UNIVERSITY OF OKLAHOMA

GRADUATE COLLEGE

AN EXAMINATION OF THE RELATIONSHIP BETWEEN PRINCIPAL TECHNOLOGY LEADERSHIP AND TECHNOLOGY INTEGRATION IN URBAN SCHOOLS

A DISSERTATION

SUBMITTED TO THE GRADUATE FACULTY

in partial fulfillment of the requirements for the

Degree of

DOCTOR OF PHILOSOPHY

By

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Norman, Oklahoma
2013

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AN EXAMINATION OF THE RELATIONSHIP BETWEEN PRINCIPAL TECHNOLOGY LEADERSHIP AND TECHNOLOGY INTEGRATION IN URBAN SCHOOLS

A DISSERTATION APPROVED FOR THE
DEPARTMENT OF EDUCATIONAL LEADERSHIP AND POLICY STUDIES

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Dedication

I dedicate this study to my mother, Pranee Larson, who, from my first memories, instilled in me a passion of learning and a value of both hard work and pursuit of academic excellence. There isn't a day that goes by that I don't miss you and think about you. You are the most amazing example of a strong woman, and I see Ashley becoming more and more like you each day. I know you are proud of me as I am of you, and I love you and miss you dearly.

To my family who sacrificed so much over the years while I completed this study. Daron, Riley, and Ashley, who always cheered me on and encouraged me to keep persevering toward my goals: I couldn't have done this without you. I love you more than the air I breathe.

To all my family and friends, I will be forever grateful for all the words of encouragement and love you have shown me along the way. I am blessed to have such a wonderful circle of friends who are always there for me both professionally and personally.

Acknowledgements

I would like to acknowledge several individuals for their continual encouragement and support for me through this entire process. Thank you, Dr. Jeffery Maiden, for serving as my advisor and committee chair and guiding me through my graduate coursework to ensure it was a valuable experience. Thank you to the members of my committee, Dr. Gregg Garn, Dr. Courtney Vaughn, Dr. Gaetane Jean-Marie, Dr. Sara Beach, and Dr. Frank McQuarrie, for you extended service, patience, and recommendations that made this research study even stronger. I was blessed to have the same committee through my entire doctorate program.

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Abstract

The purpose of this exploratory/quantitative descriptive and correlational study was to examine the relationship between principal technology leadership and technology integration in urban schools. The technology activities of principals along with Organizational Health Instrument (OHI) survey outcomes perceived by their faculty were described and analyzed to discover if there was a relationship between and among them. The targeted sample was school administrators in two urban school districts in Oklahoma and Texas. Oklahoma participants came from 11 elementary schools, one middle school, one high school, and one middle/high school. Texas participants came from one Montessori school, 10 elementary schools, one middle school, one high school, and one alternative middle school. The Survey of Technology Competency and Proficiency to the National Educational Technology Standards of Administrators (STCP-NETS-A) was used for technology-related data gathering. Participants responded using a 5-point Likert scale. Survey data were combined from *daily* and *weekly* to form *at least weekly* versus *monthly or less* with respondents answering *at least weekly* in their responses and combined *agree* and *strongly agree* as well as *disagree* and *strongly disagree* to form *agree* versus *disagree*. For the review of data from surveys, descriptive analysis was used, such as percentages, means, standard deviations, and item analysis. Data from the OHI surveys from each participating urban school were used to examine the relationship to culture and student achievement. The data were displayed across each of the 10 dimensions using descriptive analysis, including percentages, means, and standard deviations. In addition to descriptive analysis, survey data were analyzed using inferential statistics. An analysis of variance

was used to determine if there were significant differences in school health among school principals' perceptions of their leadership competencies in four OHI dimensions. Analysis of data involved an overview of the 29 urban school principals with information analyzed from each survey. Findings indicated a high level of frequency in technology productivity use for administrators. Findings further indicated a high level of frequency in technology perception and beliefs about the positive impact of technology in the school setting. These findings indicate that principals' perceptions of technology's influence plays a key role in the integration occurring at schools. Survey results revealed strong technology leadership behaviors and use of a variety of technology in schools. Findings further indicated nonsignificant differences in technology integration and school organizational health indicators relative to student achievement. Analysis of survey results supported a null hypothesis that there was no relationship between the technology behavior of urban school principals and the four organizational health dimensions that correlate to high student achievement in schools.

CHAPTER 1. INTRODUCTION

Introduction to the Study

Historical Perspective

Technology is infused in nearly every aspect of society. Whether simple or complex, the progress of Western civilization has been directed by technological paradigms (Riley, Kunin, Smith, & Roberts, 1996). The daily use of technology has become an essential part of everyday life, from enhancing personal effectiveness to job performance.

The manipulation of data has become so efficient today that our personal and professional lives are dramatically different from a decade ago. The end of the 20th century brought the world into the digital age—a technologically driven era requiring new definitions for work, communication, privacy, and learning. Dede (2000) found that "new technology innovations occurring in fields of manufacturing and telecommunications would naturally force the reshaping of education" (p. 3). It is this world of connections that allows learning to extend beyond cultures and countries (Bonk, 2009; Friedman, 2005; Kouzes & Posner, 2002; Pink, 2005; Rifkin, 2003). The rapid speed of technological advances and innovations such as online banking and shopping, e-mail, and smart phones have changed the expectations and systems in our public schools.

This evolution to a technological global world requires new teaching methods, strategies, and best practices in order to fully prepare students to succeed in a world that has shifted from industry to innovation and information. Table 1 summarizes how 20th-

and 21st-century teaching and learning needs changed due to global and societal changes (Thoman & Jolls, 2005).

Table 1. *19th-/20th-Century Learning Versus 21st-Century Learning*

19th/20th-century learning	21st-century learning
Limited access to knowledge and information (i.e., content) primarily through print	Infinite access to knowledge and information (content) increasingly through the Internet
Emphasis on learning content knowledge that may not be used in life	Emphasis on process skills for lifelong learning
Goal is to master content knowledge (literature, history, science, etc.)	Goal is to learn skills (access, analyze, evaluate, create) to solve problems
Facts and information are spoon-fed by teachers to students	Teachers use discovery, inquiry-based approach
Print-based information analysis	Multimedia information analysis
Paper-and-pencil or word processing for expression	Powerful multimedia technology tools for expression
Classroom-limited learning and dissemination	Worldwide learning and dissemination
"Lock-step" age-based exposure to content knowledge	Flexible individualized exposure to content knowledge
Mastery demonstrated through papers and tests	Mastery demonstrated through multimedia
Teacher selecting and lecturing	Teacher framing and guiding

Because the world has changed, so have students' educational needs. The reality of the 21st century is that a connected, globalized society has precipitated the need for students to acquire and master new skills and literacies, not just memorize and recite content or factual knowledge in preparation for today's test or gain basic skills for tomorrow's blue- or white-collar jobs (Pink, 2005). Schools across the nation have witnessed a need to create a setting that supports a new kind of teaching and learning.

Because technology is credited with helping increase productivity in many industries, a common conception is that effective use of technology in schools could do more to improve educational opportunities and quality (Valdez, 2004). Over the past decade, the explosion of technology integration in the external environment has not been mirrored in schools. Public schools have generally lagged behind other public and private institutions due to the lack of infrastructure to support technology use. Federal, state, and local governments found a disparity of access to hardware, software, and networking capabilities, which led to over a decade of federal funding resources allocated to states and districts.

Funding Technology

School district infrastructures and resources were not prepared to sustain technology in schools. In 1994, only 35% of U.S. public schools had access to the Internet, and only 3% of instructional rooms had access to the Internet (DeBell, 2005). Many school districts were using operating budgets to fund technology improvements, but they faced many challenges and barriers. Thurm (1998) reported technology had to compete with other needs and priorities, including school building maintenance, repair, and construction; mandated programs (such as asbestos removal); and additional teachers to handle increased enrollment.

The financial inability of school districts to fund technology led to the *digital divide,* "defined as the gap in technology ownership and access between those who are affluent and those who are poor and live in areas with limited or no access to the Internet" (Charp, 2001, p. 10). To bridge the digital divide, many funding sources emerged to assist in funding technology in schools. As late as 1998, "the level of

technology access" (Lemke, Quinn, Zucker, & Cahill, 1998, p. 25) was found inadequate to meet the education system's learning goals.

Understanding the inequities that existed, federal officials saw the need to assist schools with technology funding. The level of access or disparity led to several initiatives funded by the federal government. Carvin (2000) reported the Clinton administration and its allies in Congress began to seek a means to incorporate funding into the proposed telecommunications law. The Universal Service Fund for Schools and Libraries was created in 1996 as part of Public Law 104-104, the Telecommunications Act of 1996, to provide discounts on the cost of telecommunications and equipment services to all public and private schools and libraries (Puma, Chaplin, & Pape, 2000). This program became known as Education Rate (E-Rate).

E-Rate provides eligible discounts to schools and libraries and allocates billions of dollars each year to support ongoing technology purchases. During its first two years, the E-Rate program provided close to $4 billion in revenue to the nation's schools and libraries to support their efforts in expanding access to 21st-century information technology (Puma et al., 2000). Thanks to E-Rate, schools and districts across the United States now have comprehensive Internet access; in Fall 2005, nearly 100% of public schools in the United States had access to the Internet, compared to 35% in 1994 (DeBell, 2005). Table 2 illustrates the characteristics and increase of Internet access in schools from 1994 to 2005.

Table 2. *Percentage of Public Schools With Internet Access*

School characteristics	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2005
All public schools	35	50	65	78	89	95	98	99	99	100[2]	100[2]
Instructional level[1]											
Elementary	30	46	61	75	88	94	97	99	99	100[2]	100[2]
Secondary	49	65	77	89	94	98	100[2]	100[2]	100[2]	100	100
School size											
Less than 300	30	39	57	75	87	96	96	99	96	100	100
300–999	35	52	66	78	89	94	98	99	100[2]	100[2]	99
1,000 or more	58	69	80	89	95	96	99	100	100	100	100

Note. All of the estimates in this report were recalculated from raw data files using the same computational algorithms. Consequently, some estimates presented here may differ(i.e., 1%) from results published to 2001. For estimates that are 100%, the event defined could have been reported by few schools had a different sample been drawn. From National Center for Education Statistics, 2006, *Computer and Internet Use by Students in 2003.* Retrieved from http://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2006065

[1]Data for combined schools are included in the totals and in analyses by other school characteristics but are not shown separately. [2]Estimate is rounded to 100% for presentation in table. [3]Percent minority enrollment was not available for some schools. In 1994, this information was missing for 100 schools. In subsequent years, the missing information ranged from 0 to 46 schools. In 2005, the information was missing for 20 schools. [4]Percent of students eligible for free or reduced-price lunch was not available for some schools. In the 1994 survey, free and reduced-price lunch data came from the Common Core of Data (CCD) only and were missing for 430 schools (percentages present in this table based on cases for which data were available). In reports prior to 1998, free and reduced-price lunch data were not report for 1994. In a 1998, a decision was made to include the data for 1994 for comparison purposes. In subsequent years, free and reduced-price lunch information was obtained on the questionnaires supplemented, if necessary, with CCD data. Missing data ranged from 0 schools (2002, 2003, and 2005) to 10 schools (1999).

(continued)

Table 2. *Percentage of Public Schools With Internet Access*

School characteristics	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2005
Locale											
City	40	47	64	74	92	93	96	97	99	100	99
Urban fringe	38	59	75	78	85	96	98	99	100		99
Town	29	47	61	85	90	94	98	100	98	100	100
Rural	35	48	60	79	92	96	99	100[2]	98	100	100
Percent minority enrollment[3]											
Less than 6%	38	52	65	84	91	95	98	99	97	100	99
6–20%	38	58	72	87	93	97	100	100	100	100	100
21–49%	38	55	65	73	91	96	98	100	99	99	100
50% or more	27	39	56	63	82	92	96	98	99	100	100[2]

Note. All of the estimates in this report were recalculated from raw data files using the same computational algorithms. Consequently, some estimates presented here may differ(i.e., 1%) from results published to 2001. For estimates that are 100%, the event defined could have been reported by few schools had a different sample been drawn.

[1]Data for combined schools are included in the totals and in analyses by other school characteristics but are not shown separately. [2]Estimate is rounded to 100% for presentation in table. [3]Percent minority enrollment was not available for some schools. In 1994, this information was missing for 100 schools. In subsequent years, the missing information ranged from 0 to 46 schools. In 2005, the information was missing for 20 schools. [4]Percent of students eligible for free or reduced-price lunch was not available for some schools. In the 1994 survey, free and reduced-price lunch data came from the Common Core of Data (CCD) only and were missing for 430 schools (percentages present in this table based on cases for which data were available). In reports prior to 1998, free and reduced-price lunch data were not report for 1994. In a 1998, a decision was made to include the data for 1994 for comparison purposes. In subsequent years, free and reduced-price lunch information was obtained on the questionnaires supplemented, if necessary, with CCD data. Missing data ranged from 0 schools (2002, 2003, and 2005) to 10 schools (1999).

(continued)

Table 2. *Percentage of Public Schools With Internet Access*

School characteristics	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2005
Percent of students eligible for free or reduced-price lunch[4]											
Less than 35%	39	60	74	86	92	95	99	99	98	100	99
35–49%	35	48	59	81	93	98	99	100	100	100	100
50–74%	32	41	53	71	88	96	97	99	100	100	100
75% or more	18	31	53	62	79	89	94	97	99	99	99

Note. All of the estimates in this report were recalculated from raw data files using the same computational algorithms. Consequently, some estimates presented here may differ(i.e., 1%) from results published to 2001. For estimates that are 100%, the event defined could have been reported by few schools had a different sample been drawn.

[1]Data for combined schools are included in the totals and in analyses by other school characteristics but are not shown separately. [2]Estimate is rounded to 100% for presentation in table. [3]Percent minority enrollment was not available for some schools. In 1994, this information was missing for 100 schools. In subsequent years, the missing information ranged from 0 to 46 schools. In 2005, the information was missing for 20 schools. [4]Percent of students eligible for free or reduced-price lunch was not available for some schools. In the 1994 survey, free and reduced-price lunch data came from the Common Core of Data (CCD) only and were missing for 430 schools (percentages present in this table based on cases for which data were available). In reports prior to 1998, free and reduced-price lunch data were not report for 1994. In a 1998, a decision was made to include the data for 1994 for comparison purposes. In subsequent years, free and reduced-price lunch information was obtained on the questionnaires supplemented, if necessary, with CCD data. Missing data ranged from 0 schools (2002, 2003, and 2005) to 10 schools (1999).

Over the past 3 decades, school technology expenditures have increased 300% (Gosmire & Grady, 2007). The federal government's major funding initiatives, such as the Improving America's Act of 1994; Technology Literacy Challenge Fund; Technology Innovation Challenge Grants; and Title II, Part D of Enhancing Education Through Technology, have ensured technology is part of the educational setting. The U.S. Department of Education (USDE) allocated $919 million from the 2009–2010 budget to the K–12 technology programs through the Enhancing Education Through Technology program (Fletcher, 2009). As a result, districts have witnessed a steady increase of technology in schools. Federal funds have acted as a catalyst and in some cases the glue that joins things together (Roberts, 1997).

The funding initiatives provided access to computers, software, electrical upgrades, and professional development not covered by E-Rate funding. Technology spending has remained consistent throughout the years. Subsequently, the extensive cost and influx of technology has caused many to question the effectiveness of technology contributing to student achievement. The significant investment implies that school leaders think technology will have a positive impact on school improvement (Dexter, Seashore, & Anderson, 2002). Yet, despite the financial commitment of federal and state governments and local school districts to technology acquisition, the promise of technology has not been fully realized, and legislators and the public are now looking for returns on this huge investment (Bennett & Gelernter, 2001).

Educational Reform and Technology

Legislators, governors, and other policymakers each year make difficult choices among attractive improvement options (Langer & Boris-Schacter, 2003). Public schools

in the United States have always been in the public spotlight. Perhaps because of the high levels of funding technology or for reasons of accountability, expectations were high for technology-rich environments to contribute to improving student achievement (Schrum & Glassett, 2006).

Since the passage of No Child Left Behind (NCLB) in 2002, public school performance has become a national debate regarding effectiveness and equality. NCLB highlighted a focus on technology integration with expectations for full integration of technology into curricula and instruction (Fletcher, 2003). NCLB imposed a deadline of December 31, 2006, for technology integration as a guide for schools still struggling with the integration.

Students must have the ability to think and to synthesize and apply information. American education needs to make a leap into the 21st century and prepare for the rigorous requirements of NCLB and a competitive, global work force. Learning for the 21st century requires students to use and access information and knowledge. Students today have new ways of communicating (instant messaging), sharing (blogs), buying and selling (eBay), exchanging (peer-to-peer technology), creating (Flash), collecting (downloads), coordinating (wikis), and learning (Web surfing). Even cell phones can be used in learning (Prensky, 2005). Testing mandates from NCLB have educators looking at technology as a venue for teaching and learning. Using technology effectively within a school system encourages significant reform (International Society for Technology in Education [ISTE], 2007a).

Technology has enabled students to have greater access to vast arrays of resources, classes, and experts, thereby empowering them to become "free agent"

learners who are creating meaningful personalized learning experiences 24 hours a day/7 days a week outside the traditional classroom and school structure (Project Tomorrow, 2010). Rather than being merely the recipients of reform efforts to improve student learning, students are now the drivers. The increase in student technology access has brought with it higher expectations for student learning (Watts, 2003). According to the USDE's 2004 National Educational Technology Plan, "Today's technology-literate middle school and high school students will also be the drivers of reform, creating a new student–teacher partnership" (p. 46). The USDE's 2010 National Educational Technology Plan further clarified the disparity between the technology tools (digital tools) students use outside versus inside schools, reminding us that it is important that they learn to use the devices both "formally and informally [to create] their own engaging learning experiences" (p. 4).

Essentially, teachers prepare students for college, careers, and/or citizenship (Schmoker, 2011). States have joined together and moved toward a common curriculum called the Common Core State Standards. The standards are designed to be robust and relevant to the real world, reflecting the knowledge and skills that young people need for success in college and careers (Common Core State Standards Initiative, 2012). Student performance is measured according to these standards and used to determine the rate of student achievement at each school and district. Each state has revised or is revising its measure of student performance. The Common Core State Standards outline rigorous content expectations with the intent to make all students ready for life in a technological society.

Therefore, the integration of technology into instruction must also support the mastery of content knowledge (Honey, Culp, & Spielvogel, 2005). The integration of technology within curricular instruction represents a new focus, shifting away from the teaching of computer skills and productivity in software in isolation (Holznogel, 2005). Limited research and evidence that technology can increase student achievement make it difficult for districts to justify the huge cost of technology in educational settings. Whether or not some linear model for technology integration is realistic, many have argued that educational technology only has potential when teachers and students can use it effectively to improve learning (Provenzo, 2000).

Decades of studies have shown teachers' minimal use of technology for instruction even as equipment, training, and access have increased exponentially (Schoepp, 2004). Cuban (2003) observed that by 2001, computers were widespread in schools but underutilized as instructional tools in the classroom due to the lack of practical application-oriented teacher training and rigid school structures. For myriad additional reasons, teachers and schools have not been able to keep pace with their clientele nor the society surrounding them when it comes to integrating media and technological advancements for student learning—despite the fact that by 2005, nearly 94% of instructional classrooms had access to the Internet, the national ratio of students to computers had dropped to an all-time low of 3.8 to 1, and 83% of schools had offered professional development specifically related to integrating the Internet into teachers' curriculum (Wells & Lewis, 2006).

Prensky (2009) suggested that there also exists a divide between young people who have been exposed to technology during most of their lives and adults whose

technology use is often as diverse as they are. However, the distinction will continue to grow irrelevant over time. Digital technology offers the opportunity to increase knowledge and understanding, regardless of age, and helps prepare students not only for college but also for the work force (O'Kane, 2010).

The effective integration of technology into classroom instruction can and will result in higher levels of student achievement (Apple, 2002). The impact of technology on teaching and learning is felt in the areas of enhancing mastery of basic skills and student motivation and engagement. Technology provides a venue to support mastery of basic skills that students learn *from* the computer. Student motivation and engagement are intrinsic student outcomes as they learn *with* the computer.

Reeves (1998) described learning from computers as different than learning with computers. When students are learning from computers, the computers are essentially tutors (Ringstaff & Kelley, 2002). The technology serves as a tool that helps students master fundamental skills. In contrast, in learning with computers, students use technology as a tool that can be applied to a variety of goals in the learning process rather than serving simply as an instructional delivery system (Ringstaff & Kelley, 2002).

Background of Study

Technology and Leadership

Regardless of the theory used to explain it, leadership has been intimately linked to the effective functioning of complex organizations throughout the centuries (Marzano, Waters, & McNulty, 2005). The roles of principals and their attitudes toward technology are important aspects for effective technology integration (Daresh, 2006).

Technology integration in schools cannot take place without effective internal leadership.

For technology to fulfill its promise in education, strong principal leadership is essential and the need is now well supported in literature (Creighton, 2003; Wilmore, 2000). Leadership, dynamics, and support for teachers are critical when implementing any innovation such as education technology. Hoffman (1996) identified seven variables contributing to the failed implementation of educational technologies:

1. lack of administrative support;
2. inadequate staff development and technical support;
3. low quantity, quality, and access to technologies in the classroom;
4. nonexistent or cursory plans for adopting and implementing technology into a school;
5. failure to allocate a technology coordinator to help train teachers and coordinate technologies;
6. lack of funds and personnel to maintain equipment; and
7. continual assessment of content acquisition through traditional methods.

The most important variable Hoffman identified was administrative support. Administrative focus on the use of technology has the potential to make a difference in teacher use of technology in the classroom (Salpeter, 2006). The leader must be able to create an environment that is conducive to making the behavioral and structural adaptations necessary to attain the goals of the innovation.

Technology and Leadership in 21st-Century Schools

Perhaps no topic has been researched more than leadership, featured in almost every textbook on organizational behavior (McFillan, 1977). Leadership is considered to be a necessary component of effective schools. Educational leadership was shaped by the scientific management movement and the military management system because educational policymakers and school administrators primarily came from business and military establishments (Fairman & McLean, 2003). A 1977 U.S. Senate Committee report on equal educational opportunity identified the principal as the person who has the most impact in a school:

> In many ways the school principal is the most important and influential individual in any school. He or she is the person responsible for all activities that occur in and around the school building. It is the principal's leadership that sets the tone of the school, the climate of teaching, the level of professionalism and morale of teachers, and the degree of concern for what students may or may not become. The principal is the main link between community and the school, and the way he or she performs in this capacity largely determines the attitudes of parents and students about the school. If a school is a vibrant, innovative, child-centered place, if it has a reputation for excellence in teaching, if students are performing to the best of their abilities, one can almost always point to the principal's leadership as the key to success. (as cited in Marzano et al., 2005, p. 24)

According to Fullan (2002), principals must be leaders who create a fundamental transformation in the learning culture of schools and the teaching profession itself. Over the past 20 years, the role of school leadership has witnessed a paradigm shift. The traditional view of principals as efficient managers has been replaced by the view that principals should be instructional leaders who help teachers focus on student learning by emphasizing effective teaching and learning strategies (Valdez, 2004). An effective leader in today's educational environment requires sustained effort on the administrator's part. It requires the ability to hold a global

perspective of the school or district while at the same time being able to recognize and address all pieces that affect programs, including technology, curriculum, instructional practice, staff and community members, and managerial tasks (Brooks-Young, 2002).

