication, human relations, advocacy, team building, and empathy to better understand and respond to the needs of their students, teachers, and community so as to better provide the necessary resources to stimulate assimilation strategies that support student academic success. Purposeful and efficacious leadership also requires educational leaders to adopt persistent goals that recognize and transcend challenges and essentially facilitate and sustain the process of change utilizing constant communication, collaboration, and individualized support for educational leader-peers and teaching staff alike.

The operational incorporation of educational technology into the instructional praxis of teachers demands persevering, thoughtful, and compassionate instructional leadership that embodies bottom-up leadership strategies to appreciate the usefulness and limitations of technology as it relates to student achievement.

3.7 Summary

The purpose of the qualitative research study utilizing a grounded theory design is to uncover effective educational technology leadership processes in K-12 public schools through multiple case study analysis. Due to the exponential rate of change, information regarding technology in public school districts necessitates effective leadership (Anderson & Dexter, 2000; Anderson & Dexter, 2005; Costello, 1997; Moursund, 1992; Flanagan & Jacobsen, 2003). To meet the current needs of students, it is incumbent on policy and decision makers to focus on the importance of strategic technology planning and implementation.

Chapter Four employed the qualitative data matrix to assist with coding and organizing the data of the three case studies, searching for words and word combinations to triangulate concepts, therefore allowing the researcher to analyze the existing data in a more cogent and systematic manner.

CHAPTER IV: FINDINGS

Three studies were selected for analysis to disclose the grounded theory underlying the impact of leadership practices on technology integration in K-12 schools inclusive of student achievement, staff self efficacy, community stake-holder usage and overall school district infrastructure health and security. Each of the three studies mirrored the findings that leadership knowledge, roles and attitudes regarding technology significantly impacts the development of a comprehensive mission statement, elaboration of strategic planning, implementation of short-range goals as well as daily practices utilized by district personnel and the supported surrounding community. The ensuing chapter employs a thorough comparative analysis conducted for the purpose of identifying common themes, outcomes and findings of the identified studies as well as uncovering any discrepant or incompatible data within the three identified research studies described in Chapter 3. The comparative analysis will utilize two strategies to develop commonality and triangulate data. The first analysis method consists of recognizing the researcher as instrument, concurrently described in Chapter 1 and 2. The second analysis strategy utilizes the qualitative analysis matrix. Utilizing the aforementioned analysis methodologies, triangulation of data sets and culminating emergent themes were documented and reflected on.

The overarching commonality of the three identified studies lies in their attention to phenomena supported by data collected in school districts in the United States of America. Each study was identified as qualitative research utilizing a participant purposeful sample selected from the identified school district environments. Similarities also included the use of data collection interactions with educational staff in one study as well as district leadership targeted in

all three studies to gain a rich and full perspective of each considered district environment and the pursued activities regarding the integration and use of technology recorded in the three acknowledged studies.

Although each research problem was stated in a unique perspective, the goal for all three research studies was to ascertain those observations and opinions leading to an acknowledged phenomenon affecting the use of technology in specified learning environments and if new or unrecognized relationships would emerge from the collection and analysis of the data. Each study utilized open and axial coding of data to further the recognition of interrelated concepts and practices. The three studies utilized recognized national standards such as the NETS-A to assist recognition of incorporated ideals and principles purported to lead to successful achievement of educational technology integration and usage.

4.1 Study Methodology, Comparison and Analysis

The comparison and analysis of the methodologies in the three studies employed similar qualitative approaches, although each specific study was a variant of the qualitative design. Close scrutiny disclosed that the New Jersey study (Hill, 2011) employed a grounded theory methodology, as did the Long Island, New York study (Lodico, 2013) that engaged a hermeneutical inquiry grounded theory perspective. The third study from Wisconsin (Lichucki, 2013) utilized a case study format. Furthermore, the New Jersey (Hill, 2011) and Wisconsin (Lichucki, 2013) research derived data from interview designs. The New York (Lodico, 2013) research was conducted through an online survey as well as interviews employing online focus group responses.

Each research study engaged a purposeful sample selected from the proposed educational

environment. The New York (Lodico, 2013) sample encompassed a diverse range of multiethnic suburban K-12 educators, with ten through forty-five years in the field of education, and those having recently occupied an educational leadership function of district superintendent or assistant, director or program supervisor or building administrator. The New York (Lodico, 2013) research also activated maximum variation and snowball sampling as secondary selection strategies.

The New Jersey (Hill, 2011) research utilized K-12 districts with a student population over 1,800 students. Non-public districts and those not meeting the K-12 parameters were excluded from the study. Eventually, 177 districts fell within the initial guidelines of the study. The participants were chosen first by convenience sampling in the New Jersey (Hill, 2011) study due to the number of districts initially contacted. Since district administrators were self-selected based on responsibility and scheduling limitations and due to the voluntary nature of the invitation to participate, only those administrators agreeing to participate were requested to complete a preliminary questionnaire. Theoretical purposeful sampling was then employed to generate properties and themes of categories to begin to create a grounded theory utilizing ongoing data collection.

The Wisconsin research (Lichucki, 2013) sampled the teachers and administrators in a single rural K-12 district identified as Black River Falls. The research focused on job type in identifying participants. The district is comprised of one early-learning Pre-K and first grade building, one elementary building serving 2nd and third grades, one 4th-5th elementary level, a 6th, 7th and 8th middle school and a secondary school. 96 classroom teachers were evaluated for participation. All classroom teachers had taken a 21st Century Skills Assessment the previous

year. Each teacher that scored a 70% or above and had garnered three years teaching experience within the Black River Falls district was invited to participate in a focus group, creating a homogenous sampling population. 43 teachers met the established criteria and were given an invitation to participate. Eventually, a representative sample of 23 teachers joined the study and three educators were asked to join a pilot study along with one administrator to test and refine focus group interview questions. The remaining 20 teachers were assigned to two focus groups with ten individuals in each group. Three building principals comprised an administrative focus group. The fourth supervisor was the author of the study and participated as researcher. The criteria of three years' experience in the district was established due to the significant technology reforms within that time span and allowed participants to have fully engaged those technology changes thus establishing a second level of participant homogeneity.

All three studies utilized established institutional review board protocols regarding required institutional permissions at all organizational and individual levels. Ethical considerations included participant confidentiality and anonymity, full disclosure and signed participant agreements and data collection review for participant agreement. All names and personally identifiable information were replaced with coded numbers throughout the data collection, analysis, and reporting phases and geographic or socio-economic identifiers were not included in analysis and reporting (Lodico, 2013; Hill, 2011; Lichucki, 2013). Data collection details differed slightly although each study followed general qualitative procedures.

The Wisconsin (Lichucki, 2013) research employed the use of a camcorder to create a visual and auditory record of each focus group interview in entirety. The researcher also noted observations during all interactions with participants. Focus group sessions were completed in

one of three locations within the school district environment. Each focus group completed an initial review of the NETS-A Standards, followed by a preliminary explanation of the Focus group interview format. The opening question was asked individually to establish the identity, position status, years of experience and educational level of each respondent. The researcher presented each question and any follow-up questions for clarification. Focus group data were analyzed utilizing the constant comparison analyses procedure.

