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Teacher Perceptions of Effective School Leadership Using Twenty-first Century Skills and Knowledge

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Teacher Perceptions of Effective School Leadership Using Twenty-first Century Skills and Knowledge

by

Bobbie Anita Augspurger

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A Dissertation submitted to the Education Faculty of Lindenwood University in

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This Dissertation has been approved as partial fulfillment

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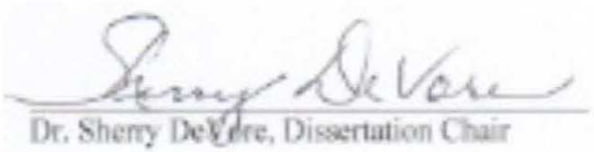

Dr. Sherry DeVore, Dissertation Chair

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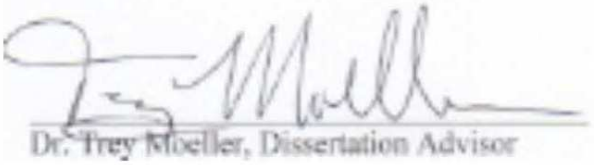
Date



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Dr. Terry Reid, Committee Member

November 1, 2013

Date

Declaration of Originality

I do hereby declare and attest to the fact that this is an original study based solely upon my own scholarly work at Lindenwood University and that I have not submitted it for any other college or university course or degree.

Bobbie Anita Augspurger

Signature: Bobbie Augspurger Date: Nov. 1, 2013

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Abstract

This quantitative study was conducted to examine the primary components of school leadership for 21st-century skills and knowledge integration. With the passing of the National Educational Technology Standards (NETS) for students, teachers, and administrators, the need for administrative leadership within the realm of technology is continually evolving and growing. The NETS based survey required teachers from three varying sized school districts, who have implemented a 1:1 student device initiative, to answer statements, using a Likert scale, about themselves and their principal. Survey statement data results were revealed using a Pearson Product Moment Correlation Coefficient formula, scatter plots, and regression studies to investigate relationships between a teacher's use of 21st-century teaching skills and knowledge and his/her principal's use of 21st-century leadership skills and knowledge. Additionally investigated were what 21st-century leadership practices appear to be associated with the use of 21st-century instructional practices to effectively support teacher and student learning. This research project harvested surprising results that addressed perceptions of effective practices, characteristics, and leadership styles from the front line of learning and teaching, teachers; and, which are relevant to new mandates in education and applicable to the National Educational Technology Standards (NETS), also referred to as the International Society for Technology in Education (ISTE) standards, for both teachers and administrators.

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Chapter One: Introduction

Arne Duncan (2009), U.S. Secretary of Education stated, "Just simply investing in the status quo isn't going to get us where we need to go…. We're competing with children from around the globe for jobs of the future" (Duncan, 2009, p. 2). Education leaders, according to Bakia, Murphy, Anderson, and Trinidad (2011), were then challenged by Duncan (2009) to focus on four primary areas. The areas included standards adoption for student college and workforce success, retention and recruitment of quality teachers, addressing low performing schools and ways to increase performance, and tracking both student achievement and teacher effectiveness (Bakia et al., 2011; Duncan, 2009). In response to these challenges, Schrum and Levin (2009) proposed:

> One framework we use is the newly refreshed National Educational Technology Standards (International Society for Technology in Education [ISTE], 2009), which provides guiding principles for how school leaders can inspire, advance, and sustain the integration of 21st-century technology in their schools and districts. (p. xii)

Experts agreed leaders must effectively use and implement 21st-century skills and knowledge to drive relevant long-term change (Lessen & Sorenson, 2006). An essential role for leaders has been to analyze what components and practices continue to be most effective for supporting teacher and student learning (Akbaba-Altun, 2004).

In November of 2010, Congress was presented the Administration's National Education Technology Plan, *Transforming American Learning Powered by Technology*, developed by the Department of Education, which stated "education is the key to

America's economic growth and prosperity and to our ability to compete in the global economy" (U.S., 2010, p. ix). Furthermore, they then recommended educators "should implement a new approach to research and development (R&D) in education that focuses on scaling innovative best practices in the use of technology in teaching and learning . . ." (U.S., 2010, p. x).

Schools must examine development of essential 21st-century leadership responsibilities stemming from societal advances, which are constantly improving to proactively initiate systemic change (Akbaba-Altun, 2004). Current school leadership roles and student learning expectations are outdated (Bakia et al., 2011). According to Bakia et al. (2011), communities across the globe continue to actively invest in information and communication technologies (ICT) to improve education. Bakia et al. (2011) has further advocated for global analysis of defining the common issue of "how best to support teachers and students in acquiring the skills necessary to teach and learn with technology" (p. 50). Schrum and Levin (2009) explained in more depth that technology has offered a variety of ways to support learning and instruction; and thereby, helping school leaders become more effective. Leaders who conceptualize "a vision and plans for harnessing digital technology for teaching and learning is very important due to the needs of 21st-century students and teachers, especially given the continuing need to improve achievement for all students" (Schrum & Levin, 2009, p. xii).

Background of the Study

Educational leadership and administration patterns of North America, Australia, and the United Kingdom were synthesized in a peer reviewed article by Kowch (2009), who referenced an educational leadership handbook by Leithwood and Hallinger (2002).

Within the handbook, an original study by Blasé and Blasé (1996) was described. Blasé and Blasé (1999) conducted an additional study where more than 800 teachers replied to an open-ended questionnaire over teachers' perspectives on effective instructional leadership. This empirical study gave an overview that allowed for further dissemination of leadership perspectives with education trends and patterns. Kowch (2009) classified organizational and policy patterns by decade and detailed both the teacher and student societal influences of each era from 1950 to present; whereas, Blasé and Blasé (1996) addressed theories and detailed data disseminated strategies and themes.

Kowch's (2009) overview explained how educational thinking and practices have evolved from objective, where individual feelings are not taken into consideration when learning, to subjective, where individual feelings drive how learning occurs. Even more relevant, according to both Blasé & Blasé (1999) and Kowch (2009), is how good administrative characteristics have also evolved based on the shift to a more subjective-based, or decentralized, leadership theory. As explained by Bush (1995) in his book, subjective educational models of leadership focus on goals, structure, environment, and leadership while emphasizing the importance of individuals.