Understanding the importance of collaboration and global thinking, an instructional leader should not make decisions or plan for educational technology in isolation. Technology in the classroom improves students' motivation and attitudes, increases family involvement in their children's education, and serves as a tool to help teachers improve their classroom practice (USDE, 1996). Technology-integrated programs are in place in schools that have empowering, facilitating principals who create a vision (Gosmire & Grady, 2007).

Principals are a critical element in the adoption and implementation of any change in their schools (Kadela, 2002). Technology integration is no exception. Administrative focus on the use of technology has the potential to make a difference in teacher use of technology in the classroom (Salpeter, 2006). When computer technology is not integrated effectively, technology advocates blame the principals (Byrom & Bingham, 2001).

The role of the principal in integrating computer technology may make a significant difference in the teacher level of technology use in the classroom (Brockmeier, Sermon, & Hope, 2005). Technology leadership, therefore, requires new knowledge, policies, and strategies to facilitate effective utilization of information technology in the learning environment and the teaching profession (Dexter et al., 2002). Determining if there is a relationship between the role of the administrator and

teacher adoption of new techniques or tools in the classroom may provide some insights for technology integration.

Problem Statement

When technology began to enter the school culture, much of the emphasis was directed toward building infrastructure and teacher training. With emphasis on acquiring knowledge relevant to a global economy, the manner and method of teaching is important for technology integration (Enriquez, 2006). However, recently, the focus has shifted to include administrative leadership. Researchers have begun to study effective technology leadership at the school level. Principals play a significant role in the adoption and implementation of any change in a school. Technology integration is no exception. When computer technology is not integrated effectively, technology advocates blame the principals (Byrom & Bingham, 2001).

While National Educational Technology Standards (NETS) for teachers were created in 2000, it is only recently that principal leadership was seen as important for facilitating technology use in schools. NETS for teachers and administrators were developed to provide a framework and set of standards for successful technology integration in schools. Use of the technology based on the ISTE NETS is an indicator of effective use of technology by teachers and effective leadership in schools (Barron, Kemker, Harmes, & Kalaydjian, 2003). For a technology program to be successful, educators, including administrators, are the key (Whale, 2003). Principals are the primary administrators of instructional technology—from technology planning and implementation to upgrades and classroom application. While a strong infrastructure

will be necessary to introduce technology into the school culture, strong leaders will be necessary to promote and sustain it (Ertmer et al., 2002).

Additionally, research indicates that the successful implementation of technology is interdependent on the quality of leaders and their involvement in the implementation process. Typically, technology-focused professional development for educators has focused on the needs of classroom teachers and been driven by a technology coordinator or someone in an equivalent role who more often than not lacked experience as a classroom teacher (Schmeltzer, 2001). Additionally, training has focused on using technology as management tools. These tools included applications for entering grades and attendance. However, these tools serve as productivity tools for adults rather than as an instructional or learning tools for students.

Visit any school and one will see technological elements punctuating teachers' day much more than in the early part of the century—though these technologies are not generally utilized for instruction but, rather, for management and preparation of duties (Russell, Bebell, O'Dwyer, & Connor, 2003). In 2008, educators reported using technology at the following rates for the following purposes: 76% for administrative tasks, 48% for shared information and communication with other educators, 41% for monitoring student progress, 37% for research and information, 32% for instructing students, and 29% for planning and preparing instruction (National Education Association, 2008). Despite all the funding and professional development, teachers are not effectively integrating technology into their classrooms.

Additionally, professional development of school administrators in the area of technology leadership has not been emphasized (Flanagan & Jacobsen, 2003). Few

national and state organizations offer systematic training programs for administrators in technology. Flanagan and Jacobsen (2003) provided a framework for principals of five role responsibilities in technology leadership. They are as follows:

1. Pupil engagement—an unwavering focus on pupil engagement in authentic learning experiences, supported by the use of appropriate technology.
2. Shared vision—a common vision that defines technology's place in education.
3. Effective professional development—support for ongoing, timely professional development that focuses on teaching and learning and includes many opportunities to use information and communication technology.
4. Equity of access—provision of access to all pupils in the school, regardless of the skill or interest of their teacher.
5. Ubiquitous network—digital technologies are available whenever and wherever needed.

In a K–12 school setting, society has the expectation that students will learn the 21st-century skills needed to be successful, including technology skills, whether the student chooses to go on to college or enter the workforce. Access to and use of technology is something that appears to be growing throughout the United States, portending the importance of effective use (Honey et al., 2005). While these frameworks are useful in providing initial understanding of technology leadership, additional research is needed to understand the complexities of school leadership and technology integration in P–12 education.

Purpose of the Study

Considerable research has been done that supports the fact that school leaders play a vital role in the successful integration of technology in teaching and learning (Creighton, 2003; Dexter et al., 2002). However, research that details the characteristics and practices of principals as technology leaders is limited. If principals are to be effective as instructional leaders, they must place a high priority on being knowledgeable in the areas of learning theory, instructional planning, aligning curriculum standards, and assessment, and serve as support for teachers (Mazzeo, 2003). Therefore, more research is needed to assist school districts, universities, and state education departments in identifying and understanding the leader competencies necessary to facilitate best practices for effective technology integration in the teaching and learning process. This study assessed the relationships between technology integration and technology leadership behaviors that exist with principals in an educational setting. The study determined whether organizational factors, demographic settings, professional development, and personal factors are related to organizational health dimensions.

Research Questions

1. How do school principals use technology professionally?
2. How do urban school principals perceive their technology integration performance?
3. What is the level of organizational health of schools in an urban district across each of the following dimensions:

a. Goal Focus—the ability of persons, groups, or organizations to have clarity, acceptance, support, and advocacy of goals and objectives.

b. Communication Adequacy—exists when information is relatively distortion-free and travels both vertically and horizontally across the boundaries of an organization.

c. Optimal Power Equalization—the ability to maintain a relatively equitable distribution of influence between leaders and team members.

d. Resource Utilization—the ability to coordinate and maintain inputs, particularly personnel, effectively with a minimal sense of strain.

e. Cohesiveness—exists when persons, groups, or organizations have a clear sense of identity. Members feel attracted to the membership in an organization. They want to start with it, be influenced by it, and exert their own influence within it.

f. Morale—the state in which a person, group, or organization has feelings of well-being, satisfaction, and pleasure.

g. Innovativeness—the ability to be and allow others to be inventive, diverse, and risk taking.

h. Autonomy—the state in which a person, group, or organization has the freedom to fulfill their roles and responsibilities.

i. Adaptation—the ability to tolerate stress and maintain stability while coping with the demands of the environment.

j. Problem-solving Adequacy—an organization's ability to perceive problems and solve them with minimal energy.

4. Are there differences in school organizational health among school principals' perceptions of their leadership competencies in each of these dimensions:
    a. Goal Focus
    b. Innovativeness
    c. Autonomy
    d. Adaptation

Limitations

This study focused on school administrators serving at the building level, including principals at the elementary and secondary level. Other school district personnel, such as technology directors, assistant principals, executive directors, assistant superintendents, and curriculum directors, play vital roles in technology integration in P–12 schools. However, school principals create, empower, and implement the vision for schools.

The study was limited to principals in Oklahoma and Texas urban districts. The study may not be representative of small, rural, and midsize suburban districts. However, the schools share similar high-stakes curricula, accountability standards, and demographics challenges that are representative of schools within other types and sizes of districts.

Significance of Study

Technological innovation continues to advance at a rapid pace both nationally and globally (Dutta & Mia, 2007). Accountability and growing demand for innovative methods and strategies to educate students has put significant pressure on administrators

to facilitate their staff using technology to enhance teaching and learning. Little research has been done to determine which factors lead administrators in K–12 educational settings to effectively implement and sustain technology integration. There is a benefit to having knowledgeable and effective school leaders with a focus on improving for successful implementation of technology (Valdez, 2004). In some cases, although administrators are effective in many areas, the administrators may not be comfortable or knowledgeable regarding how to proceed for successful technology integration (Valdez, 2004). The findings from this study should encourage and assist other school districts in making positive changes in recruiting, prescreening, and developing leadership in P–12 education.

Definition of Terms

Organizational health. An organization's ability to function effectively, cope adequately, change appropriately, and grow from within (Fairman & McLean, 2003).

Technology. Hardware and software used in school settings that assist students with problem solving and completion of state standards (Lemke, 2002).

Technology integration. Incorporating technology in a manner that enhances student learning; using software for real-world applications; having the curriculum drive technology usage, not having technology drive the curriculum; and organizing the goals of curriculum and technology into a coordinated whole (Dockstader, 1999).

Organization of Study

This study is organized into five chapters. Chapter 2 contains a comprehensive review of the literature defining effective technology integration, conditions necessary for technology integration, leading technology-focused professional development, and

leading and managing technology and systemic change toward technology integration in schools. Chapter 3 comprises the study design, including a detailed explanation of the methods that were used to collect the data needed to address the research questions. A description of the sample and results of the data analysis that addressed the research questions can be found in Chapter 4. Chapter 5 presents a summary, conclusions, and recommendations for further study.

CHAPTER 2. LITERATURE REVIEW

Introduction

School principals are critical to the technology integration process. To meet the needs of learners today and into the future, the ISTE began revising or refreshing their technology standards for students, teachers, and administrators in 2007. Initially developed in the late 1990s (ISTE, 2000), the updated student, teacher, and administrator NETS (ISTE, 2007a, 2007b, 2008, 2012) reflect a transformation toward connected, collaborative learning with a focus on higher order thinking skills such as creativity, problem solving, and critical thinking along with the more society-focused areas of leadership and citizenship. The ISTE developed standards to help guide administrators in the successful integration of technology. These standards, called National Educational Technology Standards for Administrators (NETS-A), are a framework for principals' technology leadership (ISTE, 2012).

The NETS-A are the most current standards in educational literature for school administrators regarding computer technology integration (ISTE, 2012). The NETS-A were developed by experts and professional organizations in the educational technology field. The NETS-A are grouped into five sections that outline the expectations or characteristics an administrator should have to effectively integrate technology in the schools they service. The NETS-A provide a framework to define how well the integration of technology, teaching, and learning are understood and implemented by school leaders (Papa, 2011). The standards were created to assist school administrators in identifying the core knowledge and technical skills needed to fulfill their leadership roles (Technology Standards for School Administrators Collaborative, 2001). Each

section contains indicators or recommendations that guide the school principal in achieving technology integration goals:

1. **Visionary Leadership.** Educational Administrators inspire and lead development and implementation of a shared vision for comprehensive integration of technology to promote excellence and support transformation throughout the organization.
2. **Digital-Age Learning Culture.** Educational Administrators create, promote, and sustain a dynamic, digital-age learning culture that provides a rigorous, relevant, and engaging education for all students.
3. **Excellence in Professional Practice.** Educational Administrators promote an environment of professional learning and innovation that empowers educators to enhance student learning through infusion of contemporary technologies and digital resources.
4. **Systemic Improvement.** Educational Administrators provide digital-age leadership and management to continuously improve the organization through the effective use of information and technology resources.
5. **Digital Citizenship.** Educational Administrators model and facilitate understanding of social, ethical, and legal issues and responsibilities related to an evolving digital culture. (ISTE, 2012, pp. 12–13)

The standards summarized the national consensus among educational stakeholders and unidentified leadership competencies needed for the effective integration of technology. In addition to understanding the structures needed to integrate technology, administrators must be aware of essential conditions to effectively integrate technology. Principals must have the ability to recognize needs and adjust accordingly to ensure implementation is sustained. A comprehensive focus requires systems that will support the day-to-day transformation of instruction for all students at all levels—systems that coordinate the literacy work of the classroom, the school, the district, and the state (Fullan, 2008).

The purpose of this literature review was to explore the role of school principals as technology leaders. Characteristics were determined that exist in school leaders who are effective at prompting technology integration. Limited research has been done on

how principals use technology or serve as leaders who foster technology integration. More specific research about the roles of building administrators in the process of technology integration would be beneficial (Flanagan & Jacobsen, 2003).

The primary focus of the literature review was on research surrounding technology integration, leadership, change models, and technology-focused professional development. The researcher sought to provide information and guidance for the current study on leadership, school settings, and the relevance and importance of administrative support in educational technology. Topics reviewed are effective technology integration, conditions necessary for technology integration, leading technology-focused professional development, and leading and managing technology and systemic change toward technology integration in schools.

Technology Integration Defined

Most of today's youth live in a world surrounded by technology and have a better grasp on living in the 21st century than most teachers. Students are actively using various technologies in their homes to communicate (texting), sharing (Instagram), and constantly learning (Internet). Schools must give students a chance to bring that technology into their curricula. Technology provides students with the opportunity to become more involved in learning, allowing them to interact with the content (Nelson, Christopher, & Mims, 2009). Integrating computer tools into the classroom is conceptually similar to integrating other tools, such as chalkboards, overhead projectors, or paints and crayons (Picciano, 2011). Although not essential for effective teaching and learning, information and communication technology tools are a critical part of improving student success in schools. Information and communication

technologies that are incorporated in the classroom are referred to as *educational technology*.

Educational technology is defined as a combination of the processes and tools involved in addressing educational needs and problems, with an emphasis on applying the most current tools: computers and their related technologies (Roblyer, 2003). Garland (2009) stated that one way to transform learning while bringing schools into this era of accountability is through the use of technology. The effective integration of technology into classroom instruction can and will result in higher levels of student achievement (Apple, 2002).

Integration should be seamless and routine as well as efficient and effective in supporting the school's goal of improving student learning (National Center for Educational Statistics [NCES], 2002). The impact of technology on teaching and learning is felt in the areas of enhancing mastery of basic skills, student motivation, and engagement.

Today's students have an intuitive nature when it comes to seeing the benefits of technology inside and outside the classroom (Armfield, 2011). Students think and process information differently because of their ability to use tools such as the Internet, social networking, video-gaming, and multimedia. Technology serves as a tool that helps students to master fundamental skills. In contrast, in learning with computers, students use technology as a tool that can be applied to a variety of goals in the learning process, rather than serving merely as an instructional delivery system (Ringstaff & Kelley, 2002).

Technology provides a venue by which to support mastery of basic skills that students learn from the computer. Student motivation and engagement are intrinsic student outcomes as they learn with the computer. These digital tools were not routinely used in the classroom. According to Farris-Berg (2008), students wanted teachers to create challenging activities that integrated teaching and digital tools. With this type of intrinsic motivation and engagement, students believed teachers would observe change in the students' behavior, attitude, and achievement. Intrinsic motivation comes from within—a desire or need that the brain determines is pleasurable or important (Sprenger, 2005).

Effective Technology Integration

Effective technology integration is influenced by several interdependent factors. Integrating technology in schools requires the use of technology to perform tasks previously accomplished without technology. Technology integration cannot take place without a viable infrastructure of hardware and software. Studies have shown that students with routine access to technology learn these basic skills more efficiently and better when they have a chance to practice them using technology (Langer & Boris-Schacter, 2003). If hardware and software are not available when needed, integration will not be seamless and effective (Flanagan & Jacobsen, 2003). Flanagan and Jacobsen (2003) provided a framework for principals that includes five role responsibilities in technology leadership:

1. Pupil engagement—an unwavering focus on pupil engagement in authentic learning experiences, supported by the use of appropriate technology.

2. Shared vision—a common vision that defines technology's place in education.
3. Effective professional development—support for ongoing, timely professional development that focuses on teaching and learning and includes many opportunities to use technology.
4. Equity of access—provision of access to all pupils in the school, regardless of the skill or interest of their teacher.
5. Ubiquitous network—digital technologies are available whenever and wherever needed.

Effective technology integration is a shared vision toward defined goals. Flanagan and Jacobsen (2003) stated that a common vision that defines a technology's place in education is key to successful technology integration. A first step in moving toward a changed and improved future is the development of a shared dream or vision of what the stakeholders want: a vision of a future that increases student outcomes (G. Hall & Hord, 2006). For technology integration to take place, an important factor may be teachers seeing how technology fits or can make a difference in learning (Rudnesky, 2007). Technology integration serves as a venue for meaningful mastery of required skills, because students use technology in their daily lives.

Effective technology integration can serve as a vehicle for increasing motivation and student engagement. Technology can serve as a teaching tool that goes beyond the traditional classroom. Media technologies such as computers, video games, and the Internet provide a mix of fun and learning in ways that schools cannot match: They are controlled by the learner, available when the learner is ready, and embedded in

networks of mutual interest among peers (Senge et al., 2000). Table 3 presents characteristics from traditional environments and emerging learning environments (ISTE, 2012).

Table 3. *The Transformation of Learning Environments*

Traditional environments	Emerging learning environments
Teacher-directed, memory focused instruction	Student-centered, performance-focused learning
Lockstep, prescribed-path progression	Flexible progression with multipath options
Limited media, single-sense stimulation	Media-rich, multisensory stimulation
Knowledge from limited, authoritative sources	Learner-constructed knowledge from multiple information sources and experiences
Isolated work on invented exercises	Collaborative work on authentic, real-world projects
Mastery of fixed content and specified processes	Student engagement in definition, design, and management of projects
Factual, literal thinking for competence	Creative thinking for innovation and original solutions
In-school expertise, content, and activities	Global expertise, information, and learning experiences
Stand-alone communication and information tools	Converging information and communication systems
Traditional literacy and communication skills	Digital literacies and communication skills
Primary focus on school and local community	Expanded focus including digital global citizenship
Isolated assessment of learning	Integrated assessment for learning

The paradigm shift from a traditional environment to an emerging learning environment will require a change in the professional development that is offered to

educators. Providing professional development and instructional support is critical to effective technology integration.

Professional development is a leading factor in effective technology integration. An instructional leader with a clear vision for teachers' professional development needs is imperative to successful technology integration. Technology integrated with the curriculum and instruction provides the option for unique learning opportunities (Merillat, Holvoet, & Adams, 2007). In a 2004 survey conducted for *Education Week,* many teachers considered themselves beginners in the use of technology in their classrooms (Picciano, 2011). The instructional leader must ensure that teachers receive adequate training in how to use technology to improve learning and that they receive the ongoing support they need to use technology well in the classroom (USDE, 1996). Teachers with specialized professional development such as technology integration may be one reason for implementing a student-centered learning environment in their classrooms.

Effective professional development in technology can be compared to Toyota Motor Corporation and its goals of increased efficiency and improved performance. Toyota's approach to improved performance in all areas of work consists of three components: identify critical knowledge, transfer knowledge using job instruction, and verify learning and success (Fullan, 2008).

Teaching is a profession in which teachers may be facilitators, sharers of information, or coaches working with students. Research-based professional development facilitates teachers' technology integration (Lengel & Lengel, 2006). A survey conducted by Parsad and Jones (2005) asked public schools whether they or

their districts provide teacher professional development on how to integrate the use of the Internet into their curriculum in the 12 months prior to the survey, and the percentage of teachers who attended such professional development. Table 4 reveals the results.

Parsad and Jones (2005) reported the following findings:

1. In 2005, nationwide, 83 percent of public schools with Internet access indicated that their school or school district had offered professional development to teachers in their school on how to integrate the use of the Internet into the curriculum in the 12 months prior to the fall survey.
2. Fifty-one percent used the Internet to participate in online professional development courses for teachers.
3. Thirty-four percent of the schools that offered professional development in 2005 had 1 to 25 percent of their teachers attending such professional development in the 12 months preceding the survey.
4. Sixteen percent of the schools had 26 to 50 percent of their teachers, 13 percent of the schools had 51 to 75 percent of their teachers, and 36 percent of the schools had 76 percent or more of their teachers attending professional development on how to integrate the use of the Internet into the curriculum in the 12 months preceding the survey.
5. Less than 1 percent of schools reported not having any teachers attending such professional development during this time frame. (p. 10)
6. Secondary schools (59%) were more likely than elementary schools (49%) to use the Internet for providing professional development through online courses (Parsad & Jones, 2005).

Professional development should be needs-based and differentiated to support the varying knowledge and proficiency level among teachers. Graduate classes as well as in-services and trainings are continually offered to teachers. School districts are required to add professional development days to their calendars on an annual basis. Technology-focused professional development should be included in the professional development opportunities that school districts design for their teachers.

Table 4. *Professional Development for Use of the Internet in the Classroom in Public Schools*

School characteristic	School or district has offered professional development[1]			% of teachers who have attended professional development								
				0%			1–25%			26–50%		
	2002	2003	2005	2002	2003	2005	2002	2003	2005	2002	2003	2005
All public schools	87	82	83	1	1		42	38	34	17	18	16
Instructional level[2]												
Elementary	87	80	84	1	2		43	39	35	15	17	15
Secondary	86	86	84				42	38	34	20	20	18
School size												
Less than 300	82	76	72		3!	1!	29	31	33	14	22	14
300–999	88	82	87	1	1!	#	45	41	34	17	17	16
1,000 or more	93	91	89	*			51	41	38	19	14	20
Locale												
City	90	84	88	1!	2!	1!	53	42	33	42	33	14
Urban fringe	90	82	83	*	*		40	39	39	18	15	15
Town	82	78	86	*	*	#	36	34	25	21	20	21
Rural	84	80	80	*	*		38	37	34	15	20	18

Note. Detail may not sum to totals because of rounding and not reporting where there are too few cases for a reliable estimate. From National Center for Education Statistics, 2006, *Computer and Internet Use by Students in 2003.* Retrieved from http://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2006065
#Rounds to zero. !Interpret data with caution; the coefficient of variation is greater than 50%. *Reporting standards not met.
[1]Percentages are based on the 99% of public schools with Internet access in 2002, 99.8% in 2003, and 99.6% in 2005. [2]Data for combined schools are included in the totals and in analyses by other school characteristics but are not shown separately. [3]Percent minority enrollment was not available for 15 schools in 2002, 28 schools in 2003, and 20 schools in 2005.