All data were transcribed in Microsoft Word and the document uploaded into the Weft-QDA software. Data from the two teacher focus groups were analyzed separately initially and then combined. The administrator focus group data were analyzed separately (Lichucki, 2013).

The New York research (Lodico, 2013) encompassed the geographically small but population dense Long Island area of New York. All interviews were audio-digitally recorded by the researcher and data transcribed by headset for participant anonymity. All digital data were transcribed utilizing a Dell laptop capturing the speech to text via a software application called Dragon Naturally Speaking 11.5. After transcribing all data, an audio file control software package known as Express Scribe was employed to review each transcribed audio file produced earlier for accuracy. The files were then encrypted on the laptop computer and the data transcriptions were printed and stored in a locked and secured location. All transcripts were filed in alpha numerically coded folders. The actual data collection traversed a timespan of three months. Each participant was identified, contacted and interviewed face-to-face. The transcription of data was completed immediately after each interview.

In-depth open-ended questions were utilized in semi-structured interviews recording each respondent's comments, while taking brief written notes. Each participant was also given the

opportunity to offer other information including journals, anonymous teacher observations, or other documentation the participant deemed an illustrative resource. Each interview began with introductory statements and several warm-up questions, followed by a series of open-ended questions designed to align with the research focus.

Data were triangulated through the use of the interview transcriptions, additionally submitted journal reflections and teacher observation reports. The qualitative data analysis software, QSR NVivo10 was engaged to facilitate the data coding process. After transcripts and observations were loaded into QSR NVivo10, open and axial coding as well as bridging was employed to make thematic connections.

Emerging identified themes based on the many perspectives of educational leaders on the integration of technology into the instructional practice of teachers were aligned to highlight common and differentiating themes. The process continued until the point of saturation was reached when no new themes presented themselves.

The New Jersey (Hill, 2011) research included all K-12 central district administrators and technology leaders in districts with a student population over 1,800. These individuals received an invitation letter requesting their participation in the study. Those who wished to participate were directed to complete an online informed consent document.

Confidentiality was maintained by randomly generated numbers that were assigned to participants and all data including demographics were collected through this blind procedure. All data were maintained in encrypted, password protected files. Printed back-up data files were kept in a locked location and shredded three years after collection. Online focus group members communicated with other practitioners by alternate user names indirectly connected to individual

emails through the online site (Hill, 2011).

Semi-structured open-ended questions were posed to the focus group members regarding the process of leading technology integration in their respective districts. The researcher posited that through the use of online technologies as the semi-structured questionnaire and the online focus group, the opportunity for clean data would present itself since participants entered their data responses directly. The questionnaire was pilot tested with a cohort of six administrators with similar positions and employment histories. The pilot was run to ensure that the procedural aspects of the study were smoothly deployed and that questions utilized provided the kinds of answers sought after in the research (Hill, 2011).

Data were collected using a two-fold procedure. Letters of invitation were mailed to the criterion sample and they were directed to the online site where they were asked to complete the informed consent initial question of the questionnaire. If the individual completed that initial consent, they were directed to continue to the remaining questionnaire responses. Those who did not approve the informed consent were not allowed to continue. Ample opportunities were provided for participants to complete the online questionnaire, with a ten-day and three-day reminder before final closure of the site availability (Hill, 2011).

The second phase of the study data collection applied an online, real-time focus group including selected district technology leaders with direct involvement and daily experiences in educational technology exigencies who agreed to group discussions on mutually acceptable dates and times. Open-ended questions were directed to focus group members simultaneously regarding effective leadership during a specified critical incident. Participants keyed their responses in utilizing an online chat tool provided through SKYPE. All participant responses

were captured and coded. Using the described method, data were saved as each response was typed, ensuring an accurate and complete record of all responses (Hill, 2011).

The data were coded initially using open coding to identify concepts, categories and sub-sets for both the questionnaire and focus group responses. Axial coding was employed next to extract relationship between categories disclosed during open coding (Hill, 2011).

4.2 Wisconsin Research Study

The findings of the Wisconsin study (Lichucki, 2013) were ordered utilizing the research questions ascertaining the perceptions of both teachers and principals in the rural district. The study disclosed five primary emergent themes from the teacher focus groups as well as ancillary themes. The themes were: 1) inadequate communication hampers technology integration 2) deficiency of access to technology obstructs usage 3) professional development opportunities in technology are necessary for teacher success 4) technology knowledge requires time to absorb and practice and 5) collaborations are advantageous to fostering positive technology practices. Each main theme also included several sub-themes. Theme 1 included subthemes of: absence of communication regarding a common vision, committees do not communicate efficiently, and district communications are not all encompassing. Theme 2 subthemes ranged from: constrained access by the technology department, the high cost of technology, the attitude that teachers should be able to resolve basic technology issues, and administrators ought to champion technology usage. Theme 3 subthemes were: teachers require the independence to investigate technology and technology changes are often made at inconvenient times. Theme 4 subthemes established that: resident technology sharing occasions are necessary, risk taking should be encouraged and facilitated and out of district technology instruction should be provided. Theme

5 subthemes encompassed: community business partnerships should be cultivated, internal district collaboration is critical and students should be cultivated as equal technology learning allies.

The Lichucki (2013) research established three key administrative focus group themes. They included: 1) technology offers fresh opportunities for learning and growth 2) collaborations are advantageous to fostering positive technology practices and 3) educational leaders must expedite technology integration. As with the teacher focus group, the primary themes emerging in the principal focus group were subdivided into secondary premises. Theme 1 subthemes presented as: technology transforms rapidly, modifying traditional teaching practices to include technology remains challenging for many, often there is a decreased quality usage of technology practices, the challenge exists to redefine instructional decisions to include technology and technology education and access for parent remains unequal in the community. Theme 2 advanced the subthemes as follows: a comprehensively collective technology vision is paramount, connections between local schools are important, technology affiliated business collaborations become essential and new district technology associations should be pursued. Theme 3 subthemes included: administration should stimulate technology risk-taking, principals ought to actively model best practices in technology integration, earmark technology resources applicably, employ education staff current in technology usage, maintain personal technology knowledge, assure that technology infrastructure exists and operates and assist families to connect to the classroom, school and district through technology.

The research study then compared and contrasted the teacher and administrator focus group responses to identify perceptions of technology leadership in the rural district. The theme

that collaborations are advantageous to fostering positive technology practices was common to both job identified participant focus group. The subtheme of fostering external business partnerships was another commonly shared value that could enhance training possibilities for educators and students, as well as providing possible financial support through grants and shared technology infrastructure. The next shared value regarding collaboration was the possibility that innovative in-district partnerships and collaborations might be fostered identifying cadres of technology integration expertise and linking them to boost technology resiliency and support within the district. These linkages would not be specific to a particular building or student level. All focus group participants further shared the notion that students should assist in sharing knowledge and technology expertise, even solving technical issues (Lichucki, 2013).