According to Kowch (2009), during the 1950s and 1960s educational leadership was guided by set rules and work structures to meet pre-set goals. Objective leadership focused primarily on transactions or workflow outcomes and considered the teachers' needs separate from the educational organization's needs (Kowch, 2009). Furthermore, this education theory was "premised on the widespread belief that school leadership is central to school improvement" (Leithwood & Sun, 2012, p. 388). Kowch (2009)

pointed out a shift from objective to subjective theory began with the open systems theory in the 1970s.

In fact, schools evolved into learning organizations rather than institutions of learning (O'Neil, 1995). Open systems theory, as Kowch (2009) explained, considered schools organisms that had a strong relationship with the external environment; and as such, required that information be gathered to find out what was wrong with teachers. This information was then used to offer professional development to fix the teacher (Kowch, 2009). Yet, according to Willis (1994), school organizations adapted the viewpoint that together we can accomplish more than any one individual.

Further, O'Neil (1995) expounded that the theory of learning organization empowerment stemmed from having open systems where a diversity of viewpoints was celebrated and ultimately strengthened the school environment. Both Kowch's (2009) data and Leithwood and Sun's (2012) data supported school improvement focus was derived from nonschool contexts and has moved leadership into a subjective theory by blending servant leadership and strategic leadership. Similarly, Blasé and Blasé (1999) summarized instructional leadership as prescriptive where the principal was charged with the decentralization of decision making in a participative relationship.

Instructional leadership in the 1980s blended relationships with organization and focused on elements of systematic processes for school improvement such as aligning curriculum, instruction practices, and school goals (Blasé & Blasé, 1996; Leithwood & Hallinger, 2002). Subjective theory has continued to evolve with the 1990s transformational leadership model (Kowch, 2009). Leithwood and Sun (2012) characterized transformational leadership as focused on meeting individual growth needs

and individual growth potential through motivation. Furthermore, Leithwood and Sun (2012) explained motivation has a positive impact on one's ability to achieve more and perform better. In fact, "Transformational leadership theory claims that a relatively small number of leadership behaviors or practices are capable of increasing the commitment and effort of organizational members toward the achievement of organizational goals" (Leithwood & Sun, 2012, p. 388). This had been previously supported by Blasé and Blasé (1999) who stated, ". . . the restructuring of schools to empower teachers and implement school-based shared decision making has resulted in a move away from bureaucratic control and toward professionalization of teaching" (p. 130).

Christensen, Horn, and Johnson (2008) generalized that subjective contingency leadership in education marked the 2000s, due to school organizations having addressed technology and global networking. More importantly, learning technology changes have been restructuring education, thereby creating more complex school systems and helping to shape what schools will become (Kowch, 2009). Unfortunately, most schools still operated in the 20th-century format and needed to develop and encourage strategic leadership for the 21st-century (Schrum & Levin, 2009).

One educational format that has increased in recent years is online learning (U.S. Department of Education, 2010). The most current meta-analysis final report listed on the office of planning, evaluation, and policy development, for the U.S. Department of Education (2010) concluded that students in online learning conditions performed better than those receiving only face-to-face instruction. Likewise, Kowch (2009) cited an estimated annual growth of 30% for online learning. This anticipated growth has been due to growing concern about the public schools' ability to individualize student

educational experiences (Kowch, 2009). According to Schrum and Levin (2009), "administrative support is the most important factor in technology implementation and that without it other variables will be negatively affected" (p. xiv). Consequently, as Kowch (2009) explained, developing leaders has remained an essential focus for continued growth within the school systems.

Research programs through the U. S. Department of Education (2006) have focused their discretionary and competitive grants intending to identify, evaluate, develop, and provide evidence of effectiveness for educational leadership and management practices that would potentially enhance the teaching and learning environment. Similarly, Blasé and Blasé (1999) addressed the need "for more research into the effects of leader behavior on teacher behavior, the relationship of instructional leadership to teaching, instructional leaders' characteristics, and conditions necessary for effective instructional leadership" (p. 131). In fact, The U.S. Department of Education (2010) has continued their grants program focus on educational research and development.

Due to increased online learning in education and the continued need for effective leadership, research for this study has focused on the examination of technology leadership components. These components comprise: (a) determining various leadership roles, (b) determining necessary skills to be effective, and (c) determining how effective technology leadership has evolved. Evaluation of these components was essential to provide an accurate overview of how technology leadership directly effects the school environment now and in the future.

Conceptual Underpinnings

The National Educational Technology Standards (NETS) (2009), national instructional and communication technologies expectations for administrators and teachers, served as the conceptual framework for this study. This was appropriate because these nationally recognized expectations explain "standards for evaluating the skills and knowledge school administrators and leaders need to support digital age learning, implement technology, and transform the instructional landscape" (ISTE, 2013, p. 1). In fact:

> A National Education Association (2007) study found that two-thirds of voters say we need to incorporate a broader range of skills in our curriculum, and that nearly eight in ten want an equal balance between basic and 21-century skills, and almost nine in ten believe that those 21-century skills can and should be part of the curriculum. (Schrum & Levin, 2009, p. 161)

The NETS components are interwoven between five teacher and five administrator expectations with task differentiation to fully implement systemic change (ISTE, 2013). More relevantly for this study, the NETS for Teachers (NETS-T) and Administrators (NETS-A) were used in framing the survey statements.