(continued)

Table 4. *Professional Development for Use of the Internet in the Classroom in Public Schools*

School characteristic	School or district has offered professional development[1]			% of teachers who have attended professional development								
				0%			1–25%			26–50%		
	2002	2003	2005	2002	2003	2005	2002	2003	2005	2002	2003	2005
% of minority enrollment[3]												
Less than 6%	86	80	83	*	3!	#	30	31	32	16	21	16
6–20%	85	82	81	*	*	#	43	44	35	18	17	20
21–49%	88	81	85	*	#	#	46	41	41	17	18	14
50% or more	89	83	84	2!	2!	1!	49	39	31	16	15	14
% of students eligible for free or reduced-price lunch												
Less than 35%	90	82	86	*	1!	#	43	38	40	15	19	15
35–49%	82	77	79	*	*	#	30	37	39	20	18	15
50–74%	85	82	83	*	*	#	42	37	25	21	17	17
75% or more	88	84	83	*	*	1!	51	43	31	11	17	16

Note. Detail may not sum to totals because of rounding and not reporting where there are too few cases for a reliable estimate. From National Center for Education Statistics, 2006, *Computer and Internet Use by Students in 2003.* Retrieved from http://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2006065 #Rounds to zero. !Interpret data with caution; the coefficient of variation is greater than 50%. *Reporting standards not met.
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School characteristic	School or district has offered professional development[1]			% of teachers who have attended professional development								
				0%			1–25%			26–50%		
	2002	2003	2005	2002	2003	2005	2002	2003	2005	2002	2003	2005
% of students eligible for free or reduced-price lunch												
Less than 35%	90	82	86	*	1!	#	43	38	40	15	19	15
35–49%	82	77	79	*	*	#	30	37	39	20	18	15
50–74%	85	82	83	*	*	#	42	37	25	21	17	17
75% or more	88	84	83	*	*	1!	51	43	31	11	17	16

Note. Detail may not sum to totals because of rounding and not reporting where there are too few cases for a reliable estimate. From National Center for Education Statistics, 2006, *Computer and Internet Use by Students in 2003*. Retrieved from http://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2006065
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(continued)

Table 4. *Professional Development for Use of the Internet in the Classroom in Public Schools*

School characteristic	% of teachers who have attended professional development					
	51–75%			76–100%		
	2002	2003	2005	2002	2003	2005
All public schools	11	13	13	30	30	36
Instructional level[2]						
Elementary	10	13	12	31	30	38
Secondary	12	13	16	26	28	32
School size						
Less than 300	9	11	12	47	33	40
300–999	11	12	13	25	29	36
1,000 or more	8	19	11	21	25	30
Locale						
City	7	11	15	25	27	38
Urban fringe	11	15	12	30	31	34
Town	14	11	16	28	33	37
Rural	12	12	11	34	29	27

Note. Detail may not sum to totals because of rounding and not reporting where there are too few cases for a reliable estimate. From National Center for Education Statistics, 2006, *Computer and Internet Use by Students in 2003.* Retrieved from http://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2006065
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(continued)

Table 4. *Professional Development for Use of the Internet in the Classroom in Public Schools*

School characteristic	% of teachers who have attended professional development					
	51–75%			76–100%		
	2002	2003	2005	2002	2003	2005
% of minority enrollment[3]						
Less than 6%	13	12	14	40	33	38
6–20%	12	11	15	26	26	30
21–49%	9	16	11	27	25	34
50% or more	7	12	12	27	32	42
% of students eligible for free or reduced-price lunch						
Less than 35%	12	13	13	29	29	32
35–49%	14	11	16	34	34	30
50–74%	7	14	10	30	30	47
75% or more	9	13	13	27	26	39

Note. Detail may not sum to totals because of rounding and not reporting where there are too few cases for a reliable estimate. From National Center for Education Statistics, 2006, *Computer and Internet Use by Students in 2003*. Retrieved from http://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2006065 #Rounds to zero. !Interpret data with caution; the coefficient of variation is greater than 50%. *Reporting standards not met.
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Educators and trainers alike recognize that people learn at different rates, yet our educational and training systems develop curricula with a one-size-fits-all approach (Kemp, 2006). Learning external to the job can represent a useful input, but if it is not in concert with learning in the setting in which one works, the learning will end up being superficial (Fullan, 2008).

Most professional development is ineffective because it is created within time limits, has generically set goals and no follow-up for participants. One fundamental reason for the imbalance is that some of today's teachers, especially those trained before the early 1990s—before the proliferation of microcomputers—were not exposed to technology as part of their preservice teacher training programs (Picciano, 2011). Additionally, natural attrition and the incoming teacher work force has created a need to make professional development meaningful to keep teachers' skills up-to-date. Becker (2000) found that teacher leaders were more successful than their peers in creating learning environments that matched their educational philosophy.

Effective technology integration does not treat technologies as if they are external to the core curriculum. McKenzie (2010) indicated that development of a systematic professional development plan also aids in the implementation of effective integration of teaching, learning, and technology. To ensure increased student achievement, a culture must be created to improve teaching and learning through technology. A survey conducted Parsad and Jones (2005) asked public schools how they used the Internet in their teaching; the following results were reported:

1. Eighty-nine percent of public schools indicated they use the Internet to provide data to inform instructional planning at the school level.
2. Eighty-seven percent of public schools reported using the Internet to provide assessment results and data for teachers to individualize instruction.

3. Eighty-seven percent also reported providing high quality digital content (i.e., learning materials brought in from the Web, such as digital libraries and museums, or any text, images, sounds and video that have been digitized).
4. Rural schools also were more likely to provide access to online distance learning than schools in cities and urban fringe areas (43 vs. 25 and 24 percent, respectively).
5. Schools with the lowest level of minority enrollment were less likely than schools with the highest level of minority enrollment to use the Internet to provide assessment results and data for teachers to use to individualize instruction (81 vs. 92 percent). (p. 10)

Assessment of the overall effectiveness of a school's technology integration and use must be ongoing to ensure success. Evaluations conducted at the end of professional development can determine future technology integration needs. A survey can be conducted to help with future goals, purchases, and professional development needs that can be added to a district's technology plan. Professional development not only is a critical component in effective and successful technology integration but also is tied to leadership practice. Public pressure for educational reform and outcomes from investment include the concept of effective technology for improving student achievement.

Technology Integration Outcomes

Mastery of Basic Skills

NCLB created accountability for districts to measure mastery of basic skills in reading, writing, and mathematics. Each state has defined a set of required mastery benchmarks that correlates to each district making required progress in each area. Additionally, states have adopted the Common Core State Standards and have started to transition from testing accountability standards to measuring mastery of the standards. Studies have shown that students with routine access to technology learn these basic

skills more efficiently and better when they have a chance to practice them using technology (Langer & Boris-Schacter, 2003).

Kulik (2003) conducted a meta-analysis in 1994 to aggregate findings from research studies on computer-based instruction. Computer-based instruction software consists of tutorials, drills and practice, and more recently integrated learning systems (Langer & Boris-Schacter, 2003). West Virginia's system focused on spelling, vocabulary, reading, and mathematics (Langer & Boris-Schacter, 2003). According to Langer and Boris-Schacter (2003), Mann's 1998 basic skills/computer education (BS/CE) study analyzed a representative sample of 950 fifth-grade students' achievement from 18 elementary schools across the state. Kulik found a significance average in effect size of .32 standard deviation units for all computer uses. Kulik noted that the average effect size of computer-based instruction compares favorably with a number of other innovations that have been implemented in schools. According to the Center for Applied Research in Educational Technology (2005), Kulik drew further conclusions from his 1994 work:

1. Students learn more in courses that involve computer-based instruction.
2. Students learn faster in courses that involve computer-based instruction.
3. Students have more positive attitudes toward instruction in courses that involve computer-based instruction.
4. Students have more positive attitudes toward computers as a result of courses that involve computer-based instruction.
5. Students' attitudes toward subject matter is unaffected by the use of computer-based instruction.

The West Virginia BS/CE was a large-scale, longitudinal study designed to focus on the state's basic skill goals in reading, language arts, and mathematics (Ringstaff & Kelley, 2002). The study looked at the influence of West Virginia's integrated learning system on student achievement. Picciano (2011) described the integration of hardware, software, and curriculum, and provided sophisticated computer-managed instructional techniques that customize the learning based on the individual student needs. The study determined that scores on the Stanford 9 increased for students who participated in the BS/CE (Ringstaff & Kelley, 2002). Beglau (2011) noted that schools invest in technology in classrooms with the expectation that it will impact student learning, engagement, and student achievement.

Student Motivation and Engagement

The rise of the global economy, an increasingly multicultural society, and rapid changes in technology require students to learn and apply new skills in their academic and career endeavors (Apple, 2002). No longer will the skills of 20 years ago meet the needs of today's global society (Fletcher, 2007). Technology can serve as a motivation in learning and in working with others because technology is a part of students' daily lives. It can bring equity to students who are categorized as "at-risk," socioeconomically disadvantaged, and academically disadvantaged.

A study funded by the USDE focused on the impact of technology on student achievement and found nine schools that were technology-rich and achieved educational gains with students regardless of age, race, parental income, or other characteristics (Means & Olson, 1995). According to Langer and Boris-Schacter (2003), Sivin-Kachala conducted a 1998 study assessing the effect of technology on learning

and achievement across all learning domains and all ages of learners. The study found technology-rich environments had positive effects on student achievement in all major subject areas and increased achievement for both regular and special needs children. Technology can serve as a platform to assist teachers in meeting the educational learning needs of a diverse classroom.

Differentiating Instruction

Technology can be a vehicle by which to address learning through various multiple intelligences—sets of specialized intelligences that give one the ability to solve a problem or create a product that is valued in a culture (Hoerr, 2000). The interconnectedness of today's society, however, means that working with others is an integral part of any complex task, and the prospect of technological advances only exacerbates the need to work together (Hoerr, Boggeman, Wallach, & New City School, 2010). If educators accept Gardner's theory—or even if educators simply accept that people have different talents, aptitudes, or modalities for learning, similar to multiple intelligences—then should educators not be teaching in a manner that can tap into these intelligences instead of relying on one of them while neglecting the others (Picciano, 2011)?

Computer technology has proven to be an excellent tool to differentiate instruction using Gardner's multiple intelligence theory. A curriculum that incorporates both Gardner's multiple intelligence theory and technology can create expanded learning opportunities for students (McCoog, 2007). The use of multimedia can assist with achieving mastery of skills for all types of students. Educators have been using slide projection, film, videotape, and videodisc for decades to enhance student interest

(Picciano, 2011). Students with strong interpersonal attributes can use computer technology for Internet research, journaling, and word processing. Using the Internet can assist students with research and completion of courses that might not be offered.

Technology can serve as an alternative method of providing instruction to students. A survey conducted by Parsad and Jones (2005) asked public schools to report various ways they used the Internet to provide opportunities and information for teaching and learning; results indicated that "[a] thirty-two percent provided access for online distance learning for courses that are otherwise unavailable at the school; [b] secondary schools were more likely to provide access for students to online distant learning (57 vs. 24 percent)" (p. 10).

Technology in the classroom serves as a motivator in providing a meaningful learning environment that enhances student achievement. Students are motivated because technology is a part of their daily lives. It provides an authentic learning environment that mirrors the student environment. Authentic learning environments mirror the types of activities that individuals do in real-life situations. In authentic learning, students use computers as cognitive tools to enhance the learning experience and increase student achievement.

Student Achievement

Simulation software is used to create a real-life situation that could not be replicated in the classroom. Wenglinsky (1998) assessed the effects of simulation and higher order thinking technologies on a national sample of 6,227 fourth graders' and 7,146 eighth graders' mathematics achievement on the National Assessment of Educational Progress (NAEP). Control variables in the study included socioeconomic

status, class size, and teacher characteristics. According to Langer and Boris-Schacter (2003), Wenglinsky found that eighth-grade students who used simulation and higher order thinking software showed gains of up to 15 weeks above grade level as measured by the NAEP. Students interact within a simulation that influences decisions and outcomes often used to develop higher order thinking skills (Picciano, 2011). Additionally, Wenglinsky determined that higher order use of computers and professional development were positively related to academic achievement in mathematics for both fourth- and eighth-grade students.

The Apple Classrooms of Tomorrow (ACOT) project set out to investigate how routine use of technology by teachers and students would affect teaching and learning (Sandholtz, Ringstaff, Dwyer, & Cuban, 1997). The ACOT project was a 5-year initiative that documented the impact of technology at five school sites in California, Tennessee, Minnesota, and Ohio. ACOT equipped each classroom with a variety of hardware and software, and each teacher received two computers for home and work use. ACOT staff provided training for teachers on telecommunications, basic troubleshooting, and tool software such as spreadsheets, databases, and graphic programs (Sandholtz et al., 1997). During the 5-year period, comparisons were made of (a) ACOT students' basic skills performance to nationally reported norms, (b) ACOT students' progress and achievement over time, and (c) ACOT teachers' teaching practices (Langer & Boris-Schacter, 2003). The ACOT experience appeared to result in new learning experiences requiring higher level reasoning and problem solving. The ACOT research supported the following conclusions:

1. Students, especially those with few advantages in life, learn basic skills—reading, writing, and mathematics—better and faster if they have a chance to practice those skills using technology.
2. Technology engages students, and as a result they spend more time on basic learning tasks than students who use more traditional approaches.
3. Technology offers educators a way to individualize curriculum and customize it to the needs of the individual students so all students can achieve their potential.
4. Students who have an opportunity to use technology to acquire and organize information show a higher level of comprehension and greater likelihood of using what they learn later in their lives.
5. By giving students access to a broader range of resources and technologies, students can use a variety of communication media to express their ideas more clearly and powerfully.
6. Technology can decrease absenteeism, lower dropout rates, and motivate more students to continue on to college.
7. Students who regularly use technology take more pride in their work, have greater confidence in their abilities, and develop higher levels of self-esteem. (Sandholtz et al., 1997, p. 4)

ACOT had a positive impact on student attitudes and an impact on changing teacher instructional practices toward more cooperative group work and less teacher stand-up lecturing.

Although integrating technology requires significant commitment of both fiscal and human capital, the benefits for students are worth the investment. A leadership challenge to incorporate any innovation is the ability to forecast predictable barriers in the implementation process and to proactively address those rather than to wait and react when those circumstances arise. A proactive leadership style tends to involve more group collaboration and consensus, which lead to more commitment to the change. A reactive leadership style tends to reflect more crisis management and directive leadership behaviors, which tend to result in more resistance to the change. Therefore, an awareness of the dynamics and stages of change is a critical component to successfully implementing an innovation. Another inherent challenge for those working

with technology is to remain current with all the innovations in technology (Hughes, McLeod, Dikkers, Brahler, & Whiteside, 2005). One of the core traits associated with a position of leadership in the 21st century is to be an agent of change—predict it and prepare for it.

Change Models in Education

School reform initiatives and NCLB have led to expectations of educators in organizations to create cultures that facilitate student achievement. In light of the trends toward change in the work force and the world, there is a need for leadership that is adaptive and flexible (Bass, Jung, Avolio, & Berson, 2003). "Adaptive leaders work more effectively in changing environments by helping make sense of challenges and then responding appropriately to the challenges" (Bass et al., 2003, p. 207).

Successful initiatives require collaboration from all key stakeholders involved in the innovation for change. The transformational leadership style is different from the style typically seen in public schools today. Traditional leaders are grounded both in philosophy and practice in a model centered on business practices that were created during the industrial age, with its characteristics of hierarchal centralization, specialized job functions, and standardized roles and relationships (Fairman & McLean, 2003).

According to Creighton (2011), "transformational leadership is considered essential when the goal is systemic change and reform, such as integration of teaching, learning, and technology" (p. 19). These goals are attained when the followers act in a manner that reflects the values, motivation, wants and needs, aspirations, and expectations of both leaders and followers. The genius of leadership lies in the manner in which leaders perceive and then act on their own and their followers' values and

motivations. The focus of their leadership is change, both extrinsic and intrinsic. Transformational leadership has at its end fundamental changes in individuals, organizations, and society (Sparks, 2007).

Administrators provide teacher leaders with more authority, time, and resources to develop leadership roles (Doyle, 2004). Transformational leadership focuses on developing the organization's capacity to innovate (Hallinger, 2003). The entire learning community takes a stake in a shared vision and commitment toward school improvement.

Principles of Change

Effective change requires the leader to focus on the context in which he or she will approach change. *Leadership* is defined as the process of influencing the activities of an individual or groups in efforts toward goal achievement in a given situation (Harris, 1987). G. Hall and Hord (2006) identified and defined 12 principles of the change process in which researched patterns have been observed when an innovation is implemented:

1. "Change is a process, not an event" (p. 4). Change does not occur overnight and should not serve as a quick fix.
2. "There are significant differences in what is entailed in development and implementation of an innovation" (p. 5). Development includes all the steps and actions involved in creating, testing, and packaging an innovation, whereas implementation includes all the steps and actions involved in learning how to use it (G. Hall & Hord, 2006).

3. "The organization does not change until the individuals within it change" (p. 7). The stakeholders must have buy-in and gain an internal sense of ownership in the change taking place.
4. "Innovations come in different sizes" (p. 7). Each innovation must be approached differently depending on the size and complexity. Large-scale innovations require major changes in the roles of teachers, principals, and schools; take 5–8 years to implement; and demand specialized training and ongoing consultation (G. Hall & Hord, 2006).
5. "Interventions are the actions and events that are key to the success of the change process" (p. 8). An intervention may arise in the form of staff development workshops and training sessions for teachers.
6. "There will be no change in outcomes until new practices are implemented" (p. 9). Continuous improvement is essential in meeting the needs and demands of internal and external factors.
7. Administrator leadership is essential to long-term success. A collaborative approach toward change is vital to any innovation or change. A central theme of advocates for bottom-up change is that those nearest the action have the best ideas of how to accomplish the change (G. Hall & Hord, 2006).
8. "Mandates can work" (p. 11). A mandate is one kind of strategy that is used widely (G. Hall & Hord, 2006). A district-wide online grade book is an example of a mandate that can lead to increased productivity use.

9. "The school is the primary unit for change" (p. 12). The stakeholders at a school site have the power to make an innovation succeed or fail.
10. "Facilitating change is a team effort" (p. 12). Effective change cannot take place unless there is stakeholder buy-in and internalization of the innovation.
11. "Appropriate interventions reduce the challenges of change" (p. 13). A key to successful implementation of change is to understand the need for the change and the reasons behind resistance to the innovation. Appropriate action must be taken to alleviate the resistance.
12. "The context of the school influences the process of change" (p. 14). The physical features, such as size and arrangement of the facility, and the people factors, which include the attitudes, beliefs, and values of the individuals involved, are important dimensions to consider when implementing change (G. Hall & Hord, 2006).

The Hall Innovation Category Scale

Change is a process, and the school administrator can monitor implementation of an innovation by observation of stakeholders. Hall created a scale of attitudes and strategies to use during the change process (Cambron-McCabe, Cunningham, Harvey, & Koff, 2005). Table 5 outlines the stages of the scale and provides examples of behaviors or strategies during each stage.

Table 5. *The Hall Innovation Category Scale*

Level	Name	Example
		Talking
0	Cruise Control	Teacher in same classroom for many years
1	Whisper	Commission reports
2	Tell	New rules and more regulation of old practices
3	Yell	Prescriptive policy mandates
		Tinkering
4	Shake	Revise curriculum
5	Rattle	Change principal
6	Roll	Change teacher's classroom
		Transforming
7	Redesign	Integrated curriculum
8	Restructure	Differentiated curriculum
9	Mutation	Changing role of school board
10	Reconstruction	Local constitutional convention

Stages of Concern

In 1970, Fuller conducted an in-depth study of student teachers to examine stages of concern (Cambron-McCabe et al., 2005). The study began when Fuller wanted to understand why three students found her class relevant when the other 97 found it to be "irrelevant" or a "waste of time" (as cited in Cambron-McCabe et al., 2005, p. 113). She determined three stages of concern: self-concerns, task concerns, and impact concerns. Self-concerns do not revolve around teaching or learning; task concerns show up after students have entered student teaching (Cambron-McCabe et al., 2005). Impact

concerns are the desired goal because the teacher is focused on student learning and achievement. Building on this foundation, University of Texas at Austin researchers developed a seven-stage typology of stages of concern (Cambron-McCabe et al., 2005):

Awareness

0. Little concern about or involvement with the innovation.

Self Concerns

1. Informational—"A general awareness of the innovation and interest in learning more about it" (p. 222). These people seem unworried about themselves in relation to the innovation. They are interested in substantive aspects of the change, such as general characteristics, effects, and requirements for use.
2. Personal—"Individuals are uncertain about the demands of the innovation or inadequacy to meet those demands" (p. 222). Anxiety exists about role in innovation, including relation to the organization's reward structure and decision making. Financial and status implications of the innovation for self and colleagues may be an issue.

Task Concerns

3. Management—"Attention focused on processes and tasks using the innovation and the best use of information and resources" (p. 223). Issues related to efficiency, organizing, managing, scheduling, and time demands are at the forefront.

Impact Concerns

4. Consequence—"Attention is directed at impact of information or immediate clients or students" (p. 223). This is an outward-looking concern; the focus is on relevance of innovation for students before teachers, evaluation of outcome related to performance and student competencies, and changes needed to increase student success.
5. Collaboration—"The focus is on coordination and cooperation with others regarding use of the innovation" (p. 223).
6. Refocusing—"The focus is on exploring the more universal benefits of the innovation, including the possibility of major changes or replacement with a more powerful alternative" (p. 223). Individuals have definite ideas about the existing form of the innovation and about alternatives that might be proposed.

Understanding the change process is less about innovation—the actual technology in the classroom—and more about innovativeness—how the teacher applies or integrates the technology into the curriculum (Fullan, 2008). Planning and implementing change can assist in sustaining a technology innovation. Change cannot be controlled, but leadership can make a difference in intervening and making adjustments to internal and external demands of change. Fullan (2008) identified several components to assist leaders through change:

1. The goal is not to innovate the most.
2. It is not enough to have the best ideas.
3. Appreciate the implementation dip.

4. Redefine resistance.
5. Reculturing is the name of the game.
6. Never a checklist, always complexity.

Change cannot occur in isolation or by one individual. It takes the entire learning community to make it effective. Fullan (2001) stated,

> Leading in a culture of change means creating a culture (not just a structure) for change. It does not mean adopting innovations, one after another; it does mean producing the capacity to seek, critically assess, and selectively incorporate new ideas and practices—all in time, inside the organization as well as outside it. (p. 44)

Therefore, school administrators must understand the cycle of change and develop leadership traits to effectively impact change. In addition to recognizing and coordinating change in school settings, the school administrators must demonstrate skill sets that empower stakeholders to embrace the innovation. There is an expectation for collaborative planning to provide a functional technology infrastructure with adequate access and training for the staff, including teachers and students who would be using the technology (Valdez, 2004).

Technology Standards for Administrators

The role of the school principal has transformed from manager to instructional leader. The role of the instructional leader includes understanding the systems that must be in place to provide learning experiences that integrate technology. The integrity of the learning environment depends on the principal having an understanding of teaching and learning (Papa, 2011). The ISTE developed the NETS-A, recommended standards that administrators should develop or possess that lead to implementation of effective and innovative technology programs. The updated NETS-A provide a framework for

school leaders to follow as they transition schools from the instructional age to the digital age of learning (ISTE, 2012). The NETS-A are grouped into five categories that emphasize educational administrators' abilities to facilitate systemic growth:

1. **Visionary Leadership.** Educational Administrators inspire and lead development and implementation of a shared vision for comprehensive integration of technology to promote excellence and support transformation throughout the organization.
2. **Digital-Age Learning Culture.** Educational Administrators create, promote, and sustain a dynamic, digital-age learning culture that provides a rigorous, relevant, and engaging education for all students.
3. **Excellence in Professional Practice.** Educational Administrators promote an environment of professional learning and innovation that empowers educators to enhance student learning through infusion of contemporary technologies and digital resources.
4. **Systemic Improvement.** Educational Administrators provide digital-age leadership and management to continuously improve the organization through the effective use of information and technology resources.
5. **Digital Citizenship.** Educational Administrators model and facilitate understanding of social, ethical, and legal issues and responsibilities related to an evolving digital culture. (ISTE, 2012, pp. 12–13)

When the NETS-A were updated, essential conditions were added to assist administrators in creating a culture that ensured successful implementation of the standards. The NETS-A added profiles for campus leaders and essential conditions for successful implementation of the standards (ISTE, 2012). The essential conditions for successful implementation of the NETS-A are as follows:

1. Shared vision
2. Empowered leaders
3. Implementation planning
4. Consistent and adequate funding
5. Equitable access
6. Skilled personnel

7. Ongoing professional development
8. Technical support
9. Curriculum framework
10. Student-centered learning
11. Assessment and evaluation
12. Engaged communities
13. Support policies
14. Supportive external context

Administrators who effectively integrate technology into the instructional process usually do the following:

1. Assist teachers in using technology to access, analyze, and interpret student data performance, and in using results to appropriately design, assess, and modify student instruction.
2. Collaboratively design, implement, support, and participate in professional development for all instructional staff that institutionalizes the effective integration of technology for improved student learning. (ISTE, 2012, p. 4)

The technology standards for school administrators and essential conditions are the first step to defining the specifics of what administrators need to know and be able to do in order to effectively integrate technology into learning environments (Creighton, 2003). Administrative support is essential to ensuring that technology integration is implemented and sustained. Administrators must model and participate in professional development that embraces technology integration and develops leadership skills to successfully implement a technology-rich learning environment. It is imperative that successful principals be strong instructional leaders (Zepeda, 2007) who are highly knowledgeable in the research of current teaching practices, especially in the field of technology.