A second theme introduced by the teachers was that inadequate communication hampers technology integration. This theme was not shared by the administrator focus group although of the six subthemes, several did converge. The lack of communication of a shared technology vision was significant to all focus groups. The principals commented that a cross-representation comprised of all stakeholder groups including parents, administrators, students, teaching staff, support staff, business and community members should meet and provide a shared technology vision for the district. The teachers agreed on the necessity of the vision, but felt that the impetus to create such a vision was lacking. The teachers also felt that the lack of effective communication did not only impact the technology vision, as did the principals, but included many areas of technology integration in the classroom, school and district (Lichucki, 2013).

Under the theme stating lack of technology access impedes usage, different subthemes for each job-related focus group brought out similar maxims. The teachers stated that they were

expected to fix basic technology issues and this was a frustration having to deal with ill-functioning technology while trying to teach while the administrators more broadly stated that the technology must be reliable and functional to remain educationally viable and useful (Lichucki, 2013).

The theme of administrators assisting the facilitation of technology usage resonated with both the teacher and principal focus group participants. Two coinciding sub-themes arising within both the teacher and administrator focus groups were to establish a risk-taking environment without fear of reprisals and the development of local technology sharing opportunities (Lichucki, 2013).

4.2.2 New Jersey Research Study

The findings of the New Jersey study (Hill, 2011) were designed to generate a grounded theory that revealed efficient and successful technology leadership practices in K-12 public schools in New Jersey. Data were corroborated to identify collective characteristics, responsibilities, and organizational configurations utilized by educational technology leadership. The outcomes of a semi-structured online questionnaire administered to educational leaders in K-12 districts were used to identify categories for coding and further investigation. Of the 177 districts meeting the initial screening criteria, and receiving an initial delivered postal letter explaining the nature of the study, 124 email addresses became available to the researcher and an invitation was generated to participate in the online questionnaire utilizing Survey Monkey. Seventeen district technology leaders consented to participate in the semi-structured questionnaire. These leaders were also invited to continue in the research by becoming focus group members to investigate significant incidents occurring in educational technology in New

Jersey K-12 schools. Of the seventeen questionnaire participants, two agreed to engage in the online focus group. The focus group members were requested to reflect on an incident or set of incidents that tested leading educational technology in their districts and how they met that challenge as a technology leader. Each participant typed responses and dialogued. A significant group discussion ensued, contributing an in-depth transcript (Hill, 2011).

Hill (2011) also found the amalgamation of responses from participants generated several themes and subthemes regarding the process of effective technology leadership in New Jersey schools. The first theme identified was the characteristics necessary for effective educational technology leadership. Three ancillary subthemes emerged. Number one subtheme was stated as flexibility. This characteristic was the most shared of any representative quality. Life-long learning was noted as another attribute of technology leaders. The third associated aspect of technology leadership was viewed as credibility that created a sense of trust and reliability necessary for technology leaders to maintain support and constancy of service.

Another theme was stated as leadership responsibilities necessary to sustain the process of an educational technology leader. Two emergent subthemes arose. The act of leading others was seen as a significant secondary category. Examples of the stated trait included modeling effective leadership behaviors, motivating others, knowledge of technology staff issues, creating buy-in, collaborating to solve issues, celebrating successes, communicating effectively and maintaining visibility and transparency (Hill, 2011). The second sub-theme under leadership responsibilities was documented as managing change. Noteworthy illustrations of managing change included minimizing catastrophic conditions, prioritizing and reaching resolutions, strategic action planning, creating a shared vision and mission plan and meeting goals and

objectives (Hill, 2011).

Leadership skills were a substantial emergent theme requiring three sub-themes. One substantial sub-theme was technical expertise. Several participants noted that technology leaders require both hardware and software knowledge and must keep abreast of innovations and updates to major technology advances. Furthermore, technology leaders must possess time management proficiencies to accomplish multiple projects through to ultimate completion and efficiency. Lastly, strong technology administrators should exhibit exceptional interpersonal aptitudes including consideration, concern, patience, the ability to develop relationships and advance consensus allowing the accomplished technology leader to interact positively with individuals and groups, producing an effective team approach to situations (Hill, 2011).

Hill (2011) further posited that the organizational structure of educational technology in New Jersey surfaced as another major premise addressed by the research participants. Several sub-themes were allied with the technology organizational theme. The first acknowledged sub-theme was defining the ordered structure of district technology leadership. Suggested methods incorporated basing leadership hierarchy decisions on evaluated employee abilities. Other proposed methods were to utilize outside consultant reviews or base the leadership structure on research and experience gained from other districts. Another closely related sub-theme regarding the organizational framework of district technology was the connection of education technology supervisors to educational components of the leadership position. Some supervisors were enlisted from the business world or the technology industry and lacked the background, training or expertise in the educational realm. Other district structures created dual roles for individuals to supervise the technology or educational perspectives. The most beneficial and

balanced arrangement created a leadership paradigm procuring an individual familiar with both technology and educational viewpoints (Hill, 2011).

Hill (2011) queried what an effective technology leadership prototype might look like and how it might enhance the overall technology process in a district. This became the final focus of the participant responses. The introduced sub-themes included: typical technology duties and technology demands. The respondents articulated that essential technology responsibilities remained critical to purposeful leadership requirements. Commonly recognized obligations included budgeting, seeking alternative funding sources, resource allocation, problem solving and hands-on technology project completion. Pressures on leaders arose as a second sub-theme and encompassed balancing educational and purely technology related aspects of supervision, pursuing on-going professional development, rectifying a lack of administrative support and a deficiency of trained technology staff. Conflicts are common between network and system security and the openness of the required learning environments. Leadership respondents also admitted a lack of administrative understanding that lead to inaccurate situational expectations. Patience is critical because although technology changes quickly, educational technology adaptations are more slowly accepted. Many educators are perceived as slow to use technology in learning environments. The concept also reflected the lack of buy-in by district stakeholders, educators and other administrators. A final significant concern was that the students were more informed about technology than the teachers and the teachers knew more about using technology in education curricular areas than the preponderance of administrators, creating a stressful and often insurmountable obstacle to communication and technology integration (Hill, 2011).

4.2.3 New York Research Study

The findings of the New York study (Lodico, 2013) were intended to share perceptions of education leadership from K-12 suburban Long Island districts concerning effective technology integration strategies involved in enhancing educator practices supporting ultimate student success. The criteria for participant selection were predicated on the individual professional reputation and demonstrated effective integration of educational technology in their respective districts. Qualitative data were collected and analyzed from the purposeful sample of eight one-on-one semi-structured interviews with strategically chosen educational leaders who had supported technology. After the data were derived using the stated method, responses were entered into QSR NVivo 10 analysis software to facilitate triangulation and coded into categorized themes for contrast and comparison. Interview transcripts from each respondent were thus directly coded into the software and themes and sub-themes, establishing open coding of the data. The next phase of the analytical process allowed Lodico (2013) to aggregate code the data in QSR NVivo 10, resulting in axial coding, allowing for the reconstruction of data from respondents in unorthodox or newly emergent themes and sub-themes.