The NETS-T (2009) Standard 1 elements were used to frame survey statements one, two, and nine. Survey statement one specifically references sub-topics b and c, while alluding to potentially utilizing sub-topics a and d. Statement two specifically references sub-topics c and d, while the potential for using a and b are available. Statement nine specifically references sub-topics b and c with potential application of sub-topics a and d. The NETS-T (2009) Standard 1 elements are:

> Teachers use their knowledge of subject matter, teaching and learning, and technology to facilitate the experiences that advance student learning, creativity, and innovation in both face-to-face and virtual environments.
>
> a. Promote, support, and model creative and innovative thinking and inventiveness
>
> b. Engage students in exploring real-world issues and solving authentic problems using digital tools and resources
>
> c. Promote student reflection using collaborative tools to reveal and clarify students' conceptual understanding and thinking, planning, and creative processes
>
> d. Model collaborative knowledge construction by engaging in learning with students, colleagues, and others in face-to-face and virtual environments (p. 1)

The NETS-A (2009) Standard 1 elements were used to frame survey statements 12 and 17. Statement 12 and 17 both specifically reference the sub-topics of a, b, and c. The NETS-A (2009) Standard 1 elements are:

> 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.
>
> a. Inspire and facilitate among all stakeholders a shared vision of purposeful change that maximizes use of digital-age resources to meet and exceed learning goals, support effective instructional practice, and maximize performance of district and school leaders
>
> b. Engage in an ongoing process to develop, implement, and communicate technology-infused strategic plans aligned with a shared vision

c. Advocate on local, state and national levels for policies, programs, and funding to support implementation of a technology-infused vision and strategic plan (p. 1)

The NETS-T (2009) Standard 2 elements were used to frame survey statement seven. Statement seven specifically refers to sub-topics a and d, while alluding to potentially utilizing sub-topics b and c. The NETS-T (2009) Standard 2 elements are:

Teachers design, develop, and evaluate authentic learning experiences and assessment incorporating contemporary tools and resources to maximize content learning in context and to develop the knowledge, skills, and attitudes identified in the NETS-S.

a. Design or adapt relevant learning experiences that incorporate digital tools and resources to promote student learning and creativity

b. Develop technology-enriched learning environments that enable all students to pursue their individual curiosities and become active participants in setting their own educational goals, managing their own learning, and assessing their own progress

c. Customize and personalize learning activities to address students' diverse learning styles, working strategies, and abilities using digital tools and resources

d. Provide students with multiple and varied formative and summative assessments aligned with content and technology standards and use resulting data to inform learning and teaching (p. 1)

The NETS-A (2009) Standard 2 elements were used to frame survey statements 14 and 18. Statement 14 specifically refers to sub-topics b, c, and e, while alluding to potentially application of sub-topics a and d. Statement 17 specifically refers to sub-

topics a, c, and e with the potential application of sub-topics b and d. The NETS-A (2009) standard 2 elements are:

> Educational Administrators create, promote, and sustain a dynamic, digital-age learning culture that provides a rigorous, relevant, and engaging education for all students.
>
> a. Ensure instructional innovation focused on continuous improvement of digital-age learning
>
> b. Model and promote the frequent and effective use of technology for learning
>
> c. Provide learner-centered environments equipped with technology and learning resources to meet the individual, diverse needs of all learners
>
> d. Ensure effective practice in the study of technology and its infusion across the curriculum
>
> e. Promote and participate in local, national, and global learning communities that stimulate innovation, creativity, and digital age collaboration (p. 1)

The NETS-T (2009) Standard 3 elements were used to frame survey statements three, eight, and 10. Statement three specifically references sub-topics b and c, while alluding to potentially utilizing sub-topics a and d. Statement eight specifically references sub-topics c and d, while the potential for using a and b are available. Statement 10 specifically references sub-topics b and c with potential application of sub-topics a and d. The NETS-T (2009) standard 3 elements are:

> Teachers exhibit knowledge, skills, and work processes representative of an innovative professional in a global and digital society.

a. Demonstrate fluency in technology systems and the transfer of current knowledge to new technologies and situations

b. Collaborate with students, peers, parents, and community members using digital tools and resources to support student success and innovation

c. Communicate relevant information and ideas effectively to students, parents, and peers using a variety of digital age media and formats

d. Model and facilitate effective use of current and emerging digital tools to locate, analyze, evaluate, and use information resources to support research and learning (p. 1)

The NETS-A (2009) Standard 3 elements were used to frame survey statements 13 and 20. Statement 13 specifically references sub-topics a, b, and c with the inferred potential application of sub-topic d; and, statement 20 references sub-topic c. The NETS-A (2009) Standard 3 elements are:

Educational Administrators promote an environment of professional learning and innovation that empowers educators to enhance student learning through the infusion of contemporary technologies and digital resources.

a. Allocate time, resources, and access to ensure ongoing professional growth in technology fluency and integration

b. Facilitate and participate in learning communities that stimulate, nurture and support administrators, faculty, and staff in the study and use of technology

c. Promote and model effective communication and collaboration among stakeholders using digital age tools

> d. Stay abreast of educational research and emerging trends regarding effective use of technology and encourage evaluation of new technologies for their potential to improve student learning (p. 1)

The NETS-T (2009) Standard 4 elements were used to frame survey statements four, five, and six. Statement four specifically refers to sub-topic b, while alluding to potentially utilizing sub-topics a c, and d. Statement five specifically refers to sub-topic a, while the potential for using b, c, and d are available. Statement six specifically refers to sub-topic c, with potential application of sub-topics a, b, and d. The NETS-T (2009) Standard 4 elements are:

> Teachers understand local and global societal issues and responsibilities in an evolving digital culture and exhibit legal and ethical behavior in their professional practice
>
> a. Advocate, model, and teach safe, legal, and ethical use of digital information and technology, including respect for copyright, intellectual property, and the appropriate documentation of sources
>
> b. Address the diverse needs of learners by using learner-centered strategies providing equitable access to appropriate digital tools and resources
>
> c. Promote and model digital etiquette and responsible social interactions related to the use of technology and information
>
> d. Develop and model cultural understanding and global awareness by engaging with colleagues and students of other cultures using digital age communication and collaboration tools (p. 2)

The NETS-A (2009) Standard 4 elements were used to frame survey statement 11. Statement 11 specifically refers to the sub-topics of a, b, and e, while a alluding to the potential application of sub-topics c and d. The NETS-A (2009) Standard 4 elements are:

> Educational Administrators provide digital age leadership and management to continuously improve the organization through effective use of information and technology resources.
>
> a. Lead purposeful change to maximize the achievement of learning goals through the appropriate use of technology and media-rich resources
>
> b. Collaborate to establish metrics, collect and analyze data, interpret results, and share findings to improve staff performance and student learning
>
> c. Recruit and retain highly competent personnel who use technology creatively and proficiently to advance academic and operational goals
>
> d. Establish and leverage strategic partnerships to support system improvement
>
> e. Establish and maintain a robust infrastructure for technology including integrated, interoperable technology systems to support management, operations, teaching, and learning (p. 2)

The NETS-T (2009) Standard 5 elements were used to frame survey statement seven. Statement seven specifically refers to sub-topics a, c, and d while alluding to potentially utilizing sub-topic b. The NETS-T (2009) Standard 5 elements are:

> Teachers continuously improve their professional practice, model lifelong learning, and exhibit leadership in their school and professional community by promoting and demonstrating the effective use of digital tools and resources.

a. Participate in local and global learning communities to explore creative applications of technology to improve student learning

b. Exhibit leadership by demonstrating a vision of technology infusion, participating in shared decision making and community building, and developing the leadership and technology skills of others

c. Evaluate and reflect on current research and professional practice on a regular basis to make effective use of existing and emerging digital tools and resources in support of student learning

d. Contribute to the effectiveness, vitality, and self-renewal of the teaching profession and of their school and community (p. 2)

The NETS-A (2009) Standard 5 elements were used to frame survey statements 15, 16, and 19. Statement 15 specifically references sub-topic d with the potential application of sub-topics a, b, and c. Statement 16 specifically references sub-topic b with the potential application of sub-topics a, c, and d. Statement 19 specifically references sub-topics b, c, and d with the potential application of sub-topic a. The NETS-A (2009) Standard 5 elements are:

Educational Administrators model and facilitate understanding of social, ethical, and legal issues and responsibilities related to an evolving digital culture.

a. Ensure equitable access to appropriate digital tools and resources to meet the needs of all learners

b. Promote, model and establish policies for safe, legal, and ethical use of digital information and technology

c. Promote and model responsible social interactions related to the use of technology and information

d. Model and facilitate the development of a shared culture understanding and involvement in global issues through the use of contemporary communication and collaboration tools (p. 2)

In addition to study relevance with regards to technology relevant teacher and administrator practices, according to Blasé and Blasé (1999), “few studies have directly examined teacher’s perspectives on principals’ everyday instructional leadership characteristics and the impacts of those characteristics on teachers” (p. 130). Furthermore, Schwahn and McGarvey (2011) prompted the continued examination of effective leadership components and practices, when they stated no one “believes that public schools are doing a good job of preparing our students for the future” (loc. 131). Therefore, both the teacher-based statements and principal-based statements were NETS-component based (see Table 1).

Table 1.

NETS Based Survey Statement Components

Teacher Self Assessment	Component	Teacher Principal Assessment
Statement 1	Digital Age Leadership and Management	Statement 11
Statement 2	Development and Implementation	Statement 12
Statement 3	Collaboration	Statement 13
Statement 4	Culture is Rigorous Relevant and Engaging	Statement 14
Statement 5	Responsible and Ethical Use of Information	Statement 15
Statement 6	Digital Safety	Statement 16
Statement 7	Instruction and Resources Utilizing Technology	Statement 17
Statement 8	Collaboration with Data Collecting and Analyzing	Statement 18
Statement 9	Reflection for Growth and Improvement	Statement 19
Statement 10	Communication and Involvement	Statement 20

Note. Adapted from the NETS (2009).

Leadership skills are necessary to effectively implement the NETS within any educational setting in the 21st-century. Instructional leadership has slowly evolved in conjunction with school practices and policies; and, according to Blasé & Blasé (1999) has been outpaced by private and charter schools that offer more individualized education options for students. The NETS (2009) has provided a set of expectations for leaders, which, according to the ISTE (2012), "[is] based on the premise that there is a common core of skills and knowledge" (loc. 53) that must be integrated into all educational settings.

Therefore, for the purpose of this study, survey information from statements 11-20 was desegregated into the NETS-A components for accurate conclusions and recommendations towards achieving excellence in professional practice (ISTE, 2012). Whereas, survey information from statements one through 10 was desegregated into the NETS-T components for profile comparisons with ISTE coaching information for accurate conclusions and chapter five recommendations.

Quoted from Duncan's (2009) speech, "Just simply investing in the status quo isn't going to get us where we need to go…" (Bakia et al., 2011, p. 1; Duncan, 2009, p. 2) because continued examination of leadership components and practices, in regard to 21st-century skills and integration, is a priority. Remaining important is the continued examination of effective leadership components and practices, which constituted the basis for this study. The continuing examination of leadership serves to determine relationships and patterns of effective implementation needed to initiate systemic change for improved leadership development. Technology "offers school leaders many ways to support needed changes in student learning and achievement, teacher instruction and

productivity, and communication with other stakeholder groups" (Schrum & Levin, 2009, p. xii).

Statement of the Problem

Due to the evolving nature of effective 21st-century leadership in the educational system, and necessity of this role within the educational community, there has traditionally been a lack of consistency in what qualities and skills are most needed for effective implementation and incorporation of systemic change using 21st-century skills and knowledge throughout the educational organization (Kowch, 2009). Globally, the United States of America has addressed this through the passing of the NETS (2009) and Information Literacy expectations with essential conditions necessary to effectively leverage technology for learning (NETS, 2009). The Missouri Schools K-12 (2011) census of technology report showed gains for student education in technology, but left out components of leadership development.

As Li (2010) maintained, leaders must explore what their attributes are and the "characteristics, skills, and behaviors of effective open leaders" in order to drive meaningful change (loc. 259). This need for examining effective leadership components was reiterated by Schwahn and McGarvey (2011). They further explained that organizational leaders have been responsible "for 1) setting the organization's direction, and 2) creating the organizational alignment that will effectively move the organization in that direction" (Schwahn & McGarvey, 2011, loc.2931) in order to employ the performance role of authentic visionary leader.