Professional Development for School Administrators

Learning external to the job can represent a useful input, but if it is not in concert with learning in the setting in which one works, the learning will be superficial (Fullan, 2008). In addition to providing professional development for their staff, school principals must be trained to ensure that technology is used effectively to create new opportunities for learning and to promote student achievement.

Professional development opportunities are the change necessary to improve principals' technology competencies and help them understand the role of technology leadership (McGarr & Kearney, 2009). School principals must understand the importance of technology for improving school management as well as its implication for improved instruction (MacNeil & Harmon, 1998). Participating in technology-focused professional development with their teaching staff creates trust between school principals and teachers.

Organizational Health

The importance of change as a component of the conceptual framework of organizational health is demonstrated by the fact that two of the 10 dimensions that measure the health of an organization—Innovativeness and Adaptation—are change dimensions. Innovativeness measures the extent to which organizational members feel the freedom to be creative, initiate change, and take risks. In other words, the impetus for the change is internal. Adaptation measures the extent to which organizational members have the ability and willingness to cope with demands in the external environment. Therefore, with adaptation, the impetus for the change is external. Consequently, organizational members do not have control over the change demand; the

change will happen organically. Leaders and members can, however, control their response to the change demand and control the process for change.

As these dimensions relate to technology integration is schools, most would likely agree that schools have been in the adaptive mode rather than the innovative mode. Although one can identify some examples of innovative implementations, it is the general case that technology implementation in schools has not kept pace with the external environment. The adapting organization is not merely a surviving organization; through appropriate, continuous adaptations, it can become a thriving organization. The adapting organization is one that is in touch with the outside world via living data. The history of business, social, and educational institutions is replete with examples of organizations that have experienced desperate straits because of excessive internal focus—internal politics, complacency, and a members-only attitude. Adaptive leadership practices, therefore, must be externally focused, seeking to be in constant commerce with the outside world and proactively adapting to it.

In addition to society's demand for better prepared students, educators must also adapt to both the complexity and the rate of change in every aspect of the external environment. Nowhere is change more evident or more dramatic than in technology, which impacts all other environments. The urgency of coping with the exponential rate of change is made even more compelling by the globalization of technology.

Technology has allowed millions of students from developing countries to access a wealth of information and given them the ability to acquire critical problem-solving skills and effective communication strategies. This turbulent world of change has created a level playing field for education globally. The challenge for educators is

not to try to keep up with students' technological ability and the latest gadgets but rather to create relevant learning experiences where students are taught how to apply their knowledge and abilities to solve real-world problems.

This shift in thinking would necessarily result in systemic adaptations. For example, technology-focused professional development—some of which would be taught by students—could involve both teachers and students for the purpose of collaboratively planning relevant learning application experiences. Since the impetus for adaptation for an organization comes from the external environment, the challenge for leaders is to develop adequate sensors so that the change process can be anticipated and managed successfully. Leaders who have established adequate mechanisms and strategies for sensing the need for change remain in a position to be proactive rather than reactive.

Those leaders who are not sensitive to and do not anticipate the external needs for change will find themselves being blind-sided and placed in a position in which they must react to the demand. When leaders find themselves in a reactive rather than a proactive mode, they will negatively impact the quality of their organizations' health in the process. Leaders who are skillful in helping their organizations be highly adaptive can anticipate needed change and facilitate the change process in such a way that the organizations can adapt and change appropriately.

Leaders must help orchestrate and facilitate the change process regardless of the degree to which they are in a position to alter the direction, speed, and duration of the change process. Leaders whose organizations exhibit high levels of proactive adaptation have been successful in creating vision, mission, and goals that are compatible with the

needs of constituents and are in a position to delegate decision-making power to organizational members as they fulfill the vision and implement the specific strategies.

Summary

This chapter discussed the three main contexts of this study—technology integration, change models, and leadership in education and in educational technology. The chapter included the topics related to the research questions for this quantitative study. This review of literature provided readers the framework from which this study was proposed, conceptualized, and developed.

The initial thrust of technology in schools was the acquisition of the tools necessary to use technology. The second wave of technology was providing professional development for teachers and staff to use the hardware and software. Over the past decade, most of the focus in research has been devoted to technology integration by teachers. The role of the school administrator has been ignored. This contradicts a body of research that indicates how vital the school administrator is regarding continuous improvement and student achievement (Marzano et al., 2005).

NCLB, fiscal accountability, and other external demands have highlighted the need to understand the characteristics of effective leadership and meaningful technology integration. The literature supported the importance of learning about and using technology in schools and demonstrated how technology can have a positive impact on student learning. The literature on technology integration in schools and teacher use of technology included information on the importance of technology, professional development, student learning needs, and tools that leaders can use to implement change in school settings.

Much of the literature reviewed in this chapter presented theory and observations of leaders in technology and was not based on any quantitative statistical measures. "The research clearly shows that administrative leadership has a direct impact on all successful school reform, including the quantity and quality of technology use in schools" (Brooks-Young, 2006, p. 2). Administrative support is critical for effective school reform, especially reform concerning the integration of computer technology (Brooks-Young, 2002).

"Quality technology integration in schools is likely to be determined through the caliber of the leadership directed to sustain it" (Leonard & Leonard, 2006, p. 223). The literature recognized the diverse role and responsibilities of administrators in the field of education as well as the importance of their involvement. "Ongoing research is needed to understand the evolving role, competencies and dispositions toward technology and learning that principals require in order to be effective technology leaders, and how these are best developed and supported in practice" (Flanagan & Jacobsen, 2003, p. 140). Therefore, more research is needed. Because technology is changing at an ever-increasing pace, this study contributes to the growing research of school administrators as technology leaders and the determining characteristics that can lead to professional development or school structures that are conducive to integrating technology into the curriculum.

CHAPTER 3. DESIGN

Introduction

Chapter 3 describes the research design of the study, including the methods used to answer the research questions. The research method selected was based on the research problem and the population the researcher wanted to study (Creswell, 2003). The study assessed the relationship between technology integration and technology leadership behaviors with principals in an educational setting. The study determined whether organizational factors, demographic settings, professional development, and personal factors are related to organizational health dimensions.

Research Questions

1. How do school principals use technology professionally?
2. How do urban school principals perceive their technology integration performance?
3. What is the level of organizational health of schools in an urban district across each of the following dimensions:
    a. Goal Focus
    b. Communication Adequacy
    c. Optimal Power Equalization
    d. Resource Utilization
    e. Cohesiveness
    f. Morale
    g. Innovativeness
    h. Autonomy

i. Adaptation

j. Problem-solving Adequacy

4. Are there differences in school organizational health among school principals' perceptions of their leadership competencies in each of these dimensions:

   a. Goal Focus

   b. Innovativeness

   c. Autonomy

   d. Adaptation

Data Collection

Descriptive and inferential statistics were used to address the research questions. Data were collected using two surveys. The descriptive research design involved the use a technology survey originally developed in Texas. The survey was originally called the Survey of Technology Competency and Proficiency and then renamed the National Educational Technology Standards for Administrators (STCP-NETS-A) survey. The Organizational Health Instrument (OHI) was used for each participating urban school to examine a relationship to culture and student achievement.

Separate survey data from the OHI were collected in Oklahoma City Public Schools (OCPS) district and Victoria Independent School District (VISD) during the 2008–2009 school year. The participants and school sites were selected based on their completion of the STCP-NETS-A survey. Percentile scores in each of the 10 dimensions were displayed graphically and descriptive statistics were used to describe patterns, means, medians, standard deviations for each response indicator, and levels of

statistical significance. A frequency distribution was calculated to describe each dimension. The frequency distributions are displayed in table format in Chapter 4.

Data Collection Procedures

STCP-NETS-A

Quantitative data were collected through the administration of two surveys. The STCP-NETS-A was administered to all school principals in a large urban school district in Oklahoma City, Oklahoma. An e-mail requesting permission to use and modify the STCP-NETS-A was sent to Dr. Mark Weber (see Appendix A). The survey, developed by Weber (2006), was based on the National Educational Technology Standards for Administrators (NETS-A) and was designed to measure principals' level of computer technology use, their level of participation in the leadership practices as defined by the NETS-A, and to what extent organizational and personal factors—based on adoption, change, and innovation theory—may affect principals' computer technology use and behaviors related to technology integration leadership practices as defined by the NETS-A. The survey also measured whether principals' level of computer technology use and level of participation in the NETS-A technology integration leadership practices correlate.

All items on the survey were taken directly from the NETS-A and were divided into four sections. Part I of the STCP-NETS-A asked the respondents to select the frequency use for specific computer technology applications. Thirteen questions were adapted from Ury's 2003 survey to query the principal about the frequency of technology use (daily, weekly, monthly, seldom, and never) regarding particular computer applications (ISTE, 2002). Part II of the survey examined the participants'

technology training; Items 14–27 asked principals where they had received their computer technology training, how many hours of training they had received, and whether the training was computer use training or technology integration training (Weber, 2006).

Part III of the STCP-NETS-A is identical to the Survey of Technology Standards for School Administrators in that both surveys contain 16 questions designed to gather Texas elementary public school principals' opinions about their perceived technology integration leadership performance in six general areas of job-related technology leadership defined by the NETS-A. A 4-point Likert scale with possible responses of *strongly disagree*, *disagree*, *agree*, and *strongly agree* was used on Part III of the STCP-NETS-A to measure responses. Respondents' answers were converted to a scale ranging from 1 (*strongly disagree*) to 4 (*strongly agree*). Additionally, Part III of the instrument asked principals about their perception of risk involved in technology integration implementation. The principals were also asked about their preferred type of networking contacts, the amount of their perceived pressure regarding implementation of technology integration on their campus, and their perceived level of acceptance and participation in the NETS-A technology leadership practices (Weber, 2006).

Part IV of the STCP-NETS-A asked participating principals for geographical information pertaining to their campus. Also included were questions about organizational factors such as school location, spending per pupil, student ethnicity, and student socioeconomic status (Weber, 2006).

Weber (2006) used descriptive statistics to profile technology use and perceived technology integration leadership performance for dependent variables (Items 1–13 and

Items 32–47). A multiple analysis of variance was conducted to compare mean scores. The dependent variables included the 13 variables of technology use; the independent variables included the mean scores from the organizational factors.

Composite scores were created for each participating principal for each of the personal factors of technology training, risk–benefit, networking preferences, perceived pressure to integrate technology, personal technology use, and technology leadership practices as defined by the NETS-A. The composite scores were calculated by adding each principal's responses from the survey items to represent one of the five personal factors mentioned previously. The principals' composite scores were used to conduct a multiple regression analysis to explore the relationship between personal factors and principals' technology use.

The multiple regression analysis was conducted using the composite scores from each principal as a criterion variable. The predictor variables were the personal factors. This analysis determined which predictor variables or personal factors have the most influence, if any, on the criterion variable composite score for technology use (Weber, 2006). Lastly, Weber (2006) used a Pearson *r* correlation coefficient to determine the relationship between principals' responses to both dependent variable groups of technology use and perceived technology integration leadership performance.

The STCP-NETS-A was distributed to 800 elementary principals in public school districts in the state of Texas. A total of 220 responded, resulting in a 27.5% return rate. Four of the responses were rejected because of incomplete answers to survey items. The resulting sample included 216 usable surveys for the study, or a 27% usable survey response rate (Weber, 2006).

OHI

To examine the STCP-NETS-A data in relation to culture and student achievement, the researcher examined OHI survey information to describe and correlate data. Additionally, data were examined to correlate scores that were statistically significant. Data from the OHI have consistently demonstrated that each of the 10 dimensions of health and the composite health scores produce correlation coefficients with student achievement scores that are statistically significant. The level of significance in urban schools is typically .001 (Fairman & McLean, 2003).

Organizational health was initially defined by Matthew Miles, from Columbia University, as an organization's ability to function effectively, to cope adequately, to change appropriately, and to grow from within. He theorized that the level of organizational health was very important because it would help determine the level of success of any planned change effort and would help predict the productivity of an organization.

Furthermore, Miles identified 10 key dimensions of organizational health. With Miles's permission and encouragement, Fairman and McLean (2003) embarked upon a rigorous 3-year, three-phase process for operationally defining this important organizational concept. The OHI consists of 80 statements, eight for each of the 10 dimensions. All members of a work unit respond to these questions, and data collection procedures are established and followed that preserve the integrity of the data.

Response choices are *strongly agree*, *agree*, *undecided*, *disagree*, and *strongly disagree*. Based on these collective responses, raw scores are established for each of the 10 dimensions. The raw scores are converted into percentile scores. With a national

database that spans 3 decades, the Organizational Health Diagnostic and Development Corporation (OHDDC) has established group norms for key leadership groups throughout the public and private sectors. In the public school sector, group norms have been established for Elementary Schools, Middle Schools, Junior High Schools, Senior High Schools, Alternative Schools, Central Office Administrative Units, Superintendents, Policy Teams, Non-certified units, and School Community (parents).

For the past 5 years, OCPS has partnered with the OHDDC to incorporate their school climate improvement process as a leading indicator of student performance. The VISD has used the survey for the past 6 years. The OHI is the diagnostic tool that is used annually to elicit faculty perceptions of the internal workings of their school along 10 dimensions of health. Based on the composite feedback from each school, dimensions of strength and improvement are identified.

The organizational health process then provides a collaborative process that involves the campus and district leaders in developing improvement systems, structures, and strategies. Organizational health, therefore, provides a systematic process for building school leadership capacity (Fairman & McLean, 2003). The OHI consists of 80 items that are correlated to 10 dimensions to produce a composite score in each dimension. The dimensions are described as follows:

1. Goal Focus—the ability of persons, groups, or organizations to have clarity, acceptance, support, and advocacy of goals and objectives.
2. Communication Adequacy—exists when information is relatively distortion-free and travels both vertically and horizontally across the boundaries of an organization.

3. Optimal Power Equalization—the ability to maintain a relatively equitable distribution of influence between leaders and team members.
4. Resource Utilization—the ability to coordinate and maintain inputs, particularly personnel, effectively with a minimal sense of strain.
5. Cohesiveness—exists when persons, groups, or organizations have a clear sense of identity. Members feel attracted to the membership in an organization. They want to start with it, be influenced by it, and exert their own influence within it.
6. Morale—the state in which a person, group, or organization has feelings of well-being, satisfaction, and pleasure.
7. Innovativeness—the ability to be and allow others to be inventive, diverse, and risk taking.
8. Autonomy—the state in which a person, group, or organization has the freedom to fulfill their roles and responsibilities.
9. Adaptation—the ability to tolerate stress and maintain stability while coping with the demands of the environment.
10. Problem-solving Adequacy—an organization's ability to perceive problems and solve them with minimal energy. The problems stay solved and the problem-solving mechanism of the organization is maintained and/or strengthened (Fairman & McLean, 2003).

The survey was completed by certified personnel and the administrator. Administrators respond to the survey items based on how they would expect their staff to answer. Response options are on a continuum from *strongly disagree* to *strongly*

agree. A line graph based on raw scores is generated comparing the leader's expectations with the composite average of the staff. This provides a reality check for the leader. A "thirds" line graph is generated by charting the third with the most positive responses, the third with the most negative responses, and a middle third based on the composite. The "thirds" line graph, therefore, is an indicator of whether the top third or bottom third has the greater influence on attitudes.

School data are also reported on a normed basis reflecting the percentile score for each organizational health dimension. These data are reported using a bar graph that depicts the relationship between the 10 dimensions and that clearly describes the health of the campus. Multiple-year bar graphs are also generated to show the longitudinal impact of organizational health improvement efforts.

Research Population

Two urban school districts were selected for this study: OCPS and VISD. These two districts were selected because both districts have similar demographics and are urban districts. Additionally, both school districts participate in the OHI process on an annual basis. The OCPS has collected and reported OHI data since 2003. These organizational health data have consistently correlated with student performance at the .001 level in the OCPS district. The VISD has collected and reported OHI data since 2006. Based on a 5-year average of OHI data, the dimensions of Goal Focus, Cohesiveness, and Adaptation had the highest correlation coefficients with student achievement and were statistically significant at the .001 level. Six of the dimensions and the total OHI score were statistically significant at the .01 level, and one dimension

was statistically significant at the .05 level. OHI data were used for the inferential component of this research study.

OCPS

OCPS has been providing services to stakeholders since 1891. The district, which covers 135 square miles, includes the municipalities (or parts) of Oklahoma City, Nicoma Park, Spencer, Nichols Hills, The Village, Midwest City, Del City, and Valley Brook, providing educational services to a highly mobile, highly impoverished clientele. Almost all (91.2%) of the students within the district receive free or reduced meal services; 13% have Individualized Educational Plans; and 28% speak a language other than English at home, which represents more than 50 native languages.

OCPS is an urban district serving 43,000 students and employing 131 school principals, 86 central office administrators, 2,575 certified employees, 182 professional or technical staff, and 1,584 support staff. To accommodate and provide educational services to all students, the school district relies on federal support such as Title I money. NCLB is the driving force in the education of students, and to some extent determines federal funding. In 2011–2012, the district general fund revenue was $307,779,463.24, with a per-pupil average daily membership of $8,112 (OCPS, 2012). The OCPS passed a bond issue on October 9, 2007, that added more technology funding for future technology initiatives.

The district has a technology plan that guides expenditures of Metropolitan Area Projects initiatives. E-Rate and General Fund spending reflect long-term goals of the initiatives. A city trust works with OCPS staff members to ensure the money is spent as

originally intended. The district has a large investment as a result of this funding. The expectation is high to see results from this initiative.

VISD

VISD is located in Victoria, Texas. The VISD has a population of approximately 62,000 residents (Fairman & McLean, 2013). In 2005–2006, VISD had a financial base of $237,824 per student, compared to the state average of $260,579 (Fairman & McLean, 2013). Per-child expenditure was $7,314, compared to the state average of $7,229.

VISD has 18 elementary schools and 11 secondary schools. In 2010–2011, 65.1% of the students within the school district received free or reduced meal services. Ethnicity has changed from 2005–2006 to 2010–2011: Hispanic, from 54.5% to 60.9%; White, from 35.2% to 28.8%; Black, from 8.9% to 8.2%; and Other, from 1.3% to 2.2% (Fairman & McLean, 2013).

Demographics and statistical data in the study determined both sites to be urban school districts, with both districts using the organizational health process on an annual basis. Criterion for selection of public schools was location in both Oklahoma and Texas urban districts. The study included 98 school administrators in both urban districts. Participating administrators may or may not have had an assistant principal.

Methods and Procedures

To proceed with the research study, the University of Oklahoma Institutional Review Board (IRB) application was submitted for the survey deployment immediately following the committee's approval of the research proposal. The IRB application was submitted in the spring of 2009. Final approval was obtained May 14, 2009 (see

Appendix B). A permission to complete the study in each urban district was immediately sent (Appendix C). After approval of the research from district leadership (Appendices D and E), the survey was sent to all administrators in both districts.

The researcher administered the survey with OCPS and VISD elementary and secondary principals. Surveys were sent to 72 sites in OCPS and 24 sites in VISD. All participants received a cover letter (Appendix F), informed consent forms (Appendices G and H), and a survey appropriate for their district (see Appendices I and J). All survey responses were kept confidential. Respondents had 2 weeks to complete the survey; follow-up e-mail reminders were sent to both districts.

The permission cover letter contained five major elements to provide an understanding of the research study:

- Importance of participants. To encourage participants to complete the questionnaire, they needed to know why they received the instrument. The first few sentences indicated the importance of recipients and the value of their participation.
- Purpose of the study. A statement was included regarding the intent or purpose of the study. This statement not only informed the participant about the nature of the study, but it also fulfilled an important "informed consent" provision identifying the purpose of the study for participants.
- Assurance of confidentiality. To comply with informed consent and to be ethical, the investigator assured the individual of confidentiality.
- Sponsorship. The cover letter included the name of the participant's advisor and institution.

- Completion time and returns. The letter included an estimate of the amount of time the survey would take to be completed and the procedure for returning the instrument to the researcher (Creswell, 2008).

The STCP-NETS-A asked the participants to identify their school site. The identification allowed the researcher to pull OHI data for that specific school site. OHI data were pulled for schools that completed the STCP-NETS-A. All of the raw data that potentially identify participants will be destroyed upon completion of the research and dissertation process. The consent form explained the process of maintaining confidentiality and security of information, such as keeping materials in a locked cabinet and reporting of information without identifying participants.

Research Questions

1. How do school principals use technology professionally?
2. How do urban school principals perceive their technology integration performance?
3. What is the level of organizational health of schools in an urban district across each of the following dimensions:
   a. Goal Focus
   b. Communication Adequacy
   c. Optimal Power Equalization
   d. Resource Utilization
   e. Cohesiveness
   f. Morale
   g. Innovativeness

h. Autonomy

i. Adaptation

j. Problem-solving Adequacy

4. Are there differences in school organizational health among school principals' perceptions of their leadership competencies in each of these dimensions:

    a. Goal Focus

    b. Innovativeness

    c. Autonomy

    d. Adaptation

Data Analysis and Variables

Analysis of data for the study involved descriptive and inferential statistics using SPSS 17.0. Data analysis involved the systematic analysis of survey results regarding level of principals' use of technology and their perceived technology leadership performance. Analysis included reviewing the schools as an entire group and then separating those groups by job position (e.g., principal, assistant, etc.).

OHI data for each participating school were displayed across each of the 10 dimensions. The primary focus was analysis of the differences between perceived technology integration and organizational health dimensions. Analysis included a series of analysis of variance (ANOVA) tests. To understand the data, tables and figures were created as part of the analysis.

Entry of data immediately followed data collection from each participant in order to minimize the potential for error. Conducting descriptive analysis validation

allowed checking for accuracy of data entry, since responses should fall within the parameters of the Likert-type scale. Data were entered into Microsoft Excel, then uploaded to SPSS for review. Analysis included reviewing the schools as an entire group and then separating those groups by job position (e.g., principal, assistant, etc.).

Research Questions 1 and 2 looked at the level of frequency in performing tasks using a computer and principals' perceptions of their technology integration leadership performance. Participants responded using a 5-point Likert scale. The researcher combined questions from Research Question 1 from *daily* and *weekly* to form *at least weekly* versus *monthly or less* with respondents answering *at least weekly* in their responses and combined *agree* and *strongly agree*, as well as *disagree* and *strongly disagree*, to form *agree* versus *disagree* to answer Research Question 2. For review of the survey data, descriptive analysis, such as percentages, means, and standard deviations, and item analysis were used.

Research Question 3 determined the level of organizational health of schools that participated and completed the STCP-NETS-A. The data were displayed across each of the 10 dimensions using descriptive analysis, including percentages, means, and standard deviations.