As Lodico (2013) stated, the primary research query asked the viewpoints of chief educational administrators inclusive of building and district administration regarding the effective integration of educational technology into the teaching practices of classroom educators to enhance student academic success. The emergent themes were sought to establish the roles that central leaders play in expediting operational integration of technology in the instructional practices of classroom educators. Initially, each member listed administrative roles they had held in the past. The participants were then asked to explain their perceptions of educational

technology best practices and to identify successful K-12 classroom technology tools utilized by their district. The eight contributors were then requested to comment on any administrative positions that had been influential or efficacious in integrating educational technology into the teaching applications of classroom educators. The providers pondered the specific supports that allowed educational technology to flourish in classrooms. They were then asked to list ways that they had directly or indirectly modeled the effective use and integration of technology integration. The administrators recounted how they articulate and communicate effective educational technology information to district employees and community stakeholders. The leaders were invited to recount practices utilized to support and fund technology initiatives (Lodico, 2013). Further analysis of the data revealed eleven perceptually identified themes that might then be applied to the three hierarchically related administrative role categories defined as Superintendent/Assistant Superintendent, Director/Program Supervisor and Principal/ Building Administrator. The eleven perceptual themes were categorically listed as 1. visionary, establisher of goals and ideas 2. communicator 3. enabler, supporter, motivator, facilitator 4. financial resource provider and stabilizer 5. advocate 6. relationship builder, collaborator 7. integrator, implementer 8. evaluator, assessor 9. manager 10. modeler and 11. empathizer. Superintendents and assistants felt they embodied all of the perceptual themes with the exception of advocate, integrator/implementer and manager. Directors and program supervisors perceived that they personified all perceptual theme categories with the exception of financial resource provider and stabilizer. The principal/building administrator cadre also exemplified all perceptual theme categories with the exception of financial resource provider and stabilizer.

A more in-depth analysis revealed that superintendents through the visionary and evaluator lenses differentiated their duties as being more globally responsible for district programs. A further noted distinction regarding superintendents' perceptions of their role was the practice of being delegators of the responsibilities subsequently necessary to implement multiple district initiatives. Regarding the construct involving relationship building and collaboration, superintendents revealed the perceptual theme of creating connections with the Board of Education and community stakeholders.

Lodico (2013) posed a second array of questions to elicit responses regarding the challenges and successes that key educational leaders face in effectively facilitating the process of change when integrating technology into the instructional practices of teachers. Themes that emerged through data analysis of the array included 1) perspectives regarding the integration process 2) challenges and obstacles to change and 3) successful or unsuccessful change experiences. Phenomena that transpired through the data analysis process regarding this particular array of questions included (a) Change is unavoidable, fluid and can be inherently demanding; (b) Change requires a cooperative approach, (c) Change is a continuingly tailoring process; (d) Change is contingent and provisional; (e) Successful change demands a resultant and targeted orientation and (f) Change must remain principled and ethically based.

Lodico (2013) decided that a third array of questions was necessary to initiate responses regarding the factors that created best practices of key educational leaders where the effective integration of educational technology into the instructional practice of teachers was working to support the overarching goal of enabling student achievement. Interview data produced themes including (a) The perceived attributes of district educational administrators (b) The impact of

technology integration on student success and (c) Superlative leadership practices to support effective educational technology integration into the instructional practices of classroom educators. Suggested pivotal attributes included effective communication with all district stakeholders. Communication specific attributes were further listed as: good listener, receptive, accessible, compassionate, patient, understanding, and collaborative. It is interesting to note that a bottom-up leadership model emerged as a significant leadership practice to support effective educational technology integration into the instructional practices of classroom educators. Specific leadership practices were distinguished through data analysis as: an effective modeler, a supporter, a motivator, a delegator, a planner, an evaluator and a collaborator.

The results of the Lodico (2013) research study data utilized common and differentiated themes and paradigms further enhanced by the constant comparative, axial coding and bridge coding to create a summative phenomenon regarding the practices of district educational leaders regarding the effective integration of educational technology into the teaching practices of classroom educators to enhance student academic success.

Table 1: Brief Comparison of the Studies

Characteristics	**Case Study One Lodico (2013)**	**Case Study Two Hill (2011)**	**Case Study Three Lichucki (2013)**
Theme	Perspectives of key educational on the integration of educational technology into the	Leading effective educational technology in K-12 school districts in New Jersey (Hill,	A case study exploring perceptions of educational technology leadership in a rural school

	instructional practice of K-12 teachers in Long Island (Lodico, 2013).	2011).	district in Wisconsin (Lichucki, 2013).
Problem	There is a need to gain further insight into the beliefs, process, and praxis of educational leaders regarding the effective integration of educational technology into the instructional practice of teachers with the overarching goal of supporting student academic achievement.	The technology environment changes rapidly. There is a need to understand what an effective educational technology leadership model would be and how the system could benefit students, teachers, administrators and community stakeholders.	There is a need to gain a shared understanding of technology leadership between teachers and administrators. The lack of understanding leads to less effective technology professional development and integration magnified by the rural nature of the district.
Purpose	To employ a qualitative research methodology designed to gain an in-depth	To utilize a qualitative grounded theory design to uncover successful educational	To examine the perceptions of technology leadership in a rural school district utilizing open-

	understanding of the beliefs, practice, and praxis of key educational leaders in K-12 school districts regarding the effective integration of educational technology into the instructional practice of teachers with the overarching goal of supporting the academic achievement of students. opportunities	technology leadership processes in use in prescribed urban public schools' districts.	ended interviews conducted in focus groups to better understand teacher and administrator perceptions of educational technology leadership in rural schools and to examine the differences in perceptions by job type and how the perceptions impact technology integration.
Theoretical framework	Self-constructed framework based on literature supported constructs of educational technology as being a systematic use of	Fiedler's contingency model of leadership effectiveness substantiated with the integrative educational	The use of the 2009 NETS-A technology standards was the framework employed for comparison.