Akbaba-Altun (2004) pointed out in his study to determine relationship between leadership styles and effective use of educational technology in Turkey, "Managing

'school-change' and improvement is one of the most complex tasks faced by the educational administrators" (p. 256). Given the global awareness and complexity of this problem and by utilizing the NETS (2009) framework, the findings of this study may generalize to a wider educational audience.

Purpose of the Study

The purpose of this study was to examine components of school leadership as referenced in the NETS (2009) for 21st-century skills and knowledge integration. According to longitudinal study research by Ringstaff and Kelley (2002), "Although technology can support educational change, it will have little impact without accompanying reform at the classroom, school, and district level" (p. 11). Ringstaff and Kelley (2002) also explained how technology must continue to be interwoven throughout education in order to bring about meaningful systemic educational reform.

This quantitative study was designed to investigate relationships between a teacher's use of 21st-century teaching skills and knowledge and his/her principal's use of 21st-century leadership skills and knowledge. Additionally investigated were the 21st-century leadership practices that are associated with the use of 21st-century instructional practices to effectively support teacher and student learning as perceived by the teacher. These determinations may be used to provide a framework of best practices and skills for successful technology leadership and implementation school wide, thereby, better preparing school communities for change leadership and creating successful educational experiences in the 21st-century.

Research Questions

The following research questions and hypotheses guided the study:

1. What is the relationship between a teacher's integration of technology skills and knowledge in the classroom and his/her principal's integration of technology skills and knowledge in the building?

2. What 21st-century leadership practices are associated with the use of 21st-century instructional practices to effectively support teacher and student learning as perceived by the teacher?

Null hypothesis. This is designated by the symbol H_0.

H_0 There is no relationship between a teacher's use of 21st-century teaching skills and knowledge and his/her principal's use of 21st-century leadership skills and knowledge.

Alternative hypothesis. This is designated by the symbol H_1.

H_1 There is a relationship between a teacher's use of 21st-century teaching skills and knowledge and his/her principal's use of 21st-century leadership skills and knowledge.

Significance of the Study

Due to the increased online learning in education and the continued need for effective leadership, research for this study was focused on the examination of technology leadership components. Evaluation of these components was essential to provide an accurate overview of how technology leadership directly effects the school environment now, and in the future. The research is timely and valuable, as the NETS

is recognized "… for evaluating the skills and knowledge school administrators and leaders need to support digital age learning, implement technology, and transform the instructional landscape" (ISTE, 2013). The relevance of having educational technology standards for leadership are emphasized by having been nationally addressed previously by the Technology Standards for School Administrators (TSSA Collaborative) who pointed out that technology implementation required systemic reform on a large scale and that effective leadership for schools is of vital importance (Bosco, 2001).

Consequently, as Kowch (2009) explained, developing leaders has remained an essential focus for continued growth within the school systems. Current school leadership roles and student learning expectations are outdated (Bakia et al., 2011). Schrum and Levin (2009) explained in more depth that technology has offered a variety of ways to support learning and instruction; and thereby, helping school leaders become more effective.

Experts have agreed leaders must effectively use and implement 21st-century skills and knowledge to drive relevant long-term change (Lessen & Sorenson, 2006). Schrum and Levin (2009) proposed utilizing the NETS "which provides guiding principles for how school leaders can inspire, advance, and sustain the integration of 21st-century technology in their schools and districts" (p. xii).

According to Schrum and Levin (2009), "administrative support is the most important factor in technology implementation and that without it other variables will be negatively affected" (p. xiv). Similarly, Blasé and Blasé (1999) addressed the need "for more research into the effects of leader behavior on teacher behavior, the relationship of instructional leadership to teaching, instructional leaders' characteristics, and conditions

necessary for effective instructional leadership" (p. 131). In fact, The U.S. Department of Education (2010) has continued their grants program focus on educational research and development, thereby supporting the significance of this study basis, which was the examination of effective leadership components and practices to provide insight into improved leadership development for meaningful systemic change.

Limitations and Assumptions

The following limitations were identified in this study:

Sample demographics. The sample population was taken from three member school districts in the Southwest Center for Educational Excellence that had implemented a one-to-one initiative between students and devices. Therefore, the sample was limited based on consortium membership and school technology implementation plan.

Instrument. The NETS were used as a basis for creating survey statements. Therefore, the survey instrument was considered a limitation based on the single source that was utilized for survey creation.

Participant. It was assumed participants gave honest, unbiased answers and chose to complete the study of their own free will. The participant group was limited based on school policy of one-to-one initiative and role of high school teacher. An attempt to overcome this limited participant pool was addressed through the inclusion of schools of various sizes and populations.

Definition of Key Terms

The following terms are included in this study:

Active leadership. Principals who are actively responsible for the "effective integration of technology into education" both instructional and technological (Akbaba-Altun, 2004, p. 267).

Authentic. What other people see in a person largely defines authenticity and if that person is true to his or her own values (Li, 2010).

Change leadership. This style of leadership provides "new ways for future leaders to lead a distributed organizational vision, to create policy and to build high capacity teams as networks of great educators" (Kowch, 2009, p. 46).

Constructivist approach. Curriculum design open to creation of new and improved models where the teacher, as a coach, utilizes problem solving and inquiry argumentation teaching processes with performance assessments and/or portfolios (Kanaya, Light, & Culp, 2005; as cited in Riel & Becker, 2000).

Contingent reward. The leader rewards staff members for completing agreed-on work (Leithwood & Sun, 2012).

Digital commerce. An electronic means of buying and selling of goods (Ribble, 2013).

Digital dossier. An electronic profile "gives an overview of how much information is accumulated about each of us over a lifetime, whether we created it or not and whether we like it or not" (Oxley, 2010, p. 7).

Digital etiquette. An electronic standard of conduct or procedure (Ribble, 2013).

Digital foot printing. An accumulated digital portfolio of online public postings is a referenced term from the peer reviewed article, “Digital citizenship: Developing an ethical and responsible online culture” (Oxley, 2010, p. 3).

Digital health and wellness. The physical and psychological wellbeing in a digital technology world (Ribble, 2013).