In addition to descriptive analyses, survey data were analyzed using inferential statistics. An ANOVA was used to answer Research Question 4. The ANOVA was used to determine significant differences in school health among school principals' perceptions of their leadership competences in four OHI dimensions: Goal Focus, Innovativeness, Autonomy, and Adaptation. Table 6 lists the variables for the ANOVA that was completed.

Table 6. *Research Question 4 and Variables*

Independent variables	Dependent variables
Item 28: I believe technology integration will improve student learning.	OHI dimensions:
Item 29: I believe technology integration will improve school's test scores.	Goal Focus
Item 30: I believe my teachers in my school are resistant to technology integration.	Innovativeness
Item 31: I believe the money and staffing used to integrate technology take away from more important areas.	Autonomy
Item 32: I have participated in an inclusive district process through which stakeholders formulate a shared expectation for technology use.	Adaptation
Item 33: I have developed a collaborative, technology-rich school improvement plan.	
Item 34: I promote highly effective practices in technology integration among faculty and other staff.	
Item 35: I assist teachers in using technology to access, analyze, and interpret student performance data.	
Item 36: I collaborative design, implement, support & participate in professional development of staff integrating technology for student learning.	
Item 37: I currently use technology-based management systems to access and maintain personnel and student records.	
Item 38: I use a variety of media and formats to communicate and interact with peer, experts, and other educational stakeholders.	
Item 39: I provide campus-wide development for sharing work and resources.	
Item 40: I allocate campus discretionary funds to advance the technology plan.	
Item 41: I advocate for adequate, timely and high quality technology support services.	
Item 42: I promote the use of technology to analyze data to improve student learning.	
Item 43: I implement evaluation procedures for teachers that assess growth toward technology standards.	
Item 44: I include technology use in learning and teaching as criteria in assessing staff performance.	

(continued)

Table 6. *Research Question 4 and Variables*

Independent variables	Dependent variables
Item 45: I secure and allocate technology resources to meet the needs of all learners.	
Item 46: I enforce the district's acceptable use policy and other procedures related to security, copyright, and technology use.	
Item 47: I participate in the Safe, Fit, and Healthy Schools plan that focus on health and environmentally safe practices related to the use of technology.	

Summary

This study investigated the relationship between principal technology leadership and technology integration in schools. A quantitative study was used to develop an analysis of survey data from two tools. The data collection process included

- identification of participants through selection of two urban districts in Texas and Oklahoma;
- distribution of a cover letter and informed consent through postal mail to each participant; and
- completion of the STCP-NETS-A by 29 urban school principals from both districts.

Analysis of data involved an overview of the 29 urban school principals with information analyzed from each survey. OHI data were mined for each participating principal's urban school site. The data were analyzed to determine potential impact on level of technology use. To establish validity and reliability, the researcher used validated surveys that had been used in previous studies. Additionally, the OHI is

currently used in both districts that participated in this study. Both districts have been using the OHI process for over 7 years.

Chapter 4 includes the research findings of this descriptive and inferential quantitative study. The chapter also contains the analysis of the data from the STCP-NETS-A and OHI. Data collection, data analysis, and data presentations are included.

CHAPTER 4. RESULTS

Introduction

This chapter presents the results of the study and focuses on the concomitant statistical analysis. The research questions were answered using a combination of descriptive statistics and ANOVA. Participant responses to the survey instrument were collected and recorded in SPSS 17.0 for analysis.

To answer the four research questions for this study, two instruments were used to gather the data: the STCP-NETS-A, which was mailed in May 2009, and the OHI from each participating urban school, which was used to examine a relationship to culture and student achievement. The STCP-NETS-A was mailed to 98 building administrators in urban districts in Oklahoma and Texas. Data from the OHI were used to determine if there was a correlation with the items in the STCP- NETS-A that was given to the administrators from each district.

Purpose Statement

This purpose of this study was to determine the relationships between technology integration and technology leadership behaviors that exist for urban school principals in an educational setting. The study determined whether organizational factors, demographic settings, professional development, and personal factors are related to organizational health dimensions.

Research Questions

The study was conducted to answer the following research questions:

1. How do school principals use technology professionally?
2. How do urban school principals perceive their technology integration performance?
3. What is the level of organizational health of schools in an urban district across each of the following dimensions:
    a. Goal Focus
    b. Communication Adequacy
    c. Optimal Power Equalization
    d. Resource Utilization
    e. Cohesiveness
    f. Morale
    g. Innovativeness
    h. Autonomy
    i. Adaptation
    j. Problem-solving Adequacy
4. Are there differences in school organizational health among school principals' perceptions of their leadership competencies in each of these dimensions:
    a. Goal Focus
    b. Innovativeness

c. Autonomy

d. Adaptation

Description of Population and Sample

The STCP-NETS-A was mailed to 98 building administrators in urban districts located in Oklahoma and Texas. A total of 29 responded, for a response rate of 29.5%. Twenty-nine OHI surveys were identified from the school sites that participated in the STCP-NET-A survey. Table 7 presents a comparison of the participating schools' response data.

Table 7. *Respondents by Participation in STCP-NETS-A*

District	*N* principals	*n* participating principals	%
Oklahoma urban district	75	15	20
Texas urban district	23	14	61
Total	98	29	30

Of the 29 urban school principals who completed the survey, 15 were from OCPS and 14 were from VISD. The OCPS grade configuration included 11 elementary schools, one middle school, one high school, and one middle/high school from Oklahoma City. The VISD grade configuration included one Montessori school, 10 elementary schools, one middle school, one high school, and one alternative middle/high school.

The STCP-NETS-A was divided into three sections, and each section used either a 4- or 5-point Likert scale based on questions in the section.

Results

Research Question 1

Research Question 1 asked, How do school principals use technology professionally? To answer Research Question 1, urban school principals were asked to complete Part I of the STCP-NETS-A. Part I contained 13 questions that provided Likert-scale responses of *daily*, *weekly*, *monthly*, *seldom*, and *never*. The questions asked how often the responding urban school principal participated in various types of computer use. The higher the mean, the more frequent the use of the specific tool. The results are provided in Table 8.

The urban school principals used technology daily for productivity tasks. All 29 principals (100%) indicated using e-mail and sending attachments as a daily activity. Nine principals (31%) solved common printing problems, 27 (93%) rated accessing webpages as a daily activity, 24 (82.8%) use the Internet daily for a variety of reasons, 10 (34.5%) rated using technology weekly for more-complex tasks such as cropping graphics and converting files. A small number of the principals tended not to use technology for tasks related to communication and word processing. One urban school principal (3.4%) indicated using technology to create graphs from spreadsheet data daily. Finally, 25 urban school principals (86.2%) rated starting up/shutting down the computer and opening/closing applications as a daily activity.

Table 8. *Frequency of Technology Use Among Principals*

Task	Daily		Weekly		Monthly		Seldom		Never	
	n	%	*n*	%	*n*	%	*n*	%	*n*	%
Solve common printing problems	9	31	13	45	3	10	3	10	1	3
Use formulas & functions in a spreadsheet	3	10	8	28	9	31	8	28	1	3
Create a graph from spreadsheet data	1	3	13	45	7	24	8	28	0	0
Copy a graphic from a website	3	10	11	38	8	28	6	21	1	3
Send and receive e-mail messages/attachments	29	100	0	0	0	0	0	0	0	0
Access a specific webpage (URL)	27	93	1	3	0	0	1	3	0	0
Search the Internet	24	83	5	17	0	0	0	0	0	0
Create and use bookmarks/favorites in a web browser	20	69	4	14	2	7	2	7	1	3
Create an electronic presentation	4	14	10	34	11	38	4	14	0	0
Reduce, enlarge, or crop images	6	21	7	24	6	21	9	31	1	3
Start up/shut down computer, open/close application/program, insert disk	25	86	3	10	0	0	1	3	0	0
Create, copy, move, rename, delete files and folders	20	69	7	24	2	7	0	0	0	0
Cut, copy, move, rename, delete files and folders	22	76	4	14	2	7	0	0	1	3

Note. $N = 29$.

The results depicted in Figure 1 indicate that of the 29 urban school principals surveyed completed common daily tasks on a daily basis. Tasks included sending e-mails, accessing websites, searching on the Internet, and common tasks when using applications. The five least frequently used tools are tasks that could be related to creation of a project that might include more complex computer use skills.

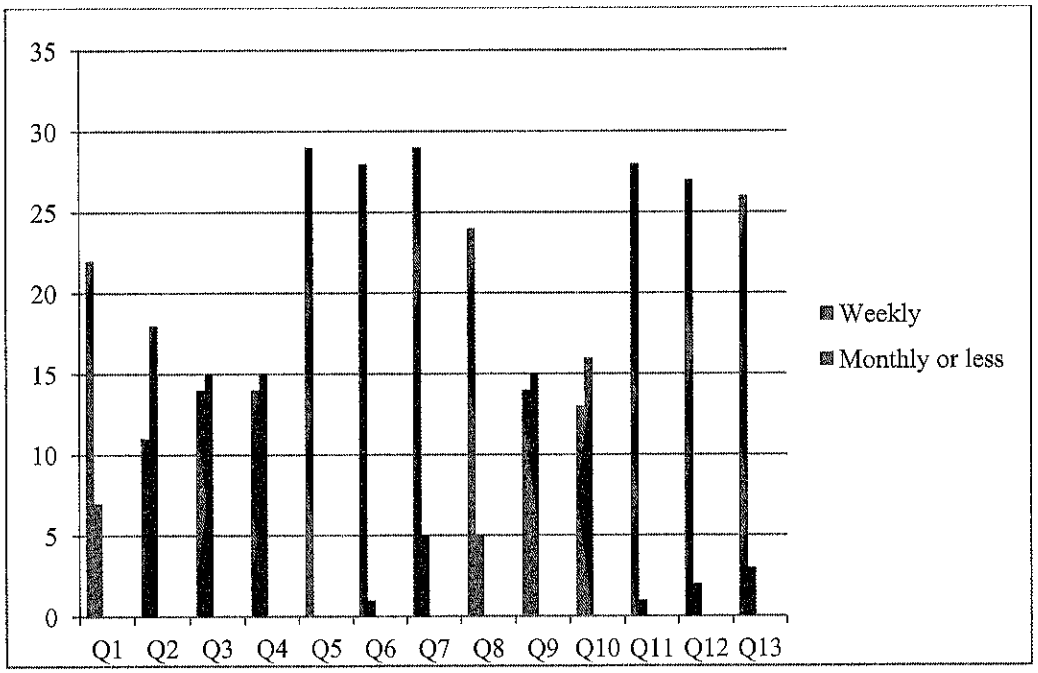

Figure 1. Frequency of technology use among principals.

Research Question 2

Research Question 2 asked, How do urban school principals perceive their technology integration performance? Urban school principals were asked to respond to Part III of the STCP-NETS-A, which contained 12 questions using a 4-point Likert scale of *strongly disagree*, *disagree*, *agree*, and *strongly agree*. Table 9 illustrates the principals' responses.

Table 9. *Perceived Technology Integration Leadership Among Principals*

Item	Strongly agree		Agree		Disagree		Strongly disagree	
	n	%	*n*	%	*n*	%	*n*	%
28. I believe technology integration will improve student learning.	21	72	8	28	0	0	0	0
29. I believe technology integration will improve my school's test scores.	16	55	12	41	1	3	0	0
30. I believe teachers in my school are resistant to technology integration.	7	24	11	38	11	38	0	0
31. I believe the money and staffing used to integrate technology take away from more important areas.	0	0	6	21	15	52	8	28
32. I have participated in an inclusive district process through which stakeholders formulate a shared expectation for technology use.	3	10	9	31	13	45	4	14
33. I have developed a collaborative, technology-rich school improvement plan.	3	11	17	61	8	29	0	0
34. I promote highly effective practices in technology integration among faculty and other staff.	5	17	21	72	3	10	0	0
35. I assist teachers in using technology to access, analyze, and interpret student performance data.	10	34	19	66	0	0	0	0
36. I collaboratively design, implement, support, and participate in professional development for instructional staff institutionalizing integration of technology for student learning.	3	10	15	52	10	34	1	3
37. I use current technology-based management systems to access and maintain personnel and student records.	12	41	17	59	0	0	0	0
38. I use a variety of media and formats to communicate and interact with peer, experts, and other education stakeholders.	14	48	11	38	4	14	0	0
39. I provide campus-wide development for sharing work and resources.	7	24	14	48	8	28	0	0

Twenty-one urban school principals (72%) strongly agreed that technology integration will improve student learning; 21 (72.4%) agreed they promote highly effective practices in technology integration among faculty and other staff. Urban school principals believe they have created a culture that promotes technology integration in their schools. Seventeen principals (58.6%) agreed they have developed a collaborative, technology-rich school improvement plan that is aligned to the district strategic plan and use current technology to access and maintain personnel and student records. Sixteen principals (55.2%) believed technology integration will improve student test scores.

Although the majority of urban school principals agreed or strongly agreed regarding their perceived technology leadership practices, sizable percentages disagreed with some items. Fifty-two percent of the principals disagreed with "I have participated in an inclusive district process through which stakeholders formulate a shared expectation for technology use." Fifteen principals (51.7%) disagreed that money and staffing used to integrate technology take away from more important areas in their schools. This variance in urban school principal agreement may be due in part to outside factors such as district processes and procedures or state and local budget needs.

Figure 2 indicates that the majority of urban school principals tended to agree with items related to technology integration in education. A sizable group of the principals did not report taking a leadership role in implementing professional development processes that support technology integration. Thirty-four percent of principals disagreed with "I collaboratively design, implement, support, and participate in professional development for instructional staff institutionalizing integration of

technology for student learning." Overall, the data indicated that school principals perceive that technology integration has a role in education and has a valued role in the school curriculum.

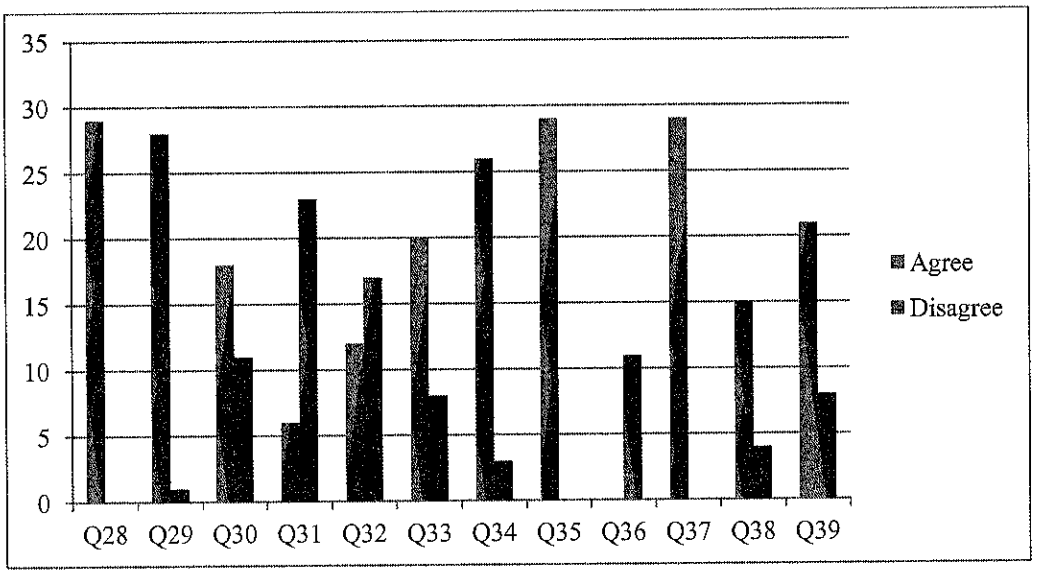

Figure 2. Organizational health data for participating school sites.

Research Question 3

Research Question 3 asked, What is the level of organizational health of schools in an urban districts? This section provides a comparison of the organizational health data from the schools that participated in the STCP-NETS-A. The OHI consists of 80 items that correlate to 10 dimensions that determine a school's culture and the overall health of the school. Each dimension contains eight questions related to that dimension. The entire teaching staff answered each question and an overall percentage was formulated for each dimension. Table 10 illustrates the organizational health of schools across various dimensions from the two participating districts.

Table 10. *Organizational Health of OCPS and VISD Across OHI Dimensions*

Dimension	*M*	*SD*	Min	Max
Goal Focus	63.00	25.72	8	98
Communication Adequacy	68.03	28.12	7	99
Optimal Power Equalization	60.76	29.13	2	96
Resource Utilization	62.93	27.42	4	98
Cohesiveness	64.41	26.47	5	97
Morale	65.55	31.33	8	99
Innovativeness	59.24	30.51	1	99
Autonomy	54.97	32.12	1	95
Adaptation	56.52	27.57	5	97
Problem-solving Adequacy	64.28	28.34	7	98

Note. $N = 29$.

The results in Table 10 indicated that Communication Adequacy had the highest mean (68.03) when all 29 schools were combined. Goal Focus and Adaptation typically have the highest level of significance to achievement, frequently .001. Autonomy is significantly related as long as it is high and balanced with Goal Focus. When Autonomy is low, it typically suggests that staff feel more accountable than responsible. When this pattern exists and Morale is high, staff members feel safe in being dependent. As long as they are being directed, they are not to blame for failure.

In these data, Innovativeness is higher than Autonomy, so the principals feel freedom to take initiative and be creative. If they have technology skills (Resource Utilization), they may feel freedom to be creative and to explore the use of such skills.

Additionally, Adaptation is lower than Goal Focus, which can indicate that staff may not be receiving the help and support needed to implement Goal Focus expectations. When this pattern exists, Innovativeness may be higher because highly committed staff may be trying to figure it out on their own. This can be the case particularly if teachers are expected to integrate technology but are not getting the needed training.

Other patterns suggest that trust among staff is relatively high given high Communication Adequacy and Cohesiveness. However, trust between administration and staff is generally lower, since Optimal Power Equalization is lower than Goal Focus. When administrators do not trust, they are unlikely to grant freedom (Autonomy). With Communication Adequacy and Problem-solving Adequacy as strengths, it is likely that staff are relatively satisfied (Morale) with how problems are being addressed on campus. The mean scores for all 10 dimensions were similar. The lowest mean was Autonomy, which is one of the big four dimensions discussed for Research Question 4.

Research Question 4

Research Question 4 asked, Are there differences in school organizational health among school principals' perceptions of their leadership competencies in each of these dimensions: (a) Goal Focus, (b) Innovativeness, (c) Autonomy, (d) Adaptation? These dimensions are indicators of student achievement. If the data in all 10 dimensions have a high percentage and balance, then high student achievement should be taking place at the school. Innovativeness and Autonomy correlate with technology integration.

An ANOVA was performed for Items 28–33 in the STCP-NETS-A and the four organizational health dimensions (see Table 11).

Table 11. *Research Question 4 ANOVA Results for STCP-NETS-A Items 28–33*

	Strongly agree		Agree		Disagree		Strongly disagree		ANOVA results	
Item	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*F*	Sig.
Item 28	I believe technology integration will improve student learning.									
Goal Focus	65.19	23.56	57.13	31.72					0.56	0.460
Innovativeness	64.05	30.69	46.63	27.93					1.95	0.174
Autonomy	56.38	33.99	51.25	28.33					0.14	0.708
Adaptation	58.90	28.47	50.25	25.72					0.56	0.460
Item 29	I believe technology integration will improve my student's test scores.									
Goal Focus	67.31	24.38	55.25	27.07	86.00				1.19	0.322
Innovativeness	69.19	46.67	46.67	28.60	51.00				2.05	0.149
Autonomy	63.38	32.49	44.25	30.90	49.00				1.26	0.301
Adaptation	62.88	27.79	47.92	27.23	58.00				1.01	0.377
Item 30	I believe teachers in my school are resistant to technology integration.									
Goal Focus	64.57	31.52	60.64	23.19	64.27	26.62			0.07	0.934
Innovativeness	72.14	35.28	54.91	27.77	55.36	30.57			0.82	0.454
Autonomy	70.57	31.95	49.55	33.56	50.45	30.41			1.10	0.348
Adaptation	66.00	32.10	52.09	24.81	54.91	28.4			0.56	0.580

(continued)

Table 11. *Research Question 4 ANOVA Results for STCP-NETS-A Items 28–33*

Item 31	I believe the money and staffing used to integrate technology takes away from more important ideas.									
Goal Focus			60.67	30.81	65.60	24.16	59.75	27.74	0.16	0.857
Innovativeness			55.00	35.44	55.27	28.66	69.88	31.69	0.66	0.528
Autonomy			56.17	35.13	48.93	32.81	65.38	29.82	0.67	0.519
Adaptation			53.00	33.68	57.00	26.84	58.25	27.81	0.06	0.940
Item 32	I have participated in an inclusive district process through which stakeholders formulate a shared expectation for technology use.									
Goal Focus	72.00	26.23	49.78	30.09	62.31	21.05	88.00	9.42	2.54	0.080
Innovativeness	66.00	19.47	39.22	31.76	69.69	25.72	65.25	36.44	2.13	0.122
Autonomy	58.33	29.57	35.56	33.73	64.92	27.55	63.75	36.08	1.75	0.182
Adaptation	64.00	26.51	39.67	28.26	60.62	25.22	75.50	22.07	2.16	0.118
Item 33	I have developed a collaborative, technology-rich school improvement plan.									
Goal Focus	39.33	29.28	70.94	25.47	60.25	15.90			2.48	0.104
Innovativeness	41.33	35.02	67.18	29.38	55.13	27.51			1.21	0.316
Autonomy	46.67	36.17	63.59	29.8	45.75	32.97			1.06	0.362
Adaptation	39.33	29.77	64.06	25.44	53.13	26.05			1.38	0.271

Note. $N = 29$.

The ANOVA determined if agreement with the different technology statements in the STCP-NETS-A predicted the score for the organizational health dimensions. Likert-scale responses served as the basis for quantitative analysis for Part III of the STCP-NETS-A. The urban school principals responded to the questions using a Likert scale from 1 (*strongly disagree*) to 4 (*strongly agree*).

The results in Table 11 are related to urban school principals' assessment of risks and benefits of integrating technology. The benefits of technology were improved student learning and achievement. The higher the percentage, the more the principals saw benefits to technology use. For Item 28, results for Goal Focus indicated no statistically significant difference in the mean score between the difference response group ($F[1, 27] = .56, p = .46$), meaning the principals' beliefs in technology integration to improve student learning did not affect goal focus within their schools. Results for Innovativeness and Autonomy indicated no statistically significant difference in the mean score between the difference response group ($F[1, 27] = 1.95, p = .174$; $F[1,27] = .143, p = .708$), meaning the principals' beliefs did not affect perceptions of innovativeness or autonomy within their schools. Results for Adaptation indicated no statistically significant difference in the mean score between the difference response group ($F[1,27] = .56, p = .46$), meaning the principals' beliefs in technology integration did not affect adaptation within their schools.

For Items 29 and 30, results for Goal Focus indicated no statistically significant difference in the mean score between the difference response group ($F[2,26] = 1.85, p = .32$; $F[2,26] = .06, p = .93$), meaning the principals' beliefs in technology integration to improve student test scores or teacher resistance to technology did not affect goal focus

within their schools. Results for Innovativeness and Autonomy indicated no statistically significant difference in the mean score between the difference response group (F[2,26] = 2.05, p = .15; F[2,26] = .82, p = .45; F[2,26] = 1.26, p = .30; F[2,26] = 1.10, p = .35), meaning the principals' beliefs toward improving test scores or teachers' perceptions toward technology integration did not affect perceptions of innovativeness or autonomy within their schools. Results for Adaptation indicated no statistically significant difference in the mean score between the difference response group (F[2,26] = 1.01, p = .38; F[2,26] = .56, p = .58), meaning adaptation was not affected by principals' beliefs toward improving test scores or teachers' perceptions toward technology integration.