	practical knowledge, communication, and cognitive processes leading to a hermeneutical inquiry.	leadership framework supported through the work of Fernandez; Kouzes and Posner and Marzano, Waters, and McNulty.	
Research questions	What are the perspectives of key educational leaders, inclusive of principals/building administrator, directors/district program supervisor and superintendents/deputy/assistant on the effective integration of educational technology into the instructional practice	What characteristics exist within the process of leading educational technology in K-12 public schools? What responsibilities exist within the process of leading educational technology in K-12 public schools? What skills are required within the process of leading	What are the perceptions of rural classroom teachers regarding educational technology leadership utilizing NETS-A 2009 standards? What are the perceptions of rural school principals regarding educational technology leadership utilizing NETS-A 2009 standards? What are the

	of teachers? What roles do key educational leaders perceive they play, in the hierarchy of school district leadership, in facilitating the effective integration of technology? What challenges and/or successes do key educational leaders face?	educational technology? What organizational structures exist within the process of leading educational technology?	differences between rural principal and teacher perceptions of technology leadership utilizing NETS-A 2009 standards?
Methodology	Qualitative grounded theory study research methodology used. Analysis utilized QSR NVivo 10 software.	Qualitative grounded theory study research methodology employing an online questionnaire and online focus group used for data collection. Open and axial coding was	Case study using an open-ended focus group interviews format. Analysis used WEFT-QDA software.

		used for analysis.	
Findings	Effective integration of educational technology is facilitated by educational leaders who play supporting roles that focus on vision, communication, human relations, advocacy, team building, and empathy to better understand and respond to the technology integration needs of their students, teachers, and community. Requires educational leaders with purposeful goals that are ethically and	Technology leadership characteristics, responsibilities, skills, and the organizational structure of leadership emerged as essential concept themes. Additional themes included general technology skills of the administrator and the pressures within the process encroaching on effective technology leadership. The most common leadership characteristic was noted as flexibility.	The results of the research should be shared with district stakeholders to reduce barriers to technology integration since a significant technology initiative is being strategically planned. The creation of a shared vision is critical to the success of the technology initiative. The promotion of a risk-free learning environment should also be adopted. A clear communication structure regarding technology information and technology

	morally-driven to overcome barriers and effectively facilitate and sustain change through communication, collaboration, and individualized support. Also requires patient, understanding, and compassionate educational leaders who practice bottom-up leadership strategies and understand both the efficacy and limitations of technology on student achievement.	Life-long learning was also recognized, as was credibility. Leadership responsibilities included leading others and managing change. Leadership skills identified technical expertise, time management and interpersonal skills. Within the organizational structure, determining the hierarchy of technology was a key factor. Connecting technology to educational goals was also deemed critical. Another	supervision is mandated. The communication should include shared decision making strategies. Technology support should be reviewed to eliminate lack of technology access and functionality. The inclusion of technology in professional learning community agendas to share and communicate. Finally, cultivating partnerships with local and regional businesses, educational institutions could increase technology

		area of focus was pressures on educational technology and included inadequate staffing to support the technology infrastructure.	resources
Limitations	Acknowledged that qualitative research may not be deemed generalizable in a statistical sense.	Qualitative research may not be generalized to a broader population. Bias of the researcher as a current technology leader.	Perceptions of respondents were heavily influenced by personal experiences in technology impacting generalizability. External participant review of transcripts was not fulfilled creating a further limitation.
Recommend-ations	The results of this study help fill an existing qualitative	Further research at the regional or national level could	The study should be replicated after the recommendations

	gap in the research base of previous literature and provides a Self-Constructed Conceptual Framework that can be used as a spring board for future research.	be conducted using the grounded theory generated by this investigation as well as to broaden the applicability of the findings.	have been implemented to determine if perceptions of teachers and leaders have changed regarding technology. Teachers and leadership could also be surveyed to find how they feel obstacles impede technology implementation.

4.3 Cross-study Findings Comparison

Table 1. depicts a visual representation of the comparison of the three research studies. Lodico (2013) found that effective integration of educational technology is facilitated by educational leaders who perform supporting roles that focus on vision, communication, human relations, advocacy, team building, and empathy to better understand and respond to the technology integration needs of their students, teachers, and community. The Hill (2011) study delineated technology leadership characteristics, responsibilities, skills, and the organizational structure of leadership as emergent essential concept themes. Additional themes included general technology skills of the administrator and the pressures within the process as

encroaching on effective technology leadership. The Lichucki (2013) study suggested that the results should be shared with district stakeholders to reduce barriers to technology integration. The creation of a shared vision is critical to the success of a strategically planned technology initiative. The promotion of a risk-free learning environment need also be adopted to facilitate the drastic and stressful changes that often occur during technology integration cycles. A clear communication structure regarding technology information and technology supervision is also mandated and the communication should include shared decision making strategies.

Lodico (2013) echoed the theme of communication stating that technology integration requires educational leaders with purposeful goals that are ethically and morally-driven to overcome barriers and effectively facilitate and sustain change through communication, collaboration, and individualized support. Hill (2011) noted the most common leadership characteristic as flexibility. Life-long learning and credibility were also substantiated as significant themes. Lichucki (2013) emphasized the inclusion of technology in professional learning community agendas to share and communicate data and successes. Lodico (2013) suggested that technology leadership requires patient, understanding, and compassionate educational leaders who practice bottom-up leadership strategies and understand both the efficacy and limitations of technology on student achievement. Hill (2011) accentuated leadership responsibilities to include leading others and managing change. The Hill (2011) study also articulated leadership skills identified as technical expertise, time management and interpersonal skills. Within the organizational structure, determining the hierarchy of technology was a key factor. Connecting technology to educational goals was also deemed critical. Another major area of focus was pressures on educational technology and included inadequate staffing to

support the technology infrastructure. The Lichucki (2013) research findings intimated that cultivating partnerships with local and regional businesses and other educational institutions, ultimately increasing school district technology resources, would bolster the necessary technology infrastructure support.

4.4 Implications for Technology Leadership

It is posited that the three studies analyzed in the research will provide technology leadership practitioners with an insightful leadership viewpoint affording further professional clarity necessary to enhance technology integration in regional, state and local educational jurisdictions while assuring foundational and ongoing incentive for future research in educational technology and administration of technology integration. Components such as the characteristics, responsibilities, skills, and the organizational structure of technology leadership remain the essential concepts investigated directly impacting technology leadership in K-12 school districts. Educational technology leaders and district school board practitioners will be provided with the tools and information required to refine technology leadership expectations and to prioritize leadership roles in districts.

4.5 Summary

In summary, the three studies chosen were analyzed to disclose the grounded theory underlying the impact of leadership practices on technology integration in K-12 schools inclusive of student achievement, staff self-efficacy, community stake-holder usage and overall school district technology infrastructure health and security. The findings indicate that many similarities exist regarding the Lodico (2013), Hill (2011) and Lichucki (2013) research studies in the systems of technology leadership utilized by urban, suburban and rural school districts.

All three studies portrayed the traditional hierarchy of leadership applied to administer technology in the referenced locations. Each of the three studies mirrored the findings that leadership knowledge, roles and attitudes regarding technology significantly impacts the development of a comprehensive mission statement, elaboration of strategic planning and implementation of short-range goals as well as daily practices utilized by district personnel and the supported surrounding community.

Chapter V examined the comparative analysis findings from the current chapter and draw comparisons, reflecting prevailing literature and the theoretical framework of the current research study. The discussion also disclosed the emergent-grounded theory, the significance of the study for leaders and policy makers, recommendations for future research and concluding remarks.