Digital literacy. The process of teaching technology, learning about technology, and using technology (Ribble, 2013).

Digital security. Any electronic precautions taken to guarantee safety and self-protection (Ribble, 2013).

Educational technologist. One who works with “educational technology, including every aspect of school technology integration, is regarded as a field in its own right and the term ‘educational technologist’ refers to those who work as leaders in this field” (Davies, 2010, p. 55).

Ethnomethodology. The “Qualitative approach rooted in sociology, anthropology, and social psychology” (Hung, Lee, & Lim, 2012, p. 75; as cited in Maynard & Clayman, 1991).

Formal learning environments. Any designated learning environment, such as school where learning is usually assessed and tied to specific learning indicators (Hung, Lee, & Lim, 2012).

Informal learning environments. Where learning takes place, such as team sports or extracurricular activities and is not tied to specific learning indicators (Hung, Lee, & Lim, 2012).

Instructional leadership. In education, “the instructional leadership approach blended classical human relations and organizational theory principles to refocus principals on school goals, curriculum alignment, safe school environments and classroom teacher instruction (supervision) as elements of school improvement processes” (Blasé & Blasé as cited in Kowch, 2009, p. 42).

International Society for Technology in Education: ISTE standards. Standards implemented by the “International Society for Technology in Education published technology standards for principals in the following categories: 1) Leadership and vision, 2) Productivity and professional development, 3) Support, management, and operations, 4) Assessment and evaluation, 5) Social legal and ethical issues” (Akbaba-Altun, 2004, p. 256).

Knowledge broker. A knowledge broker is “someone who helps you identify online sources” (Rosen, 2011, p. 14).

Management by exception. The leader monitors the performance of staff members and interacts with them when their behavior deviates from expectations (Leithwood & Sun, 2012).

Meta-cognitive thinking. The process people go through to “develop thinking by analyzing their own weaknesses, finding strategies to overcome them, regulating their actions in relation to others, and capitalizing on the social cultural artifacts around them to achieve goals” (Hung et al., 2012, p. 85).

National Educational Technology Standards (NETS). The National Educational Technology Standards: -A for Administrators, -S for Students, -T for Teachers, -C for Coaches, and –CSE for Computer Science Teachers (Ertmer & Ottenbreit-Leftwich, 2012).

National Educational Technology Standards for Administrators (NETS-A). A leader who successfully uses "The standards for evaluating the skills and knowledge school administrators and leaders need to support digital age learning, implement technology, and transform the education landscape" (NETS-A, 2012, para. 1).

National Educational Technology Standards for Teachers (NETS-T). A teacher who successfully uses "The standards for evaluating the skills and knowledge educators need to teach, work, and learn in an increasingly connected global and digital society" (NETS-T, 2012, para. 1).

One-to-One (1:1) initiative. Reference to electronic device incorporation and "describes programs which schools, districts, or states implement one laptop for each learner in a particular grade or grades" (Schrum & Levin, 2009, p. 179), but for this study will mean any electronic device, instead of just a laptop.

Open leadership. Leadership with confidence and humility that shares control and inspires commitment from people to accomplish goals because the leader has developed trust that employees will know what to do and when (Li, 2010).

Self-efficacy. Self-confidence teachers need to facilitate the achievement of instructional learning goals using technology (Ertmer & Ottenbreit-Leftwich, 2012).

Subjective contingency. Subjective contingency is a debatable term in which "leadership scholars argue that most advanced organization and policy theory is now more subjective and relational, and less structure or power oriented" (Christensen, Horn, & Johnson as cited in Kowch, 2009, p. 44).

Systemic change. A systemic educational approach to change includes "Cognitive, social, motivational and self-regulative aspects of learning tasks and learning processes are related to instructional and wider educational contexts" (Mooij, 2009, p. 3).

Transformational leadership. Transformational leadership theory claims that a relatively small number of leadership behaviors or practices are capable of increasing the commitment and effort of organizational members toward the achievement of organizational goals. According to Leithwood and Sun (2012) the values and aspirations of both leader and follower are enhanced by these practices.

Web 2.0. A term used since 2004 to describe the second generation internet, more specifically, "Web 2.0 is a trend in the use of World Wide Web technology and web design that aims to facilitate creativity, information sharing, and, most notably, collaboration among users" (Schrum & Levin, 2009, p. 48).

Worried skeptic. Leaders who cannot understand the benefits and the barriers of being an open leader; so, they are pessimistic and independent and do not have a collaborative mindset or skill set (Li, 2010).

Summary

This quantitative study was designed to investigate relationships between a teacher's use of 21st-century teaching skills and knowledge and his/her principal's use of 21st-century leadership skills and knowledge. Additionally investigated were the 21st-

century leadership practices that are associated with the use of 21st-century instructional practices to effectively support teacher and student learning as perceived by teachers. This study was focused on the examination of technology leadership components of: (a) determining various leadership roles, (b) determining necessary skills to be effective, and (c) determining how effective technology leadership has evolved.

Evaluation of these research components was essential to provide an accurate overview of how technology leadership has and will directly affect the school environment. Furthermore, study determinations may be used to provide a framework of best practices and skills for successful technology leadership and implementation school wide. More importantly, the research component analysis provides insight into leadership styles, qualities, roles, and abilities for semi-local statistical significance for potential comparisons to national reporting. The implementation of these identified best practices can better prepare school communities for creating successful educational experiences in the 21st-century.

Chapter Two: Review of Literature

Introduction

Effective school leadership theories, styles, characteristics, and practices have been explored to better understand how to foster and support learning in the newly chartered waters of 21st-century skills and knowledge. More importantly, these subjective based theories led to a common underlying question: How are 21st-century leadership skills developed? For this study, the relevance of this essential question was how to effectively prepare for a future no one could predict, as new technologies and practices have been continually developed.