For Items 31 and 32, results for Goal Focus indicated no statistically significant difference in the mean score between the difference response group (F[2,26] = .16, p = .86; F[3,25] = 2.54, p = .08), meaning the principals' beliefs toward money and staffing used for technology integration and their participation in district processes toward shared expectation for technology use did not affect goal focus within their schools. Results for Innovativeness and Autonomy indicated no statistically significant difference in the mean score between the difference response group (F[2,26] = .66, p = .53; F[3,250] = 2.13, p = .12; F[2,26] = .67, p = .52; F[3,25] = 1.75, p = .18), meaning the principals' beliefs toward money and staffing used for technology integration and their participation in district processes toward shared expectation for technology use did not affect innovativeness or autonomy within their schools. Results for Adaptation indicated no statistically significant difference in the mean score between the difference response group (F[2,26] = .06, p = .52; F[3,25] = 2.16, p = .11), meaning adaptation was not affected by principals' beliefs toward money and staffing used for technology

integration and their participation in district processes toward shared expectation for technology use.

For Item 33, results for Goal Focus indicated no statistically significant difference in the mean score between the difference response group ($F[2, 25] = 2.48, p = .10$), meaning the principals' responses toward developing a technology plan did not affect goal focus within their schools. Results for Innovativeness and Adaptation indicated no statistically significant difference in the mean score between the difference response group ($F[2,25] = 1.21, p = .32$; $F[2,25] = 1.06, p = .36$), meaning the principals' responses toward developing a technology plan did not affect perceptions of innovativeness or autonomy within their schools. Agreement with Item 33 (development of a technology plan) is not a statistically significant predictor of Adaptation ($F[3,25] = 1.38, p = .27$), meaning the principals' beliefs toward developing a technology plan did not affect adaptation within their schools.

An ANOVA was performed for Items 34–39 in the STCP-NETS-A and four organizational health dimensions (see Table 12). The results in Table 12 indicated that for Items 34 and 35, there is not a statistically significant difference in the mean score for Goal Focus and Innovativeness between the difference response group ($F[2,26] = 1.37, p = .27$; $F[1,27] = .08, p = .79$; $F[2,26] = 1.83, p = 1.83$; $F[1,27] = .01, p = .91$), meaning the principals' beliefs in promoting effective practices toward technology integration and teachers using technology to access, analyze, and interpret performance data did not affect goal focus and innovativeness within their schools.

Table 12. *Research Question 4 ANOVA Results for STCP-NETS-A Items 34–39*

	Strongly agree		Agree		Disagree		Strongly disagree		ANOVA results	
Item	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*F*	Sig.
Item 34	I promote highly effective practices in technology integration among faculty and other staff.									
Goal Focus	65.20	22.99	65.71	26.5	40.00	17.32			1.37	0.272
Innovativeness	77.00	17.21	58.33	32.59	36.00	14.42			1.83	0.181
Autonomy	72.20	13.14	54.76	34.27	37.67	22.12			1.92	0.166
Adaptation	64.00	18.91	58.19	29.56	32.33	11.65			1.42	0.260
Item 35	I assist teachers in using technology to access, analyze, and interpret student performance data.									
Goal Focus	64.80	28.81	62.00	24.73					0.08	0.786
Innovativeness	58.30	31.52	59.74	30.83					0.01	0.907
Autonomy	52.70	31.42	56.16	33.27					0.07	0.788
Adaptation	54.00	27.89	57.84	28.07					0.12	0.728
Item 36	I collaboratively design, implement, support, & participate in professional development for staff.									
Goal Focus	77.33	14.74	58.73	28.14	63.40	25.51	79.00		0.55	0.653
Innovativeness	73.67	21.22	66.80	31.45	45.50	29.01	40.00		1.40	0.267
Autonomy	70.33	24.50	62.07	32.16	39.60	32.28	56.00		1.27	0.305
Adaptation	67.67	24.58	58.27	30.41	50.80	26.60	54.00		0.31	0.821

(continued)

Table 12. *Research Question 4 ANOVA Results for STCP-NETS-A Items 34–39*

	Strongly agree		Agree		Disagree		Strongly disagree		ANOVA results	
Item	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*F*	Sig.
Item 37	I use current technology-based management systems to access and maintain personnel and student records.									
Goal Focus	71.17	25.81	57.18	24.78					2.17	0.152
Innovativeness	62.25	30.27	57.12	31.42					0.19	0.664
Autonomy	63.00	31.20	49.29	33.10					1.30	0.265
Adaptation	62.75	26.29	52.12	23.37					1.05	0.315
Item 38	I use a variety of media and formats to communicate and interact with peers, experts, and other education stakeholders.									
Goal Focus	62.57	25.24	65.73	23.95	56.75	37.70			0.17	0.844
Innovativeness	53.93	32.00	72.09	23.06	42.50	36.96			1.91	0.169
Autonomy	49.00	32.07	68.18	27.21	39.50	39.74			1.72	0.199
Adaptation	51.43	24.38	67.55	26.20	44.00	28.10			1.60	0.222
Item 39	I provide campus-wide development for sharing work and resources.									
Goal Focus	60.39	31.08	67.79	24.34	56.88	24.94			0.49	0.618
Innovativeness	66.86	32.21	62.79	28.75	46.38	32.05			1.03	0.373
Autonomy	66.71	29.76	58.79	29.15	38.00	35.96			1.78	0.189
Adaptation	58.43	30.59	61.71	23.86	45.75	31.46			0.87	0.432

Note. $N = 29$.

Results for Autonomy and Adaptation indicated no statistically significant difference in the mean score between the difference response group ($F[2,26] = 1.92, p = .17$; $F[1,27] = .07, p = .79$; $F[2,26] = 1.42, p = .26$; $F[1,27] = .12, p = .73$), meaning the principals' beliefs in promoting effective practices toward technology integration and teachers using technology to access, analyze, and interpret performance data did not affect autonomy and adaptation within their schools.

For Items 36 and 37, results for Goal Focus indicated no statistically significant difference in the mean score between the difference response group ($F[3,25] = .55, p = .65$; $F[1,27] = .2.17, p = .15$), meaning the principals' perceptions of professional development and technology-based management systems to access and maintain personnel and student records did not affect goal focus within their schools. Results for Innovativeness and Autonomy indicated no statistically significant difference in the mean score between the difference response group ($F[3,25] = 27, p = .26$; $F[1,27] = .19, p = .66$; $F[3,250] = 1.27, p = .1.27$; $F[1,27] = 1.30, p = .27$), meaning the principals' perceptions of professional development and technology-based management systems to access and maintain personnel and student records did not affect innovativeness and autonomy within their schools. Results for Adaptation indicated no statistically significant difference in the mean score between the difference response group ($F[3,25] = .31, p = .82$; $F[1,27] = 1.05, p = .32$), meaning the principals' perceptions of professional development and technology-based management systems to access and maintain personnel and student records did not affect adaptation within their schools.

For Items 38 and 39, results for Goal Focus indicated no statistically significant difference in the mean score between the difference response group ($F[2,26] = .17, p =$

.84; $F[2,26] = .49$, $p = .62$), meaning the principals' beliefs in using a variety of media to communicate with peers and stakeholders and providing campus-wide development for sharing work and resources did not affect goal focus within their schools. Results for Innovativeness and Autonomy indicated no statistically significant difference in the mean score between the difference response group ($F[2,26] = 1.91$, $p = .17$; $F[2,26] = 1.03$, $p = .37$; $F[2,26] = 1.72$, $p = .19$; $F[2,26] = 1.78$, $p = .19$), meaning the principals' beliefs in using a variety of media to communicate with peers and stakeholders and providing campus-wide development for sharing work and resources did not affect innovativeness and autonomy within their schools. Results for Adaptation indicated no statistically significant difference in the mean score between the difference response group ($F[2,26] = 1.59$, $p = .22$; $F[2,26] = .87$, $p = .43$), meaning the principals' beliefs in using a variety of media to communicate with peers and stakeholders and providing campus-wide development for sharing work and resources did not affect adaptation within their schools.

An ANOVA was performed for Items 40–45 in the STCP-NETS-A and four organizational health dimensions (see Table 13). The results in Table 13 indicated statistically significant results for Item 40 ($F[1,27] = 4.58$, $p = .04$). A statistically significant difference was indicated between the belief that urban school principals allocate funds to advance technology and Innovativeness, Autonomy, and Adaptation ($F[1,27] = 1.68$, $p = .21$; $F[1,27] = 1.82$, $p = .19$; $F[1,27] = 3.65$, $p = .07$). The results indicated that urban school principals were in agreement and allocated funds to support their technology plan. Technology purchases have been continuous since NCLB in 2002.

Table 13. *Research Question 4 ANOVA Results for STCP-NETS-A Items 40–45*

	Strongly agree		Agree		Disagree		Strongly disagree		ANOVA results	
Item	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*F*	Sig.
Item 40	I allocate campus discretionary funds to advance the technology plan.									
Goal Focus	47.38	29.26	65.90	22.19					4.58	0.042
Innovativeness	47.50	32.98	63.71	29.09					1.68	0.206
Autonomy	42.13	35.05	59.86	30.39					1.82	0.189
Adaptation	41.38	30.14	62.29	24.88					3.65	0.067
Item 41	I advocate for adequate, timely, and high-quality technology support services.									
Goal Focus	56.10	23.34	67.35	28.29	60.00	0.00			0.60	0.557
Innovativeness	47.80	30.27	64.41	30.48	72.50	28.99			1.15	0.333
Autonomy	41.00	31.63	62.59	30.04	60.00	49.50			1.26	0.242
Adaptation	45.30	24.41	62.76	27.65	59.50	41.72			1.30	0.289
Item 42	I promote the use of technology to analyze data to improve student learning.									
Goal Focus	64.75	28.04	60.14	23.46	88.50	13.44	30.00		1.33	0.289
Innovativeness	60.08	33.55	59.28	29.46	67.50	38.89	32.00		0.29	0.830
Autonomy	53.50	35.41	54.07	32.75	72.00	22.63	51.00		0.19	0.904
Adaptation	55.17	29.52	56.07	28.00	73.50	27.58	45.00		0.30	0.827

(continued)

Table 13. *Research Question 4 ANOVA Results for STCP-NETS-A Items 40–45*

Item 43	I implement evaluation procedures for teachers that assess growth toward technology standards.								
Goal Focus	57.33	45.62	61.60	24.62	70.00	21.53	30.00	0.85	0.482
Innovativeness	54.00	48.78	64.47	28.92	54.20	29.69	32.00	0.57	0.642
Autonomy	56.67	46.46	60.53	30.18	46.50	34.33	51.00	0.36	0.780
Adaptation	52.33	46.06	57.13	26.84	58.00	27.35	45.00	0.08	0.968
Item 44	I include technology use in learning and teaching as criteria in assessing staff performance.								
Goal Focus	56.00	36.55	60.82	26.11	71.00	20.07		0.58	0.568
Innovativeness	41.25	41.55	58.65	27.34	69.50	31.13		1.17	0.328
Autonomy	40.00	43.14	54.94	30.56	62.50	31.50		0.64	0.537
Adaptation	44.00	38.66	56.65	25.61	62.50	27.74		0.58	0.565
Item 45	I secure and allocate technology resources to meet the needs of all learners.								
Goal Focus	70.63	31.68	60.05	23.29				0.98	0.331
Innovativeness	65.25	32.03	56.95	30.40				0.42	0.523
Autonomy	30.75	32.57	52.76	32.47				0.35	0.559
Adaptation	61.50	32.34	54.62	26.15				0.35	0.558

Note. $N = 29$.

Until recently, Title II, Part D was a single funding source devoted to technology purchases in schools. Additionally, both local (specific school site) and district-level funding are used to support and maintain the schools' technology infrastructure. Recent mandates with online testing and data reporting require schools to use technology daily for productivity and day-to-day practices.

The results for Items 41 and 42 regarding Goal Focus and Innovativeness were not statistically significant ($F[2, 26] = .60, p = .56$; $F[2,25] = 1.33, p = .29$; $F[2,26] = 1.15, p = .33$; $F[2,25] = .29, p = .83$), meaning the principals' beliefs as advocates for technology services and use of technology to analyze data to improve student learning did not affect goal focus and innovativeness within their schools. Likewise, results for Autonomy and Adaptation were not statistically significant ($F[2,26] = 1.50, p = .24$; $F[2,25] = .19, p = .91$; $F[2,26] = 1.30, p = .29$; $F[2,25] = .30, p = .83$), meaning the principals' beliefs as advocates for technology services and use of technology to analyze data to improve student learning did not affect autonomy and adaptation within their schools.

Results for Items 43 and 44 indicated no statistically significant difference in the mean score for Goal Focus and Innovativeness between the difference response group ($F[3,25] = .85, p = .48$; $F[2,26] = .57, p = .57$; $F[3,25] = .56, p = .64$; $F[2,26] = 1.17, p = .33$), meaning the principals' beliefs toward teacher evaluating procedures in technology use and including technology use in learning and teaching as criteria in assessing staff performance did not affect goal focus and innovativeness within their schools. Results for Autonomy and Adaptation indicated a statistically significant difference in the mean score between the difference response group ($F[3,25] = .36, p =$

.78; $F[2,26] = .64, p = .54$; $F[3,25] = .08, p = .97$; $F[2,26] = .58, p = .57$), meaning autonomy and adaptation were not affected by principals' beliefs toward teacher evaluating procedures in technology use and including technology use in learning and teaching as criteria in assessing staff performance.

Results for Item 45 indicated no statistically significant difference in the mean score for Goal Focus between the difference response group ($F[1,27] = .979, p = .33$), meaning the principals' beliefs in securing and allocating technology resources for all learners did not affect goal focus within their schools. No statistically significant difference was indicated between the belief that urban school principals allocate funds to advance technology and Innovativeness, Autonomy, and Adaptation ($F[1,27] = .42, p = .52$; $F[1,27] = .35, p = .56$; $F[1,27] = .35, p = .56$).

An ANOVA was performed for Items 46 and 47 in the STCP-NETS-A and four organizational health dimensions (see Table 14). The results in Table 14 for Item 46 indicated no statistically significant difference in the mean score for Goal Focus between the difference response group ($F[1,26] = .11, p = .75$), meaning the principals' beliefs toward enforcing an acceptable use policy and procedures with technology use did not affect goal focus within their schools. Results for Innovativeness and Autonomy indicated no statistically significant difference in the mean score between the difference response group ($F[1,26] = .62, p = .44$; $F[1,26] = .35, p = .56$), meaning innovativeness and autonomy were not affected by principals' beliefs toward enforcing an acceptable use policy and procedures with technology use.

Table 14. *Research Question 4 ANOVA Results for STCP-NETS-A Items 46–47*

	Strongly agree		Agree		Disagree		Strongly disagree		ANOVA results	
Item	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*F*	Sig.
Item 46	I enforce the district's acceptable use policy and other procedures related to security, copyright, and technology use.									
Goal Focus	47.38	29.26	68.90	22.19					0.11	0.747
Innovativeness	47.50	32.98	63.71	29.09					0.62	0.437
Autonomy	42.13	35.05	59.86	30.39					0.35	0.557
Adaptation	41.38	30.14	62.29	24.88					0.26	0.615
Item 47	I participate in the Safe, Fit, and Healthy Schools plans that focus on health and environmentally safe practices related to the use of technology.									
Goal Focus	62.00	33.00	52.43	23.16	67.27	18.69	95.00		1.02	0.403
Innovativeness	54.80	38.34	55.29	21.79	62.18	28.29	99.00		0.69	0.569
Autonomy	51.20	36.52	47.71	24.78	59.36	32.97	95.00		0.73	0.544
Adaptation	53.00	34.66	49.57	23.64	60.73	22.47	94.00		0.89	0.458

Note. $N = 29$.

Results for Adaptation indicated no statistically significant difference in the mean score between the difference response group ($F[1,26] = .26, p = .62$), meaning principals' beliefs toward enforcing an acceptable use policy and procedures with technology use did not affect adaptation within their schools.

Item 47 indicated no statistically significant difference in the mean score for Goal Focus between the difference response group ($F[3,25] = 1.02, p = .40$), meaning the principals' beliefs toward participating in the Safe, Fit, and Healthy Schools plan related to the use of technology did not affect the goal focus within their schools. Results for Innovativeness and Autonomy indicated no statistically significant difference in the mean score between the difference response group ($F[3,25] = .69, p = .57$; $F[3,25] = .73, p = .54$), meaning innovativeness and autonomy were not affected by principals' beliefs toward participating in the Safe, Fit, and Healthy Schools plan related to the use of technology. Results for Adaptation indicated no statistically significant difference in the mean score between the difference response group ($F[3,25] = .89, p = .46$), meaning the principal's beliefs toward participating in the Safe, Fit, and Healthy Schools plan related to the use of technology did not affect adaptation within their schools.

Tables 11–14 indicated no statistically significant difference in the mean score for Goal Focus, Innovativeness, Autonomy, and Adaptation, with the exception of Item 40. Item 40 is a predictor of the score for Goal Focus ($F[1, 27] = 2.17, p < .05$). However, principals' level of allocating campus discretionary funds to advance the technology plan does not predict the scores for Innovativeness, Autonomy, and Adaptation.

Summary

This chapter presented the findings generated by analysis of quantitative data collected in a descriptive statistics study. A survey was administered to school principals in two urban districts in Oklahoma and Texas. The study was conducted to examine the difference between principal technology leadership and technology integration in urban schools.

This investigation, through quantitative data, sought to determine if principals impact the level of technology integration that takes place in their schools and in the classroom. The study investigated how principals use technology, their perceptions of technology integration, and their level of organizational health, and whether their perceived level of technology integration is a predictor of their organizational health score.

Descriptive statistics were used to determine the frequency of urban school principals' use of technology for productivity. The results indicated that urban school principals use technology for common tasks such as sending and receiving e-mail messages/attachments, searching the Internet, and using computer applications on a daily basis. Urban school principals reported they use computer technology at work, especially applications that support communication, almost daily. The data also determined that urban school principals completed more complicated tasks, such as spreadsheets, electronic presentations, and formulas, with less frequency.

Although this initial use of descriptive statistics was basic and calls for more detailed analysis, it appears that urban school principals use technology for productivity at a frequency of daily or weekly, but do not use technology applications for more

complex tasks. Urban school principals do not use technology for projects such as spreadsheets, graphs, and projects that would be seen as independent from daily tasks on a frequent basis.

Descriptive statistics were also used to determine the level of urban school principals' perceptions of their technology integration. The survey data outcomes determined that urban school principals believe that technology integration will improve student learning and will improve a school's test scores. Overall, the data indicated that the urban school principals shared a common belief that they supported and facilitated the use of technology in their schools and that they created an environment for technology integration.

A series of ANOVA tests were used to determine if there were any statistically significant differences between perceived technology integration and the organizational health dimensions of Goal Focus, Innovativeness, Autonomy, and Adaptation. Goal Focus, Autonomy, and Adaptation were used because they are consistent predictors of student achievement levels at schools. If a school has high and balanced Goal Focus, Autonomy, and Adaptation, it is predicted that a high level of student achievement is taking place at that school. Innovativeness, in theory, is closely tied to technology integration because it requires a different level of lesson planning for a teacher to effectively integrate technology into his or her teaching. None of the questions, except Item 40, had a statistical significance as a predictor of each organizational health dimension. Item 40 was a predictor of the score for Goal Focus.

There is a possible threat to any statistical conclusion to validity due to the small sample size of urban school principals ($N = 29$). Due to the small sample size,

conclusions regarding the difference between principal technology leadership and technology integration in urban schools are limited. A total of 98 surveys were sent out to urban school principals; 29 were returned. A higher number of participants could add more validity to the study and is noted as an additional limitation of the study.

The final chapter contains a summary of the findings of this study and a discussion of those findings. Recommendations for practice and further study are also provided.

CHAPTER 5. SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Introduction

This chapter reviews the main points for this study and conveys the study's key findings based on the data analysis presented in Chapter 4. The study was designed to describe the relationship between principal technology leadership and technology integration in urban schools. The study used the STCP-NETS-A and OHI data as a framework for describing principals' technology leadership beliefs and perceptions. This chapter provides a discussion of the results and potential limitations of the study. Implications for educators and recommendations for future study conclude this chapter.

Problem Statement

The school principal is the most important and influential individual in the school (Marzano et al., 2005). Principals are responsible for all activities that occur in and around their learning communities. The school of leadership creates the setting, learning climate for teaching and learning, morale, and ownership for the commitment to academic achievement. Kaufman (1997) regarded the principal's role as perhaps the most dynamic factor as schools struggle with technological transformation.

Although technology in schools has increased dramatically in the last decade, integrating technology into the classroom has been a challenge. With the recent establishment of federal E-Rate funding used strictly for technology in schools and the creation of the national technology plan, billions of dollars have been channeled into technology for schools (Picciano, 2011; Rivero, 2005). Recent NCES (2010) survey data indicated that all elementary and secondary schools' Internet and computer use for instructional services has increased. Even with the increase of technology in schools,

along with the positive significant effects of technology use on student learning, U.S. students are still not making the grade (Sandholtz & Reilly, 2004).

The USDE found the arrival of computers and the Internet has not significantly changed how teachers teach and students learn (Smerdon et al., 2000). Ultimately, the resolve toward educational change for a school is placed on the school's leadership, namely the principal. The school principal directly affects any change within a school (Costa, Cunha, & Matos, 2004). The implementation of technology depends on the ability of the principal to create a culture of change and share his or her vision regarding the use of technology as a tool to improve teaching strategies and student achievement (Stanage, 1996). Consequently, additional research is needed to understand the complexities of school leadership and technology integration in P–12 education.

Purpose Statement

The purpose of this study was to determine the relationships between technology integration and technology leadership behaviors with urban school principals in an educational setting. The study determined whether organizational factors, demographic settings, professional development, and personal factors are related to organizational health dimensions.

Research Questions

The study was conducted to answer the following research questions:

1. How do school principals use technology professionally?
2. How do urban school principals perceive their technology integration performance?

3. What is the level of organizational health of schools in an urban district across each of the following dimensions:
    a. Goal Focus
    b. Communication Adequacy
    c. Optimal Power Equalization
    d. Resource Utilization
    e. Cohesiveness
    f. Morale
    g. Innovativeness
    h. Autonomy
    i. Adaptation
    j. Problem-solving Adequacy
4. Are there differences in school organizational health among school principals' perceptions of their leadership competencies in each of these dimensions:
    a. Goal Focus
    b. Innovativeness
    c. Autonomy
    d. Adaptation

Summary of Findings

Summary of Descriptive Statistical Findings

An analysis of the descriptive statistical findings from urban school principals who completed the STCP-NETS-A did not confirm many of the research findings

discussed in the review of the literature in Chapter 2 of this study. On the other hand, a small number of responses to items in the survey agreed with previous research findings. ANOVA tests using items from the STCP-NET-A and OHI indicated a limited level of statistical significance. Explanations for these discrepancies are discussed later in this chapter.