Chapter V: DISCUSSION

Within the discussion, I briefly restated the generalizations and similarities uncovered through analysis of the three identified studies. Next I suggested how these findings were utilized as a springboard for an emergent-grounded theoretical paradigm. Subsequently, I suggested how the model is relevant to K-12 technology leadership. Lastly, I shared concluding remarks germane to the research project.

5.1 Solutions to Problems

The purpose of the present research project was to investigate the impact of leadership on technology integration in K-12 schools. Although each particular study approached the research problem with a unique perspective, the goal for all three research studies was to ascertain those observations and opinions leading to an acknowledged phenomenon affecting the leadership of technology integration in the specified learning environments and if new or unrecognized relationships would emerge from the collection and analysis of the data. The three studies were chosen because they posited a similar overarching question: What are the recognized technology leadership structures and leadership traits that allow positive integration of technology in K-12 districts allowing positive efficacy for administration, teachers, support personnel and students in learning environments?

I analyzed the three identified studies from K-12 public school districts in the United States utilizing a grounded theory methodology, incorporating a thorough review of the literature including the theoretical frameworks of Kouzes and Posner (2010); Fernandez (2005); Marzano, Waters and McNulty (2005) and the theoretical lens of Gladwell (2000). I established the criteria for the grounded theory referring to the literature of Creswell (2009), Leedy and Ormrod

(2013), Charmaz (2003) and Glaser and Strauss (2006). I then synthesized the data and multiple findings of the three studies to create a rich tapestry of the current state of leadership with regard to technology integration and also create an accurate portrayal of current leadership practices as well as suggest a plausible paradigm shift to further the dynamics and extend the dimensions of technology leadership in the public-school arena.

5.2 Methodology Discussion

The New Jersey study (Hill, 2011) employed a grounded theory methodology, as did the Long Island, New York study (Lodico, 2013) that engaged a hermeneutical inquiry grounded theory perspective. Grounded theory is classically described in the literature of Glaser and Strauss (2006) and Charmaz (2003). The third study from Wisconsin (Lichucki, 2013) utilized a case study format described in the literature by Merriam (1998), Leedy and Ormrod (2013), and Creswell (2009). The New Jersey (Hill, 2011) and Wisconsin (Lichucki, 2013) research derived data from interview designs. The New York (Lodico, 2013) research was conducted through both an online survey as well as interviews employing online focus group responses. All three researchers closely followed protocols described in the literature for the designated study design.

Each research study engaged a purposeful sample selected from the proposed educational environment as referenced by Creswell (2009) and Leedy and Ormrod (2013). The New York (Lodico, 2013) sample encompassed a diverse range of multiethnic suburban K-12 educators, with ten through forty-five years in the field of education, and those having recently occupied an educational leadership function of district superintendent or assistant, director or program supervisor or building administrator. The New York (Lodico, 2013) research also activated maximum variation and snowball sampling as secondary selection strategies.

The participants were chosen first by convenience sampling in the New Jersey (Hill, 2011) study due to the number of districts initially contacted. Since district administrators were self-selected based on responsibility and scheduling limitations and due to the voluntary nature of the invitation to participate, only those administrators agreeing to participate were requested to complete a preliminary questionnaire. Theoretical purposeful sampling was then employed to generate properties and themes of categories to begin to create a grounded theory utilizing ongoing data collection. These participant selection procedures have all been enunciated as standard procedures described in the literature of Creswell (2009) and Leedy and Ormrod (2013). The Wisconsin research (Lichucki, 2013) sampled both teachers and administrators in a single rural K-12 district.

All three studies utilized established institutional review board protocols regarding required institutional permissions at all organizational and individual levels, ethical considerations including participant confidentiality and anonymity, full disclosure and signed participant agreements and data collection review for participant agreement. All names and personally identifiable information were replaced with coded numbers throughout the data collection, analysis, and reporting phases and geographic or socio-economic identifiers were not included in analysis and reporting. These conventions have also been detailed in the literature of Creswell (2009) and Leedy and Ormrod (2013) and I found them thoroughly in compliance.

Data collection and analysis specifics in each study differed due to the nature of the research, but also followed exacting procedures as outlined by Creswell (2009) and Leedy and Ormrod (2013) and the specific data analysis software employed.

5.3 Findings Discussion

In general the findings of the three studies were ordered utilizing the research questions advanced by each author. Two of the three studies employed a grounded theory methodology and the third employed a case study approach. These variations in methodology assisted in advancing each authors' unique perspective regarding the leadership of technology integration.

I discovered that although variations occurred in the specific findings of each study due to the choice of participants, dynamics of data collection, and analysis of the data, similarities presented themselves in their conclusions. Each particular study reviewed current and similar organizational structures of district and technology leadership hierarchy. The chosen participants included technology and district administrators in all studies. Only the Lichucki (2013) Wisconsin study employed the voices of teacher participants as well as technology leaders. It is also interesting to note that although both teachers and leadership were involved in focus group interviews, the two job types were kept separate. In my opinion, the use of the teacher cohorts gave a richer perspective and dimension to this research, not shared by the Lodico (2013) New York and Hill (2011) New Jersey studies. However, I also wonder if the Lichucki participant cohorts had been mixed between teacher and leadership respondents, would there have been a more vibrant and inclusive dialogue in the data transcripts captured for analysis?

I correlated several convergent themes emerging from the three studies regarding successful technology leadership practices. Collaboration became one universal motif in the studies and included collaboration through a shared vision, echoed in the Lichucki (2013), Hill (2011) and Lodico (2013) data. This particular theme is supported in the literature by the work of Gurr (2004) who stated that unconventional capacities are now needed in distributed and

collaborative leadership that blends collegiality with authority, accountability with quality and innovation, student-learning priorities with marketing and finance capabilities. Collaboration is also identified as a significant necessity in the literature to include family and community stakeholders to eradicate the disparity in achievement by low socioeconomic students due to a perceived lack of exposure, high quality teaching strategies, and resource allocation in the area of technology (Warschauer et al., 2004). Collaboration within the education organizational structure regarding technology integration as well as outside collaborations with businesses, community organizations and institutions of higher learning are also recognized through several sub-themes discussed in the studies. Leonard and Leonard (2006) and Gurr (2004) support the aforementioned collaborative influences of internal and external stakeholders.

Concurrently, and closely allied with the theme of collaboration, I identified the topic of communication as an intrinsically shared value in the Likchuki (2013), Hill (2011) and Lodico (2013) findings. Hill (2011) identified communication as a crucial leadership behavior effective in maintaining transparency and visibility for subordinates as well as and allowing increased buy-in, collaborating to solve issues and celebrating successes. Communication is widely viewed as an exceptional interpersonal aptitude that includes consideration, concern, patience, the ability to develop relationships and advance consensus allowing the accomplished technology leader to interact positively with individuals and groups, producing an effective team approach to situations.