Literature was sub-divided into the two main sections of effective school leadership and 21st-century skills and knowledge. Effective school leadership information was further organized in the areas of traditional leadership and technology leadership in order to address leadership practices for research question two. Specifically, educational leadership literature blends into educational technology leadership with integrating technology into schools and addresses how leadership styles, characteristics, and practices in relation to school infrastructure and culture development directly affect impacts of technology that are and can be made. Educational leadership roles to foster and support learning where next analyzed in association with both faculty and students to further explore the question two aspect of effectively supporting teacher and student learning.

The literature review next addresses 21st-century skills and knowledge through learning changes, digital age learning, and developing technology impacts on education. Consequently, literature directly explores technology related instructional planning and

professional development in order to effectively lead 21st century schools, which relates to study question one in regards to integration of technology skills and knowledge. These technology dispositions and literacies are further analyzed within the digital age learning section. Equally important, developing technology impacts on education expand the study of literature from semi-locally to globally, with the literature review being comprehensively related to the study.

Traditional Leadership

As conceptualized in Leithwood and Hallinger's (2002) article, there are many models of leadership based upon how a leader leads, what he or she values, and how open or controlled he or she maintained the organization environment. Effective leadership practices and characteristics have evolved from objective-based to subjective-based (Blasé & Blasé, 1999; Kowch, 2009). Within objective leadership paradigms "teachers were counted as part of a set of work transitions within machine-like school organization" (Kowch, 2009, p. 42) and depended on organizational power-based transactions. Whereas subjective based theories included open leadership, transformation leadership, technology leadership, and coaching leadership, to name a few, where teachers were empowered (Blasé & Blasé, 1999; Kowch, 2009).

Objective leadership paradigms values a leader who managed through rules and workflow structures (Kowch, 2009). In particular, closed leadership has been best utilized with confidential information and following established hierarchy in the decision making process (Li, 2010). Whereas in contrast, Li (2010) explained that open leadership has best been utilized when it comes to sharing non-confidential information. Additionally noted are the values of an open leader, as stated by Li (2010) in his book,

which are to be human, be accessible, be authentic, be patient, and be productive. On the opposite end of the spectrum, Li (2010) cautions against being a worried skeptic who does not have a collaborative mindset or skill set.

Open leader action plans, as further detailed by Li (2010), contain open strategy goals where collaboration occurred to decide what was acceptable and not acceptable, to next create a review process, and provide workflow instructions with clearly stated responsibilities and constant feedback. Within a closed leadership style, leaders "set out a goal (ends) and offered a contingent intervention (means) so that she could expect predictable school outcomes" (Kowch, 2009, p. 42).

However, according to both Li (2010) and Kowch (2009), classical closed leadership practices do not view the teacher as a collaborative partner and results from this type of leadership are not effective and thereby limit instructional improvement. Li (2010) determined the most effective leaders are usually optimistic and collaborative, and pointed out how nurturing open leadership has required encouragement of specific skills and behaviors to become authentic and transparent. Furthermore, Kowch (2009) emphasized how leaders must be adaptive and network to connect globally.

Technology Leadership

Through a detailed process, Davies (2010) selected 12 journal articles examining the varying definitions of educational technology leadership and concluded that leadership for school change is the need for teaching reorganization, not the process of teaching. In addition, Li (2010) contended technology has continued to create new ways to build relationships, especially when utilizing the Web 2.0 (Schrum & Levin, 2009). Davies (2010) further introduced the term *educational technologist*, which he defined as

one who is a leader in technology integration and uses technology within education. A true technology leader, as determined by Davies (2010), is aware of trends; new developments; how technology could positively impact the organization; and advocates through investment and technology introduction, management, and access to improve student learning. Equally important, Li (2010) explained, are the elements of listening and learning, which require forethought, planning, and structure to not limit information sharing or combined decision making.

As an organization leader, noted Lessen and Sorensen (2006), a priority must be focused on the use of technology, through modeling or an educational unit requirement. This priority is essential, insisted Lessen and Sorenson (2006), so that team members understand the importance of having educated students, thereby having created fluid users of technology who can gain, organize, and produce information.

More recently, a research survey conducted by Ahmad and Muhammad (2011) concluded that the selling or coaching leadership style of highly directive task and high relationship is best for encouraging the use of educational technology because the style supports faculty in learning how to use technology, while allowing teacher buy-in through active participation in decision making. Namely, stated Cowan (2008), the school leader must address the challenges of content delivery schedules, accountability measures, and the effective planned use of technology. These challenges of content delivery, as clarified by Cowan (2008), must be within the boundaries of mandated finance and policy, and then regulated by local, state, and federal guidelines.

The global journey for “effective integration of technology into education depends on active leadership of the principals” (Akbaba-Altun, 2004, p. 267). Effective

school leadership globally, in the new parameters of digital age learning, as Oxley (2010) put forth at the International Association of School Librarianship Conference in Queensland, must oversee the development of students' online safety skills and ethics for making better choices when confronted with opportunities for inappropriate and or unethical behavior.

Putting this to the test, Netsmartz (2013) conducted an experiment with five teenagers under the agreed upon criteria Netsmartz was friended on Facebook and allowed six clicks. The purpose for this experiment, according to Netsmartz (2013), was for teens to focus on what information is available online and for teens to focus on if that is the information they want to be available online. The results were: teen one loved ponies, had dandruff and weight issues, and mother was active user of mommy blog page detailing personal information; teen two was a gamer boy who listened primarily to boy bands; teen three had minimal usage and no tracers; teen four was into food blogging and sketching; and, teen five was cheating on his girlfriend with her best friend (Netsmartz, 2013).

Equally important, Akbaba-Altun (2004) emphasized the global nature of this issue with the academic study conducted in Turkey on the topic of principals as school technology leaders and their perceived roles related to information technology classrooms. In truth, "based on the premise that there is a common core of skills and knowledge that every PK-12 administrator needs to be an effective technology leader, the refreshed NETS-A provide a framework of standards and performance indicators applicable to all school administrators, regardless of job title" (ISTE, 2012, loc. 53). Furthermore, according to Akbaba-Altun (2004), the ISTE NETS-A standards first and

foremost, address instructional and technological leadership and vision; second, productivity and professional development; third, support, management, and operations; fourth, assessment and evaluation; fifth, social, legal and ethical issues.