Discussion of the Findings

In the spring of 2009, the STCP-NETS-A was sent to 98 building administrators in two urban school districts, one in Oklahoma and the other in Texas. The STCP-NETS-A was divided into three sections, and each section used either a 4- or 5-point Likert scale based on questions in the section. Twenty-nine urban school principals responded to the survey. OHI data were mined upon receipt of a principal's completed STCP-NETS-A. Descriptive and inferential data analyses were conducted to determine group differences, relationships, level of perceptions and beliefs of technology integration and leadership practices, as well as other demographic and background criteria. The surveys were analyzed using SPSS 17 software.

Research Question 1. Research Question 1 asked, How do school principals use technology professionally? Descriptive statistics indicated that urban school principals use technology for productivity tasks. Twenty-nine urban school principals were surveyed regarding their use of 13 items related to productivity. The majority of the principals used the items daily. All 29 (100%) indicated they e-mailed and sent attachments as a daily activity; 27 (93%) rated accessing webpages as a daily activity.

Educational leaders are asked to apply technology to enhance their professional practice and increase their own productivity. Arguably, today's urban school principals

depend heavily on technology for completion of many tasks, the most important being frequent communication via e-mail and use of the Internet. The principals did not use such skills as reducing and enlarging graphics, using formulas and charts, copying graphics from a website, creating graphs from a spreadsheet, and creating electronic presentations at a high frequency. The less frequent use of such skills may be due to the fact they are usually not associated with tasks that need to be completed on a daily basis. The data for Research Question 1 indicated that a large majority of principals used technology for completing daily tasks and modeling the routine use of common tasks.

Research Question 2. Research Question 2 asked, How do urban school principals perceive their technology integration performance? Urban school principals' responses to the STCP-NETS-A provided data to answer this question. Participants were asked their level of agreement with 12 statements related to technology integration. A descriptive statistical analysis of the percentage responses for each question was used to identify principals' perceptions regarding level of technology integration.

Urban school principals perceived their technology leadership performance to be high. Twenty-one principals (72.4%) agreed they promote highly effective practices in technology integration among their faculty and other staff; 17 (58.6%) agreed they have developed a collaborative, technology-rich school improvement plan that is aligned to the district strategic plan and use current technology to access and maintain personnel and student records. The results imply principals' knowledge and skill regarding technology use.

The NETS-A standard of "digital-age learning culture" suggests that principals should model the frequent and effective use of technology for learning (ISTE, 2012). Results from the descriptive analysis indicated the urban school principals support technology in their schools through various practices. The findings affirmed the literature regarding the importance of leaders who model, support, and cast vision during computer technology integration. Chang, Chin, and Hsu (2008) found a strong correlation between principals' technology leadership and teachers' integration of technology in the classroom.

Research Question 3. Research Question 3 asked, What is the level of organizational health of schools in an urban district across each of the following dimensions:

a. Goal Focus
b. Communication Adequacy
c. Optimal Power Equalization
d. Resource Utilization
e. Cohesiveness
f. Morale
g. Innovativeness
h. Autonomy
i. Adaptation
j. Problem-solving Adequacy

The purpose of Research Question 3 was to determine the level of organizational health of schools in an urban district across the 10 dimensions. The level of OHI was

determined among the 29 urban school principals and their respective school sites. The mean and standard deviation was calculated for each dimension. The results indicated that Communication Adequacy had the highest mean when all school sites were combined. Overall, the means for all 10 dimensions were similar. The lowest mean was Autonomy, one of the four dimensions that typically have high correlation coefficients with high student achievement when the mean or percentage level is high in each of the four dimensions.

The literature review indicated that studies on transformational leadership and principles of change documented the positive impact that principal leadership can have on the success of an initiative and student achievement. For this study, the ability of the school principal to create and implement change structures was defined as the knowledge/skill and support actions required by the school principal to support effective use of technology in the classroom. This includes strengthening school culture, building collaborative processes, managing external resources, and modifying organizational structures. Modifying organizational structures especially impacts the work of leaders and teachers by allowing for space and time for them to perform their work and enabling access to resources and equipment.

The ISTE developed the NETS-A in 2009, the indicators of the knowledge, skills, and support actions of the school principal, focusing on visionary leadership, digital-age learning culture, excellence in professional practice, and systemic improvement and digital citizenship. The data represented by the OHI mean scores for each of the sites supported findings in the literature. Each dimension had a high percentage, with the big four dimensions tied to student achievement.

Research Question 4. Research Question 4 asked, Are there statistically significant differences in school organizational health among each of the following dimensions: (a) Goal Focus, (b) Innovativeness, (c) Autonomy, (d) Adaptation? These dimensions are indicators of student achievement. If the data for each of these dimensions have a high percentage and balance, then a correlation exists with high student achievement taking place in the school setting. Innovativeness and Autonomy correlate with technology integration. The urban school principals responded to a series of 20 questions related to their beliefs toward technology integration. An analysis of variance was performed on each question in the STCP-NETS-A and the four OHI dimensions. The test determined if agreement with the different technology statements in the STCP-NETS-A predicted the score of the organizational health dimensions.

Limitations of the Study

The study was limited to principals in Oklahoma and Texas urban school districts. The study may not be representative of small, rural, and midsize suburban districts. Additionally, a limitation not initially considered was the sample size ($N = 29$) of participants from the two districts. As the survey was not distributed until the middle of May (end of the school year), there was competition with end-of-year district and state reports and activities. Lastly, the survey was completed using a paper format, which included mailing the completed survey to the researcher. The researcher may have increased participant response by offering an online survey option.

Recommendations for Further Research

The results of this study necessitate further research on the relationship between principal technology leadership and technology integration in urban schools. Principal

technology proficiency should continue to be an area of research. Technology is given the credit for productivity in the workplace. As a result, some believe that technology implementation in schools will do more to increase educational opportunities and quality (Valdez, 2004). If principals are effective implementers of technology and exhibit positive leadership behaviors toward technology, they may in turn initiate and advocate support for the usage of technology to increase teaching and learning and support funding for technology, which may lead to educational change (Fullan, 2008; Valdez, 2004). Therefore, future study in the following areas is recommended:

1. Additional school districts need to be surveyed in regard to the relationship between technology leadership and technology integration in urban schools.
2. A comparison needs to be made of principals' perceptions of their own technology leadership with teachers' perceptions of their principal's technology leadership.
3. Take a deeper look at each survey item used in the OHI and its relationship to STCP-NETS-A items.
4. Expand the focus to compare leadership styles for principals in elementary, middle, and high schools.
5. Replicate this study using a larger sample; perhaps a mixed-methods approach could add to the understanding of the data collected.

Implications for Practice

The responsibility of technology integration into the curriculum has been given to school administrators, who in turn have delegated the responsibility to their teachers. However, the supporting literature and results of the data analysis for this study

indicated that successful technology integration is based on a variety of related factors. Principals are an essential component to the improvement of teacher performance (Johnson, 2007). The importance of principal technology leadership to the effective use of technology in the classroom must be recognized by district leaders, state and federal leaders, and the school principal.

Key stakeholders must establish a clearly defined vision of technology integration for their school district and disseminate the vision to all levels of the organization for design and implementation. District leaders must educate the community about the importance of this technology vision so that stakeholders can share in the endeavor. School districts have witnessed their federal and state funding sources decline over the past decade. Too often the public fails to provide the funding for technology innovation either because of lack of information or lack of connection to the vision. Community support and funding is vital in today's economy. Community stakeholders must provide the necessary monetary and sometimes logistical support for the implementation and sustained use of technology integration.

The school superintendent and principal must take ownership of the responsibility and challenges for implementation of the vision of technology integration. Many educators maintain their social networking profile, upload or watch videos on YouTube, chat with friends and family on Skype, read the newspaper online, and write reviews on Yelp—all aptitudes that have the potential to translate into learning activities in the classroom. Yet, like their students, teachers are somehow compelled to check their own technology at the door. Teachers have developed extensive technological skills used substantially outside the classroom, but these skills

have not translated to instructional purposes for student learning (Russell et al., 2003). Many of these same teachers who spend copious amounts of personal time online arrive at school, crack open a 10-pound 500-page textbook, place prewritten notes on an overhead projector, begin a lecture, and conduct school as it has always been conducted.

Teachers regularly make changes regarding technology use. However, it is incremental and need-based, rather than swift and monumental in the ways that techno-reformers crave (Peck, Cuban, & Kirkpatrick, 2002). Teachers have tremendous and ultimate authority over what occurs in the classroom day-to-day; the real challenge is that technology integration depends on the behavior, investments, and commitment of individual teachers (Keengwe, Onchwari, & Wachira, 2008).

Leaders who practice, support, observe, and model technology use positively impact the integration of technology into teaching and learning (Piper & Hardesty, 2005). The design of a technology plan must include key stakeholders from all levels in a school district. Key stakeholders should include curriculum coordinators, teachers, parents, and students who will assist in the design of a sustainable technology plan. Dexter, Louis, and Anderson (2009) found that in schools that integrate technology successfully, technical support is provided by personnel designated to offer this type of support, not instructional support—an asset that allows the teachers to focus on integration with curriculum and pedagogy. However, recent mandates such as Common Core State Standards and teacher evaluation have limited the amount of technology professional development that can be offered in a calendar year.

Principals' allocation of time for teachers in professional learning may also be important. Principals must allow for time for teachers to engage in the instructional

aspects of their work. A major barrier to teacher learning is a lack of scheduled time for teachers to engage in technology professional development. Principals, state leaders, and lawmakers must provide the structure for staff development to occur.

The NETS-A provides a framework to define how well integration of technology, teaching, and learning were understood and implemented by school leaders (Papa, 2011). The technology plan may involve a curriculum map, professional development for principals and teachers, and hardware and software that meet the requirements of the district's educational goals and outcomes.

Additionally, the procurement of technology infrastructure must be a well-designed collaborative effort. It is vital to maximize limited funding sources and have a long-term vision of use. This includes purchasing technology applications that can be used by the entire district and that offer both remediation and enrichment. Districts that spend more per student have increased classroom access for their students, whether the district is urban or suburban (Hess & Leal, 2001). This must be addressed to bridge the digital divide so that all students, regardless of their income status or ethnicity, will have regular access to computers at school to master the skills necessary for postsecondary education and the work force.

Professional development regarding the use and integration of the innovation must be included in the acquisition of technology and innovation. Professional development should embrace learning, instructional practices, and how technology integration enhances processes (B. C. Hall, 2009). This is very important because both the literature and results from this study showed that principals' perceptions of the

benefits of technology may have a profound effect on their willingness to lead their teachers to integrate technology into their classroom instruction.

Many do not distinguish between teachers' use of technology for the purposes of student learning and teachers' use of technology for classroom management, administrative tasks, or presentation of information. Liu, Maddox, and Johnson (2008) claimed that the phrase *technology integration* "has been used by so many people to mean so many different things that it is in danger of eventually losing any specific meaning" (p. 2). Integration represents the breakthrough phase, when a teacher consciously decides to designate certain tasks and responsibilities to technology to master learning objectives.

It is clear that administrators use technology primarily for managerial efficiency rather than for teaching and learning. As long as that is their main focus, the potential for technology integration will suffer. Technology is not a replacement for teachers; it is a tool to assist in student learning. If teachers have already made the leap to using technology for management systems such as grading and attendance, it should be theoretically possible to take the next step to integrating technology into all aspects of classroom life. Teachers and students must be empowered to facilitate, if not lead, the innovation.

The principal must set the culture of technology integration throughout the school. As the role model and leader, the principal must become technology-literate and promote and encourage technology use throughout the school. According to the results of this study, principals must take every opportunity to communicate with teachers via e-mail, model the use of technology when conducting professional development

training, and provide ongoing sustained professional development regarding the use and integration of technology. Principals will need to be the change agents who can provide a variety of differentiated professional development opportunities that meet the teachers' needs (Skrla, McKenzie, & Scheurich, 2009). A professional development policy for teachers may also assist principals in their work by allowing teachers time to learn. Professional development needs to shift from one-time training sessions to systemic integrated approaches (Brock, 2009).

In addition, low-income urban students may face different challenges in attempting to use computers at home as compared to students from higher socioeconomic backgrounds who usually have increased financial resources and larger support networks and thus accessibility to technology at home (Baek & Freehling, 2007). The achievement gap between students without access to technology at home and school and students with that access impacts college admission, college readiness, and workforce skills (O'Kane, 2010). Therefore, access to computers at school is critical to providing opportunities for low-income students to engage with technology.

Children of poverty can overcome negative situations. An educator's commitment in the potential success of every student is key to transforming the educational experience of low-income urban students. Since culture often determines what is valued and how it is learned, teachers must be provided with professional development to help students succeed in a technological world.

Although as educators we readily admit that many students are more competent in using today's electronic devices than the average adult, many still cling to the old paradigm of teacher as instructional asset and student as instructional liability.

Richardson (2008) suggested the skills that students need in this new age include using various forms of media while presenting ideas; exhibiting fluency with technology tools; being able to access, evaluate, and use different types of information; and being able to communicate ideas effectively. We continue to go to staff development regarding the use of technology so that we can teach it to our students, and we thereby retard the learning of those students who already possess the competencies.

It rarely occurs to us to shift our paradigm to take advantage of students' competence as an instructional asset when teaching and learning. Many students have access to more information than the typical teacher because students know where to search for it and how to access it. Certainly, they need guidance regarding how to filter what is important and relevant, how to distinguish what is nice to know from what is necessary to know, and how to purposefully use it, but most do not need an adult to teach them how to use the technology. Obviously, these dynamics should be the catalyst for adapting the role of the teacher.

Far too often, the technology that exists in the classroom is there primarily in hopes that the teacher will use it as a tool for instructional delivery, assuming that this will somehow make the curriculum more relevant. The reality, however, is that we are simply putting "old wine into new bottles"; we are investing in expensive—but ineffectively used—teacher tools as we ban and even punish students for bringing their common technology tool to school: their cell phone. And students continue to opt out and drop out at an increasing rate.

Lastly, state and federal leaders must include opportunities for administrators, teachers, and key stakeholders to learn how to use technology to integrate and support

state and federal mandates and initiatives. The use of webinars, collaboration among districts, and distance learning can assist districts with professional development opportunities to learn how to infuse technology into mandates. Technology must become a normal part of the learning process in curriculum development and assessment of current initiatives such as Common Core State Standards and assessments. The addition of technology may act as a bridge to pedagogy in schools to provide students with the skills and knowledge they need in today's global economy (Zhao, Alexander, Perreault, Waldman, & Truell, 2009). Leaders must modify the organizational structure to provide principals and teachers time to practice the use of technology in instruction. By engaging in learning about technology integration, they are given the opportunity to truly impact student achievement.

Summary

Several major conclusions were made during this research study. There was a high level of technology use, a high level of productivity, and principals' beliefs supported technology integration. Self-reported survey data indicated that principals hold positive perceptions regarding their technology integration practices. However, the data did not show a statistical difference in the level of technology integration or outcomes of OHI data. Lastly, technology integration did not have a statistical significance with student achievement as identified by use of the four OHI dimensions that correlate to high student achievement.

Though sometimes challenging, principals have an opportunity to influence change in schools. Their understanding of how to implement change and support their teachers through action will lead to success. In other words, a principal's level of use,

understanding of technology, and use of change models play an important role in the integration of technology. The hope is that this research will add to the current body of research that supports principal technology leadership and technology integration in urban schools.

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APPENDIX A. E-MAIL PERMISSION TO USE STCP-NETS-A SURVEY

From: Weber, Dr. Mark J. [mailto:WEBER@tarleton.edu]
Sent: Monday, February 09, 2009 8:42 AM
To: Kathy Draper
Subject: RE: Survey Permission

Kathy, (soon to be Dr. Draper), you have my consent to use the survey and any other information you need from the document to help you complete your dissertation. You should be able to print the survey off the online PDF, but if not, let me know and I'll send it to you via a ***Word*** attachment. Thanks for asking and good luck!

Mark J. Weber, Ed.D.
Tarleton State University
Stephenville, TX

From: Kathy Draper [mailto:kldraper@cox.net]
Sent: Sun 2/8/2009 3:57 PM
To: weber@vms.tarleton.edu
Subject: Survey Permission

Dr. Weber,

Good afternoon. I am a doctoral candidate at the University of Oklahoma and I would like to seek permission to use your survey in my study. If you have any questions, I can be reached at 405-642-2945. I appreciate your support.

Respectfully,

Kathy Draper

APPENDIX B. UNIVERSITY OF OKLAHOMA IRB APPROVAL

The University of Oklahoma

OFFICE OF HUMAN RESEARCH PARTICIPANT PROTECTION - IRB

ACTION REQUIRED **Report Due Date: Friday, January 14, 2011**

January 03, 2011

Kathryn Draper, M.Ed.
Educational Leadership and Policy Studies
820 Van Fleet Oval, ECH 227
Norman, OK 73019

RE: IRB No. 12504: An Examination of the Relationship Between Principal Technology Leadership and Technology Integration in Urban Schools

Dear Ms. Draper:

The OU Federal-Wide Assurance of Compliance on file with the Department of Health and Human Services (DHHS) Office for Human Research Protections requires periodic review by the Institutional Review Board (IRB) of all studies involving human participants. This review must be conducted at least once every 365 days and failure to do so will result in expiration of IRB approval and closure of the above referenced study.

The IRB Application for Continuing Review form (Progress Report) and instructions for submission can be located on our website (www.ouhsc.edu/irb-norman). The form and attachments as applicable, must be submitted to the IRB by the due date listed above. Failure to provide a report in a timely manner will jeopardize your ability to continue this study.

Please note that the Collaborative IRB Training Initiative (CITI) is required for all investigators and key personnel. Approval to extend your study will not be granted until completion of this course is documented. See http://www.ouhsc.edu/irb-norman/training.asp for further details.

The IRB is responsible for timely and thoroughly reviewing of the Application for Continuing Review, communicating to the investigator any needed changes, and reviewing and taking action prior to the approval expiration date. If you are unable to meet the deadline set forth , please feel free to contact the IRB office at 325-8110 to make other arrangements.

The new location is: 1616 W. Lindsey, Suite 150 Norman, OK 73069. Please refer to our website for further instructions or feel free to contact our office at (405) 325-8110. A 'drop box' is also available for your convenience and is picked up daily. The drop box is located in the entrance to the Provost Office, Evans Hall, first floor. Items that need immediate attention should be brought to the IRB office. Thank you. IRB website: http://www.ouhsc.edu/irb-norman//default.asp

Cordially,

Faustina Layne,
Director, Human Research Participant Protection/IRB

ltr_Prog_Periodic_Rpt_Req

1616 West Lindsey, Suite 150 Norman, Oklahoma 73069 PHONE: (405) 325-8110

APPENDIX C. PERMISSION LETTER TO SUPERINTENDENTS

March 4, 2009

Dear Superintendent _____;

It is with great enthusiasm that I introduce myself as a current PhD candidate in Educational Curriculum Administration Supervision from the University of Oklahoma. I am currently seeking to conduct research within and about Oklahoma City Public Schools to be published in a dissertation. The title of the research is: AN EXAMINATION OF THE RELATIONSHIP BETWEEN PRINCIPAL TECHNOLOGY LEADERSHIP AND TECHNOLOGY INTEGRATION IN URBAN SCHOOLS. The study will pertain technology use, technology leadership, and technology integration in schools and their relationship to student achievement.

Upon your acceptance, I will mail a survey to all build level principals. The participants will be protected through the use of pseudonym in the published dissertation, as well as the identity of the school district if desired. Once the survey is complete, I would like to compare the Organizational Health Survey data from each site that participated in the survey.

Should you choose to grant permission for the research to proceed, please do so in writing. A letter granting permission from the school district to conduct the survey on official letterhead will be needed to submit to the Institutional Review Board of the University of Oklahoma. Specific names of proposed participants will be provided to you in the event that this research is approved.

Thank-you,

Kathy Draper

APPENDIX D. OCPS REQUEST TO CONDUCT RESEARCH STUDY

Type or print neatly. Applications may be typed on a blank page with each question identified as numbered below. All statements and signatures must appear on the pages. For assistance please call the Planning, Research, and Evaluation Department at (405)297-6811. Applications for research are evaluated by a committee of district administrators selected on the basis of their relationship to the nature of the research. It is our intent to respond to research applications within four weeks, however, in some cases the actual response time may vary because of scheduling conflicts. Please note: research involving direct access to students is not scheduled after March 1.

(1) Project Title: An Examination of the Relationship between Principal Technology Leadership and Technology Integration in Urban Schools

(2) Applicant's Name: Kathy Draper

(3) Academic or Professional Affiliation (If Any) University of Oklahoma

(4 a.) Applicant's Mailing Address: 309 S. Wyndemere Lakes Dr., Moore, Oklahoma 73160

(4 b.) Applicant's E-Mail Address: kldraper@cox.net

(5) Home Phone Number: 405-642-2945

(6) Work Phone Number: 405-677-5252-ext 105

Graduate students must complete questions 7 through 10, below.

(7) Dean of your College: Dr. Joan K. Smith

(8) Advisor's Name: Dr. Jeffrey Maiden

(9) Advisor's Signature: _____

(10) Advisor's Phone Number: 405-325-1524

Involvement of Oklahoma City Public Schools

(11) Number of Subjects: School Principal

(12) Subject Selection Criteria: Building Administrator

(13) Total Instructional time per subject that will be required by this research: None

(14) OCPS Schools involved: All School Sites

(15) When do you plan to conduct this research? March 2009

(16) What potential risks are there for participants in your research? There are no risks. The participant is being asked to complete a survey.

(17) What provisions have you made to reduce these risks and to provide services in the event participants are harmed in any way be your research? To make the process easier I will include a letter explaining the study and self-addressed stamp envelope to return the survey to me.

(18) Are there any potential benefits to the participants? The benefits include a contribution to education that may include characteristics or qualities an administrator may or may not possess that lead to technology use in a school setting. The data may lead to professional development or mentor/coaching activities that increase use of technology in schools.

(19) Are there any potential benefits to the school system? The study could potentially guide professional development and allow the school system to see how Organizational Health correlates to technology integration in schools.

(20) Research conducted in the Oklahoma City Public Schools shall be done under conditions of informed consent. State specifically how you intend to inform your

participants of this condition. A cover letter will be drafted and attached to the survey that outlines the purpose and directions to complete the survey.

(21) State specifically how you intend to debrief the participants in this research: A cover letter will be drafted and attached to the survey that outlines the purpose and directions to complete the survey.

(22) State specifically how you will inform your participants they may withdraw at any time during the research: Withdrawal criteria will be stated on the cover letter they receive. A cover letter will be drafted and attached to the survey that outlines the purpose and directions to complete the survey.

Research Proposal

Please attach a formal, typed copy of your research proposal with these areas clearly identified and fully developed:

Purpose: Be concise but specific. Describe the problem you intend to study and your general research strategy.

Methodology: Describe exactly how you intend to conduct the research. Describe, in detail, the subjects, the materials, the experimental design, and the procedures.

Instruments: Your proposal should include a copy of any instrument that you intend to administer.

Your signature below indicates your agreement with the following statement: "I intend to conduct the proposed research in exactly the manner described. The data gathered will be used solely for the purposes of this research project."

(23) _____ (24)_____

applicant's signature date

Please return four copies of this form and four copies of your research proposal to:

Oklahoma City Public Schools

Planning, Research, and Evaluation Dept.