Lodico (2013) found that the dynamics of change inherent in technology implementation require a cooperative approach sufficiently enhanced by developed communication skills that are principled and ethically based. Communication specific leadership attributes were further listed

as being a good listener, receptive, accessible, compassionate, patient and understanding. Literature supporting this facet of technology leadership and integral aspects of change can be found in the work of Gurr (2004), Blau and Presser (2013) and the seminal discussions of change as a paradigm shift found in Gladwell (2000). Blau and Presser (2013) surmised that successful implementation of technology allowed e-leadership habits to develop that increased the effectiveness of data-driven decision-making, monitoring curriculum implementation, student learning performance and staff functionality, e-communication with the educational staff, students and parents, delegating responsibilities, and improving the overall school culture. Gurr (2004) concurred that the influence of the digital culture on education requires that the field become more dynamic and fast-changing, so that rigid, traditional models of leadership that emphasize the delegation of power should be rejected for more fluid leadership frameworks, focusing on communication and human relationships.

Lichucki (2013) discussed the concept of leadership and organizational communication inadequacies as roadblocks to technology integration. The teacher participants cited that the lack of ineffective communication not only impacted the overall technology vision, as did the administrators, but also obstructed many areas of technology integration in the classroom, school and community. Lichucki (2013) also emphasized the inclusion of technology in professional learning community agendas to share and communicate data and successes as also underscored by the research of Jones, Valdez, Nowakowski, and Rasmussen (1994), echoing that the greatest benefits of technology come from the opportunity it provides a learning community to transform current practices in new ways of teaching characterized as constructivist, or actively-engaged learning. Gladwell (2000) further supports these notions with his phenomena coined the

Stickiness Factor, a particular concept or idea whose content or means of delivery renders its impact memorable or desirable to individuals and the community's subgroups; hence the concept or idea is accepted or "sticks", improving the likelihood that the innovation or change process will be accepted.

A third common theme in the three studies relative to the integration of technology is the discussion surrounding supportive organizational structures. The Lichucki (2013), Hill (2011) and Lodico (2013) research are rife with portrayals of administrative prototypes that define successful approaches to technology assimilation in K-12 learning environments. However, the K-12 organizations described are all traditional leadership hierarchies featuring a school board, superintendents, and assistants or associates identified as senior administration, central office staff assuming various administrative duties through a well-defined division of responsibilities and finally the school building administration with principals, assistants and curricular department chairs, somewhat mirroring in microcosm the topmost district structure in each school setting. It is interesting to note that almost identical administrative scaffolding exists at the state education level, further imbedding this relative top-down model at the local district levels. As considered earlier, Gurr (2004) and Gladwell (2000) espouse more non-traditional organizational structures of technology leadership to best serve the integration of a digital culture in the fabric of the educational environment. This topic will be addressed more fully in the concluding remarks.

As I previously stated, examples of organizational success were one of the primary research questions portrayed in the data of the three studies. The participants advanced that organizational structures were deemed effective if they supported administrators who were

acknowledged as visionary, planned strategically, built credible relationships, advocated for students, families and staff and were responsive and empathetic to the technology needs of their constituents. Supportive literature in the work of Fernandez (2005) allowed that educational leadership performance was correlated positively or negatively to the amount of time consumed supervising internal and external aspects of the organization, encouragement from the board of education and the surrounding community, assignment difficulty, and a leadership style that actively endorsed change.

Within the organizational structure, determining the hierarchy of technology was considered a key factor. Connecting technology to educational goals was also recognized as a major thrust if the organization as identified in the literature as the value of educational technology may be measured by the educational goals it helps students achieve (National Study of School Evaluation, 1996; Halverson & Gomez, 1998; Partnership for 21st Century Skills, 2007; Friedman, 2007).

However, I believe that due to the traditional approach to hierarchical leadership of the K-12 districts reviewed, actual leadership frameworks were nominally implied and discussions were predominantly centered on individual leadership traits. Although many discussions described the organizational scaffolding employed in each region, the redundancy was apparent in their hierarchical approach to systematization.

One significant outlier regarding the technology leadership construct was proffered in the Lodico (2013) research. The noted variation suggested a bottom-up leadership model that emerged as a significant leadership practice to support effective educational technology integration into the instructional practices of classroom educators. This model was concurrent in

the literature review found within the work of Gurr (2004) and Gladwell (2000).

5.4 Findings Conclusion

The data clearly support that whether the district is rural, suburban or urban, traditional top-down leadership methodologies are employed, methodologies that have been retained since the development of public education during the golden age of industrialization. These outdated leadership methodologies are still embodied in the bureaucratic use of school boards as overseeing organizations for schools across the nation, reminiscent of a business's board of directors. The outmoded organizational procedures are further recognized in the use of centralized district office hierarchies and their hierarchical designated officers identified from the top down in descending order of importance and job responsibilities.

The industrial leadership model is also paralleled in the philosophy that education is a business and students and learning are the goods produced for the community of consumers. These approaches are not well suited for the present and future knowledge oriented, globalized educational world students face. No population has incorporated this whirlwind revolution more fully than contemporary youth (Prensky, 2010). Learners of all ages are exploring and manipulating the information environment through texting, instant messaging, social networking, gaming, blogging, and downloading and uploading and creating music and videos. These are a small percentage of the daily entertainment and communication methods utilized by youthful students (Roberts & Foehr, 2008).

Bransford, Brown and Cocking (2000); Collins and Halverson (2009) and Friedman (2007) all support the findings that secondary pupils are disproportionately consumed by technology and remain unmitigated consumers. Students of today are so influenced by

technology that they learn differently from their parents. Learners are digitally literate and socially aware, preferring group work and tasks (Hew & Brush, 2007). The students' world exists in information technology and digital media, communicating via smart phones using twitter and social media sites. Even young children have developed the ability to multi-task and move seamlessly from one activity to another with minimum readjustment (Chen & Price, 2006).

At this juncture, I would interject that an obvious and alarming similarity in the three research studies was their lack of the voices of students, who are the end users of the preponderance of technology both in and out of the educational environment. The situational effect is considerably more compelling when one recognizes that in a majority of circumstances, the students are the recognized digital natives of the society and the technology innovation and integration experts. The absence, therefore, of the collective knowledge and expertise of students in planning and leading technology integration is a considerable oversight and necessitates the rethinking and redesign of the technology leadership paradigm, reconceptualizing the ones inherent in the three studies.

Shulman (1987) submits that the organization of the knowledge continuum is fluid and purposefully evolving, gathered from a diversity of sources, and relevant in a variety of settings. Undeniable change is the new norm, and leaders refashion their comprehension of educational technology, as they similarly amend their considerations of many dynamics that influence teaching and learning. Within the process, educational leaders advance a collective knowledge through practice.

The technology integration challenges include limited expert technology leadership by administrators, limitations in the amount of time necessary for practicing new skills, the depth of

necessary training, lack of a collaborative learning community and inadequate support and opportunities to apply the new learning (Anderson & Dexter, 2005; Brockmeier, Pate, & Leech, 2005). Gurr (2004) also suggests that the technological saturation of cultures has placed concentrated responsibility on school leaders to integrate digital technologies into educational curricula. Gurr proposes the influence of digital culture on education requires that the field become more dynamic and fast-changing, so rigid traditional models of leadership that emphasize the hierarchical delegation of power should be rejected for more fluid leadership frameworks focusing on communication and human relationships. Thus, technology leadership necessitates a purposeful shift to encompass the expanded technology based learning environments of the ever-changing present day as outlined in the work of Gurr (2004); Gladwell (2000) and Uhl-Bien, Marion and McKelvey (2007).

In order for leaders to sustain any kind of transformational learning for students through integrated technology, administrators must rethink their own current leader practices and continually reconsider the learning environment and how the school may utilize technology most effectively (Otero et al., 2005). Gurr (2004) further states that the transformation requires moving away from a leader-centric organizational framework toward a decentralized model. These principles are also supported in the diffusion of innovation theory set forth by Rogers (2003) and the complexity leadership exemplar authored by Uhl-Bien, Marion and McKelvey (2007).

Through triangulation of data, analysis and reflection of the three referenced studies and their respective findings, I developed a grounded theory envisioning a bottom-up leadership continuum including key leaders and stakeholders embracing students as significant leader-

practitioners. The visualized model is buttressed by the principles devised by Gladwell (2000) referring to such paradigm shifts in educational leadership as those strategically planned or serendipitous occurrences described as a "tipping point", the moment when a model or theory reaches a level of acceptance; a critical mass explicitly disposed to the change process. Technology leaders must be cognizant of the signs that lead to the technology tipping point and take full advantage of the many changes occurring during the time of flux and advantageous innovations creating an epidemic of ideas that facilitate the process of change. Gladwell (2000) further posits that the three standards that unite to create the convergence of change resulting in innovation are the 80/20 principle, the stickiness factor and the power of context.

The 80/20 Principle posits that eighty percent of the work of innovation or change will be accomplished by twenty percent of the participant community. The twenty percent are predominantly one of three categories of workers: 1) Connectors- individuals that are well linked to large numbers of people across a varied and distinct array of cultural, social, professional and economical communities and are able to bring these diverse contingencies to the conversation 2) Mavens- information gurus whose expertise is collecting and disseminating knowledge in the community-at-large 3) Salespersons- those people who are master persuaders, charismatic individuals astute in the art of negotiation and persuasion (Gladwell, 2000).

Supported by the literature, it is my contention that students comprise the largest participant community involved in the integration of educational technology. Students also represent an untapped reservoir of technology knowledge creating expanded resources and increased collaborations. Students are the largest and most dynamic cohort of the educational environment, involved daily in technology integration practices. By recognizing these factors

and including student voices in the technology planning, development and leadership scenario, a wholly unique leadership paradigm would evolve with a new and invigorated vision. The inclusion of students would not only send a message that their knowledge is recognized and appreciated, but it would also increase buy-in and positively communicate with parents and community stakeholders and all educational staff that a divergent and innovative perspective has been adopted.

The suggested paradigm shift would allow technology innovation and integration to be communicated and tested in an atmosphere of risk free learning environment for all constituents. The model would support a refocused, shared vision, empower team building in new ways and increase supportive webs of response to technology problems and barriers to integration. Flexibility facilitating and sustaining change would be a further outcome, as well as connecting technology to educational goals including science, technology, engineering and mathematics (STEM) initiatives. The updated paradigm set forth would bolster the current technology infrastructure in unprecedented ways.

Creative and innovative responses to the suggested invitation of students to the leadership conversation might involve a wide and varied range of initiatives including, but not limited to, completing anonymous surveys regarding technology topics, improvements and issues, inclusion in technology focus group interview meetings, action research projects to include student participants, the creation of credit fulfilling curricular opportunities in the fields of technology, technology clubs and competitive technology Olympiads with wide-ranging focal activities such as robotics, coding or technology entrepreneurship. Throughout the development and rollout of these and similar activities, students would be invited and become actively engaged in the

planning, recruitment and coordination of technology efforts. Wherever possible, students should assist in leading and instructing technology activities. Collaborations with higher education science, technology, engineering and mathematics programs would employ the use of university students as role models and effective animators of secondary student cohorts of activity, facilitated by graduate students and university faculty.

5.5 Relevance for Educational Leadership

The purpose of the research study was to investigate the impact of leadership on technology integration in K-12 schools. The comparative study analysis determined that studies that include interviews provide a depth of information and rich data allowing an understanding of the phenomena and emerging grounded theory. In developing strategies for addressing technology issues, leaders should consider interview techniques to provide in-depth information to enhance productivity and increase successful technology outcomes.

Many similarities exist regarding the Lodico (2013), Hill (2011) and Lichucki (2013) research regarding the systems of technology leadership utilized by urban, suburban and rural school districts. All three studies portrayed the traditional hierarchy of leadership applied to administer technology in the referenced locations. Each of the three studies mirrored the findings that leadership knowledge, roles and attitudes regarding technology significantly impact the development of a comprehensive mission statement, elaboration of strategic planning, implementation of short-range goals as well as daily practices utilized by district personnel and the supported surrounding community. The data also provided the perspective that educational leaders require the input from all stakeholders and constituent groups to arrive at technology integration and growth that is sustainable and perceptive to future needs.

Consequently, I set forth a comprehensive grounded theory as a springboard for discussion by current technology leaders and educational policymakers, utilizing the findings and similarities of the included three studies. It is hoped that the grounded theory set forth recognizing students as primary consumers of technology learning and catalysts for technology innovation be included in the leadership paradigm and will open the way for continued dialogue regarding the ways technology leadership is defined and the effects of that leadership has on technology integration in K-12 schools and the larger community. Furthermore, institutions of higher education must carefully review teacher and educational leadership preparation programs to include technology integration and leadership courses so that educators are fully prepared to engage the digital age successfully.

5.6 Recommendations for Further Research

The findings of the multiple study analysis alluded to gaps in the understanding of the technology leadership and the influences on integration of practices in K-12 education. The literature reviewed revealed a lack of research regarding the voices of stakeholder groups including community collaborators, families and students. There is a need therefore for research involving these groups and how technology integration leadership impacts these populations.

Future research could also examine the impact of the inclusion of students in the leadership process utilizing the proposed grounded theory that recognizes students as integral protagonists in the integration of technology in K-12 educational environments.

5.7 Concluding Remarks

The purpose of this research study was to investigate the impact of leadership on technology integration in K-12 schools. The multi-study analysis has generated a more in depth understanding of K-12 school technology leadership practices and what aspects of leadership influence the integration of technology in the K-12 educational environment. The research will assist current and future leaders to engage technology innovation and integration in relevant and new ways, as well as inform learning community constituents, including students, of the changes necessary for sustainable integration and help students define their possible roles in the technology integration and leadership process.

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