413 N.W. 12th St

Oklahoma City, Ok 73103

APPENDIX E. OCPS PERMISSION TO CONDUCT RESEARCH



Oklahoma City Public Schools

Planning Research and Evaluation Department

413 NW 12th Street, Oklahoma City, OK 73103

Phone: (405) 297-6776 Fax: (405) 297-6723

Richard Weeter, Ph.D. email: rdweeter@okcps.org

Wednesday, May 06, 2009

Ms. Kathy Draper

309 S. Wyndemere Lakes Dr.

Moore, OK 73160

Dear Ms. Draper:

I am pleased to be able to inform you that your application to conduct your research project, "An Examination of the Relationship between Principal Technology Leadership and Technology Integration in Urban Schools" has been has been reviewed and approved. On the basis of this district level approval, you have permission to contact Principals and ask them to participate.

All data collected must follow the general guidelines, conditions, and timelines described in your proposal and be conducted under conditions of informed consent. Should you determine that you require any substantive changes in these procedures, please contact me.

I will forward a copy of this letter to the principals at all Oklahoma City Public School sites so they will expect you to contact them. Good luck in collecting your data!

Sincerely,

Richard Weeter, Ph.D.

APPENDIX F. COVER LETTER TO PARTICIPANTS

May 21, 2009

Dear Colleague,

As a leader, you undoubtedly have ways in which you transform and guide your staff towards the integration of technology in schools. Graduate preparation programs, associations, and seasoned professionals must be aware of the strategies that will be most useful to you and other professionals in order to help promote professional development, competency, and commitment to the field. Your response to this survey can greatly enhance our understanding.

I am conducting research to explore technology use, technology leadership, and technology integration in schools and their relationship to student achievement. I want to measure the relationships between technology integration and technology leadership behaviors that exist with principals in an educational setting. I will also measure whether organizational factors, demographic settings, professional development and personal factors are related to Organizational Health dimensions. My population is school principals in two urban districts located in Oklahoma City and Texas.

You participation in this research is, of course, voluntary. The confidentiality of responses is fully assured. Return of the survey to me is your consent for your responses to be compiled with others. Please understand that use of this data will be limited to this research, as authorized by the University of Oklahoma. You also have the right to express concerns to me at the number below, my major professor Dr. Jeffrey Maiden at the OU Department of Educational Leadership and Policy Study) address shown below, or the OU Institutional Review Board.

I greatly appreciate your participation in this research. The survey will take approximately 15-20 minutes to complete. Please return the survey within two weeks (by June 5, 2009) in the enclosed, self-addressed, stamped envelope. This will save follow-up mailing to you.

Thank you for your interest and participation in this study. I genuinely appreciate your time.

Sincerely,

Kathy Draper
Doctoral Candidate
309 S. Wyndemere Lakes Dr.
Moore, Oklahoma 73160
405-642-2945; kldraper@cox.net

Faculty Sponsor:
Dr. Jeffery Maiden
Associate Professor
University of Oklahoma
Department of Educational Leadership and Policy Studies
820 Van Vleet Oval
Norman, OK 73019
405-325-1524
maiden@ou.edu

APPENDIX G. INFORMED CONSENT

Project Title: AN EXAMINATION OF THE RELATIONSHIP BETWEEN PRINCIPAL TECHNOLOGY LEADERSHIP AND TECHNOLOGY INTEGRATION IN URBAN SCHOOLS
Principal Investigator: Kathryn L. Draper
Department: Educational Administration and Curricular Supervision

You are being asked to volunteer for this research study. This study is being conducted at Great Oklahoma City area. You were selected as a possible participant because you are an administrator in K-12 Education.

Please read this form and ask any questions that you may have before agreeing to take part in this study.

Purpose of the Research Study

The purpose of this study is: This study will determine the relationships between technology integration and technology leadership behaviors that exist with principals in an educational setting. The study will seek to determine whether organizational factors, demographic settings, professional development and personal factors are related to Organizational Health dimensions.

Number of Participants

About 85 people will take part in this study.

Procedures

If you agree to be in this study, you will be asked to do the following: First, you will be asked to complete a brief 64 item survey. Each question is related to technology use and integration. Once the survey is completed you will be asked to mail the survey back to researcher using the self-addressed stamped envelope located in the packet. Secondly,

the researcher will contact Planning, Research, and Evaluation to gather 5 years worth of survey data from school sites where administrators completed the survey.

Length of Participation

The survey should take no long than 15-30 minutes to complete and mail back to the researcher.

This study has the following risks:

The study will be limited to principals in your urban district. The study may not be representative of small rural and mid-size suburban districts. However, the schools share common curriculum standards and similar demographics that are representative of school within other districts.

Benefits of being in the study are

The benefits include a contribution to education that may include characteristics or qualities an administrator may or may not possess that lead to technology use in a school setting. The data may lead to professional development or mentor/coaching activities that increase use of technology in schools.

Confidentiality

In published reports, there will be no information included that will make it possible to identify you without your permission. Research records will be stored securely and only approved researchers will have access to the records.

There are organizations that may inspect and/or copy your research records for quality assurance and data analysis. These organizations include the College of Education, Education Administration and Curriculum Studies and the OU Institutional Review Board.

Compensation

You will not be reimbursed for you time and participation in this study.

Voluntary Nature of the Study

Participation in this study is voluntary. If you withdraw or decline participation, you will not be penalized or lose benefits or services unrelated to the study. If you decide to participate, you may decline to answer any question and may choose to withdraw at any time.

Request for record information

If you approve, your confidential records will be used as data for this study. The records that will be used include Organizational Health Inventories. These records will be used for the following purpose(s): The Organizational Health Inventory data will be correlated to the technology survey to look at patterns with each of the ten dimensions.

_____ I agree for my Organizational Health Inventory records to be accessed and used for the purposes described above.

_____ I do not agree for my Organizational Health Inventory records to be accessed for use as research data.

Contacts and Questions

If you have concerns or complaints about the research, the researcher(s) conducting this study can be contacted at 405-642-2945 or kldraper@cox.net. Additionally, the researcher's advisor, Dr. Jeffrey Maiden may be contacted at 405-325-1524 or maiden@ou.edu.

Contact the researcher(s) if you have questions or if you have experienced a research-related injury.

If you have any questions about your rights as a research participant, concerns, or complaints about the research and wish to talk to someone other than individuals on the research team or if you cannot reach the research team, you may contact the University of Oklahoma – Norman Campus Institutional Review Board (OU-NC IRB) at 405-325-8110 or irb@ou.edu.

You will be given a copy of this information to keep for your records. If you are not given a copy of this consent form, please request one.

Statement of Consent

I have read the above information. I have asked questions and have received satisfactory answers. I consent to participate in the study.

Signature Date

APPENDIX H. INFORMED CONSENT TO PARTICIPATE IN RESEARCH STUDY

My name is Kathy Draper, and I am a doctoral candidate in Educational Administration and Curricular Studies at the University of the Oklahoma. I am requesting that you volunteer to participate in a research study titled, "An Examination of the Relationship Between Principal Technology Leadership and Technology Integration in Urban Schools." You were selected as a possible participant because. Please read this information sheet and contact me to ask any questions that you may have before agreeing to take part in this study.

Purpose of the Research Study: The purpose of this study is to determine the relationships between technology integration and technology leadership behaviors that exist with principals in an educational setting. The study will seek to determine whether organizational factors, demographic settings, professional development and personal factors are related to Organizational Health dimensions.

Procedures: If you agree to be in this study, you will be asked to do the following things: First, you will be asked to complete a brief 63 item survey. Each question is related to technology use and integration. Once the survey is completed you will be asked to mail the survey back to researcher using the self-addressed stamped envelope located in the packet.

Risks and Benefits of Being in the Study: The study has the following risks: The study will be limited to principals in your urban district. The study may not be representative of small rural and mid-size suburban districts. However, the schools share common curriculum standards and similar demographics that are representative of school within other districts. The benefits to participation are: The benefits include a

contribution to education that may include characteristics or qualities an administrator may or may not possess that lead to technology use in a school setting. The data may lead to professional development or mentor/coaching activities that increase use of technology in schools.

Compensation: You will not be compensated for your time and participation in this study.

Voluntary Nature of the Study: Participation in this study is voluntary. Your decision whether or not to participate will not result in penalty or loss of benefits to which you are otherwise entitled. If you decide to participate, you are free not to answer any question or discontinue participation at any time without penalty or loss of benefits to which you are otherwise entitled.

Length of Participation: The survey should take no longer than 15-30 minutes to complete and mailed back to the researcher in a self-addressed stamped envelope.

Confidentiality: The records of this study will be kept private and your supervisor will not have access to your responses. In published reports, there will be no information included that will make it possible to identify you as a research participant. Research records will be stored securely. Only approved researchers will have access to the records.

Contacts and Questions: If you have concerns or complaints about the research, the researcher(s) conducting this study can be contacted at 405-642-2945; kldraper@cox.net or Dr. Jeffrey Maiden, 405-325-1524; maiden@ou.edu. In the event of a research-related injury, contact the researcher(s). You are encouraged to contact the researcher(s) if you have any questions. If you have any questions, concerns, or

complaints about the research and wish to talk to someone other than the individuals on the research team, or if you cannot reach the research team, you may contact the University of Oklahoma – Norman Campus Institutional Review Board (OU-NC IRB) at (405) 325-8110 or irb@ou.edu.

Please keep this information sheet for your records. By completing and returning this questionnaire, I am agreeing to participate in this study.

APPENDIX I. STCP-NETS-A OKLAHOMA

Survey of Technology Competency and Proficiency to the National EducatiOnal Technology Standards for Administrators-Oklahoma

PART I

Please use a #2 pencil to darken the appropriate oval. Please choose only one answer per question.

Please select the response below that best refelcts your usage of technology as a school principal.

Response definitions: D=Daily, W=Weekly, M=Monthly, S=Seldom, N=Never

	D	W	M	S	N
1. I solve common printing problems.	o	o	o	o	o
2. I use formulas and/or functions in a spreadsheet.	o	o	o	o	o
3. I create a graph from spreadsheet data.	o	o	o	o	o
4. I copy a graphic from a website.	o	o	o	o	o
5. I send email messages and send/receive email attachmets.	o	o	o	o	o
6. I access a specific web-page (URL).	o	o	o	o	o
7. I search the Internet using a vareity of tools	o	o	o	o	o
8. I create and use bookmarks/favorites in a web browser	o	o	o	o	o
9. I create an electronic presentation	o	o	o	o	o
10. I reduce, enlarge, or crop a graphic and convert graphics from one file format to another.	o	o	o	o	o
11. I start up and shut down the computer; open and close an application/program; insert and eject a removable disk(floppy, CD-ROM)	o	o	o	o	o
12. I create, copy, move, rename, and delete files and folders on a computer	o	o	o	o	o
13. I cut, copy, move, rename, and delete files and folders on a computer	o	o	o	o	o

PART II Please select the response below that best represents the type of computer technology training you have received and the category for the number of hours of teach type of training you received.

Response Definition: A=0 Hrs. of training B= 1-12 Hrs of training C= 13-25 Hrs of training D=26-50 Hrs of training E=50 or more Hrs of training

	A	B	C	D	E
14. Administrator Certification Program-Computer use training	o	o	o	o	o
15. Administrator Certification Program- Technology integration training	o	o	o	o	o
16. Local school district- Computer use training	o	o	o	o	o
17. Local school district-Technology integration training	o	o	o	o	o
18. OK State Dept. of Education-Computer use training	o	o	o	o	o
19. Ok. State Dept. of Education-Technology integration training	o	o	o	o	o
20. Technology Leadership Training-Computer use training	o	o	o	o	o
21. Technology Leadership Training-Technology integration training	o	o	o	o	o
22. Professional educational organizations(Ex: O.T.A., C.C.O.S.A, A.S.C.D)	o	o	o	o	o

Survey of Technology Competency and Proficiency to the Natinal Educational Technology Standards for Administrators-Oklahoma

Part II Continued" Please select the response below that best represents the type of computer technology training you have received and the category from the number of hours of each type of training you have received.

Response Definition: A=0 Hrs. of training B= 1-12 Hrs of training C= 13-25 Hrs of training D=26-50 Hrs of training E=50 or more Hrs of training

	A	B	C	D	E
23. Professional education organizations (Ex: O.T.A., C.C.O.S.A, A.S.C.D). Technology integration training	o	o	o	o	o
24. Post graduate college/university courses-Computer use training	o	o	o	o	o
25. Post graduate college/university courses-Technology integration training	o	o	o	o	o
26. Other sources not mentioned here-Computer use training	o	o	o	o	o
27. Other sources not mentioned here-Technology integration training	o	o	o	o	o

PART III Principal Perceptions

Please select the response below that best represents your perception of implementation of computer technology integration in your school.

Response definitions: SD=Strongly Disagree, D=Disagree, A=Agree, SA=Strongly Agree

	SD	D	A	SA
28. I believe technology integration will improve student learning.	o	o	o	o
29. I believe technology integration will improve my school's test scores.	o	o	o	o
30. I believe teachers in my school are resistant to technology integration.	o	o	o	o
31. I believe the money and staffing used to integrate technology take away from more important areas in my school.	o	o	o	o
32. I have participated in an inclusive district process through which stakeholders formulate a shared vision that clearly defines expectations for technology use	o	o	o	o
33. I have developed a collaborative, technology-rich school improvement plan, grounded in research and aligned with the district strategic plan	o	o	o	o
34. I promote highly effective practices in technology integration among faculty and other staff.	o	o	o	o
35. I assist teachers in using technology to access, analyze, and interpret student performance data, and in using results to appropriately design, assess, and modify student instruction	o	o	o	o
36. I collaboratively design, implement, support and participate in professional development for all instructional staff that institutionalize effective integration of technology for improved student learning.	o	o	o	o
37. I use current technology-based management systems to access and maintain personnel and student records	o	o	o	o

Survey of Technology Competency and Proficiency to the National Educational Technology Standards for Administrators-Oklahoma

Please select the response below that best reflects your opinion of the associated statement.

Response definitions: SD=Strongly Disagree, D=Disagree, A=Agree, SA=Strongly Agree

	SD	D	A	SA
38. I use a variety of media and formats, including telecommunications and the school website to communicate, interact, and collaborate with peers, experts, and other education stakeholders.	o	o	o	o
39. I provide campus-wide staff development for sharing work and resources across commonly used formats and platforms	o	o	o	o
40. I allocate campus discretionary funds and other resources to advance implementation of the technology plan.	o	o	o	o
41. I advocate for adequate, timely and high quality technology support services	o	o	o	o
42. I promote and model the use of technology to access, analyze, and interpret campus data to focus efforts for improving student learning and productivity	o	o	o	o
43. I implement evaluation procedures for teachers that assess individual growth toward established technology standards and guide professional development planning	o	o	o	o
44. I include effectiveness of technology use in learning and teaching process as criteria in assessing performance of instructional staff	o	o	o	o
45. I secure and allocate technology resources to enable teachers to better meet the needs for all learners on campus	o	o	o	o
46. I adhere to and enforce among staff and studetns the district's acceptable use policy and other policies and procedures related to security, copyright, and technology use.	o	o	o	o
47. I participate in the development Safe, Fit, and Healthy Schools plans that support and focus on health and environmentally safe practices related to the use of technology	o	o	o	o

Please rate the following sources of information about education you value as a school principal.

Response definition: N=Not important, SI=Slightly important, IM=Important, VI=Very important, ES=Essential

	NI	SI	IM	VI	ES
48. Peer principals	o	o	o	o	o
49. Administrators from the administration office in my district	o	o	o	o	o
50. Educators from the	o	o	o	o	o
51. University/college professors of education/administration	o	o	o	o	o
52. Fellow educators from professional organizations(EX: O.T.A., C.C.O.S.A, A.S.C.D).	o	o	o	o	o

Survey of Technology Competency and Proficiency to the National Educational Technology Standards for Administrators-Oklahoma

Darken the appropriate oval that best decribes the amount of pressure you feel from each of the sources below toward the implementation of computer technology integration in your school.

Response definitions: N=No pressure, L=Low perssure, M=Moderate pressure, H=High pressure

	N	L	M	H
53. The public and community where my school is located	o	o	o	o
54. The school district administration office	o	o	o	o
55. Oklahoma State Department of Education and state requirements	o	o	o	o
56. Peer principals, both within and outside the district	o	o	o	o
57. Teachers in my school	o	o	o	o
58. Students in my school	o	o	o	o
59. Parents in my school	o	o	o	o
60. Other sources	o	o	o	o

PART IV General Information

Please print the name of your school site in the boxes below(one letter per box).

Response definitions: Y=Yes N=No

62. At present, my campus school populations contains moer minority students than non-minority students	o	o	o	o
63. At present, my campus qualifies for school-wide Title I funding	o	o	o	o

APPENDIX J. STCP-NETS-A TEXAS

Survey of Technology Competency and Proficiency to the National Educational Technology Standards for Administrators-Texas

PART I

Please use a #2 pencil to darken the appropriate oval. Please choose only one answer per question.
Please select the response below that best reflects your usage of technology as a school principal.

Response definitions: D=Daily, W=Weekly, M=Monthly, S=Seldom, N=Never

	D	W	M	S	N
1. I solve common printing problems.	o	o	o	o	o
2. I use formulas and/or functions in a spreadsheet.	o	o	o	o	o
3. I create a graph from spreadsheet data.	o	o	o	o	o
4. I copy a graphic from a website.	o	o	o	o	o
5. I send email messages and send/receive email attachments.	o	o	o	o	o
6. I access a specific web-page (URL).	o	o	o	o	o
7. I search the Internet using a variety of tools	o	o	o	o	o
8. I create and use bookmarks/favorites in a web browser	o	o	o	o	o
9. I create an electronic presentation	o	o	o	o	o
10. I reduce, enlarge, or crop a graphic and convert graphics from one file format to another.	o	o	o	o	o
11. I start up and shut down the computer; open and close an application/program; insert and eject a removable disk (floppy, CD-ROM)	o	o	o	o	o
12. I create, copy, move, rename, and delete files and folders on a computer	o	o	o	o	o
13. I cut, copy, move, rename, and delete files and folders on a computer	o	o	o	o	o

PART II Please select the response below that best represents the type of computer technology training you have received and the category for the number of hours of teach type of training you received.

Response Definition: A=0 Hrs. of training B= 1-12 Hrs of training C= 13-25 Hrs of training D=26-50 Hrs of training E=50 or more Hrs of training

	A	B	C	D	E
14. Administrator Certification Program-Computer use training	o	o	o	o	o
15. Administrator Certification Program- Technology integration training	o	o	o	o	o
	o	o	o	o	o
16. Local school district- Computer use training	o	o	o	o	o
17. Local school district-Technology integration training	o	o	o	o	o
18. T.E.A Regional Service Center-Computer use training	o	o	o	o	o
19. T.E.A Regional Service Center-Technology integration training	o	o	o	o	o
20. Technology Leadership Training-Computer use training	o	o	o	o	o

21. Technology Leadership Training-Technology Integration training	o	o	o	o	o
22. Professional educational organizations (Ex: T.E.P.S.A, A.S.C.D)					
23. Professional education organizations (Ex: T.E.P.S.A, A.S.C.D, etc).	o	o	o	o	o
Technology integration training	o	o	o	o	o
24. Post graduate college/university courses-Computer use training	o	o	o	o	o
25. Post graduate college/university courses-Technology integration training	o	o	o	o	o
26. Other sources not mentioned here-Computer use training	o	o	o	o	o
27. Other sources not mentioned here-Technology integration training	o	o	o	o	o

PART III Principal Perceptions

Please select the response below that best represents your perception of implementation of computer technology integration in your school.

Response definitions: SD=Strongly Disagree, D=Disagree, A=Agree, SA=Strongly Agree

	SD	D	A	SA
28. I believe technology integration will improve student learning.	o	o	o	o
29. I believe technology integration will improve my school's test scores.	o	o	o	o
30. I believe teachers in my school are resistant to technology integration.	o	o	o	o
31. I believe the money and staffing used to integrate technology take away from more important areas in my school.	o	o	o	o
32. I have participated in an inclusive district process through which stakeholders formulate a shared vision that clearly defines expectations for technology use	o	o	o	o
33. I have developed a collaborative, technology-rich school improvement plan, grounded in research and aligned with the district strategic plan	o	o	o	o
34. I promote highly effective practices in technology integration among faculty and other staff.	o	o	o	o
35. I assist teachers in using technology to access, analyze, and interpret student performance data, and in using results to appropriately design, assess, and modify student instruction	o	o	o	o
36. I collaboratively design, implement, support and participate in professional development for all instructional staff that institutionalizes effective integration of technology for improved student learning.	o	o	o	o
37. I use current technology-based management systems to access and maintain personnel and student records	o	o	o	o

Please select the response below that best reflects your opinion of the associated statement.

Response definitions: SD=Strongly Disagree, D=Disagree, A=Agree, SA=Strongly Agree

	SD	D	A	SA
38. I use a variety of media and formats, including telecommunications and the school website to communicate, interact, and collaborate with peers, experts, and other education stakeholders.	o	o	o	o
39. I provide campus-wide staff development for sharing work and resources across commonly used formats and platforms	o	o	o	o
40. I allocate campus discretionary funds and other resources to advance implementation of the technology plan.	o	o	o	o
41. I advocate for adequate, timely and high quality technology support services	o	o	o	o
42. I promote and model the use of technology to access, analyze, and interpret campus data to focus efforts for improving student learning and productivity	o	o	o	o
43. I implement evaluation procedures for teachers that assess individual growth toward established technology standards and guide professional development planning	o	o	o	o
44. I include effectiveness of technology use in learning and teaching process as criteria in assessing performance of instructional staff	o	o	o	o
45. I secure and allocate technology resources to enable teachers to better meet the needs for all learners on campus	o	o	o	o
46. I adhere to and enforce among staff and students the district's acceptable use policy and other policies and procedures related to security, copyright, and technology use.	o	o	o	o
47. I participate in the development Safe, Fit, and Healthy Schools plans that support and focus on health and environmentally safe practices related to the use of technology	o	o	o	o

Please rate the following sources of information about education you value as a school principal.

Response definition: N=Not important, SI=Slightly important, IM=Important, VI=Very important, ES=Essential

	NI	SI	IM	VI	ES
48. Peer principals	o	o	o	o	o
49. Administrators from the administration office in my district	o	o	o	o	o
50. Educators from the	o	o	o	o	o
51. University/college professors of education/administration	o	o	o	o	o
52. Fellow educators from professional organizations (EX: TASA, TEPSA A.S.C.D).	o	o	o	o	o

Survey of Technology Competency and Proficiency to the National Educational Technology Standards for Administrators-Texas

Darken the appropriate oval that best describes the amount of pressure you feel from each of the sources below toward the implementation of computer technology integration in your school.

Response definitions: N=No pressure, L=Low pressure, M=Moderate pressure, H=High pressure

	N	L	M	H
53. The public and community where my school is located	o	o	o	o
54. The school district administration office	o	o	o	o
55. Oklahoma State Department of Education and state requirements	o	o	o	o
56. Peer principals, both within and outside the district	o	o	o	o
57. Teachers in my school	o	o	o	o
58. Students in my school	o	o	o	o
59. Parents in my school	o	o	o	o
60. Other sources	o	o	o	o

PART IV General Information

Please print the name of your school site in the boxes below (one letter per box).

Response definitions: Y=Yes N=No

62. At present, my campus school populations contains more minority students than non-minority students	o	o
63. At present, my campus qualifies for school-wide Title I funding	o	o