Education leadership for the 21st-century must address both skill application (Oxley, 2010) and challenges (Cowan, 2008). Technology points of access could easily lead to the misuse of online information by identity thieves and scam artists for harm, pointed out Oxley (2010). Education technology leadership must ensure students have gained an understanding of consequences in conjunction with how the Internet could be used as a positive tool for global and community service (Oxley, 2010).

Equally important, are addressing strategies of content delivery (Cowan, 2008). The six usage strategies Cowen (2008) recommended are: collaborate continually to help faculty understand the possibilities for innovation of curriculum development; understand the three modes and limitations of computer use (tutor, tool, or tutee) and when to utilize each; conduct reconnaissance to find out what resources are available and the routes of access; collaboratively plan for a successful technology-enhanced lesson; collaborate for utilization of the many resources already available; and, plan data driven alternative assessments to show the impact of technology-enhanced lessons. In addition, the nine skills to address are: digital etiquette, digital communication, digital literacy, digital access, digital commerce, digital law, digital rights and responsibilities, digital health and wellness, and digital security (Oxley, 2010; Ribble, 2013).

Development of educational leadership concurrently with 21st-century learning changes has remained critical, as current “Teacher education leaders must attend to leadership practices that set direction, develop people, and redesign their programs of

teacher education in order to develop technology, pedagogy, and technology knowledge and skills in preservice teachers" (Dexter, Herring, & Thomas, 2012, p. 1). Further evidenced by Ertmer and Ottenbreit-Leftwich (2012), is how effective leadership supports teachers in becoming change agents through building knowledge and practice applications utilizing technology. In truth, technology has continued to offer school leaders "many ways to support needed changes in student learning and achievement, teacher instruction and productivity, and communication with other stakeholder groups (parents, alumni, board members, and the wider community)" (Schrum & Levin, 2009, p. xii).

Schrum and Levin (2009) put forth the three strategic leadership considerations of setting direction, developing people, and organization redesign for integrating technology into professional development. Whereas, the school-level recommended practices for principal support and additional development in instructional technology implementation, as presented by Means (2010) are: integrate technology with school-wide instructional vision; align technology and curriculum; principal modeling to demonstrate technology integration; and, train teachers on student-centered teaching concepts with technology integration.

There are few cost effective or reliable technology program assessments, synthesized White, Ringstaff, and Kelley (2002), as based on a report by Ringstaff and Kelley (2002) for the U.S. Department of Education. These assessments measured behaviors, such as student engagement and collaboration (Ringstaff & Kelley, 2002). Instead of measuring investment return, leaders should assess "under what conditions does technology have the most benefits for students" (White et al., 2002, p. 2).

Leadership Styles, Characteristics, and Practices

Infrastructure. Leithwood and Hallinger (2002) generalized "Transformational leadership theory claims that a relatively small number of leadership behaviors or practices are capable of increasing the commitment and effort of organizational members toward the achievement of organizational goals" (p. 391). Having created a technology infrastructure is vital, explained Lessen and Sorenson (2006), in order to provide a systemic fluid use and access to technology tools, systems, and services. Whereas, Fullan (2008) forecasted successful implementation could be achieved by combining humility and confidence to create lasting organizational change.

Further recognized by Leithwood and Sun (2012) are the top leadership practices for redesigning the organization, which include strengthening the school culture, building collaboration structures, and involving parents and community. Experts agree, as interpreted in the peer reviewed article by Lessen and Sorensen (2006), the four best practices are to make using technology a priority, create a technological infrastructure, focus on development, and provide training opportunities. The top leadership practice for improving organization instructional programs, as determined by Leithwood & Sun (2012), are to focus on instructional development and allow for contingent rewards through management by exception (Leithwood & Sun 2012). Above all, these practices must occur during teacher education training and through continued professional development for what Ertmer and Ottenbreit-Leftwich (2012) termed meaningful systemic change to take place.

The data collected by the Missouri Census of Technology (2011) have helped districts identify needs for improvement of processes and policy, while having a

comparison of districts progress. Missouri has maintained a portal for survey information on three district level questions and seven individual building questions (Missouri Schools K-12, 2011). These Missouri Schools K-12 (2011) results identify needs of importance as: internet connectivity; technology access; student-computer ratio; classrooms with technology; skills and usage levels of administrator with technology, teacher with technology, and staff with technology; technology integrated into core curriculum; technology planning; and, technology funding. Whereas, on a larger scale, a case study from 28 states:

> …was prepared by the State Educational Technology Directors Association (SETDA) – the principal association representing the technology leadership of state and territorial departments of education – to provide an example of the ARRA [American Recover and Reinvestment Act of 2009] working at the district and classroom level that creates effective, viable, and robust reform in education, and improves the way teachers teach and students learn. (SETDA, 2012, p. 2)

Culture development. Culture development within open leadership is "having the confidence and humility to give up the need to be in control while inspiring commitment from people to accomplish goals" (Li, 2010, p. 15). Li (2010) indicated that when leaders develop a culture of trust, employees will know what to do and when. Findings by Akbaba-Altun (2004) asserted that for effective integration of technology, principals have the three primary technology needs of: understanding technology management issues to ensure coordination of proper learning and growth supports are in place with a shared leadership model; next, understanding the impact of technology on education to make positive systemic change; and lastly, knowing the administrative uses

of technology for informed decision-making and effective communication. These authentic and transparent behaviors transform collaboration into catalysts that build trust and relationships, which effectively grow an organization as leaders lead by example (Li, 2010).

Furthermore, “Successful leaders not only challenge the existing educational process and inspire a vision for meaningful change, but also provide the necessary support and modeling strategies to enable teachers to become part of a learning community” (Ahmad & Muhammad, 2011, p. 108). This is further supported by Dexter, Herring, and Thomas’s (2012) article, which contended leaders must effectively communicate vision and expectations, while providing learning and growth supports to systemically redesign organization conditions for individualization and buy in, all the while maintaining shared learning community norms.

Leithwood and Sun (2012,) through their meta-analytic review of unpublished research, deduced top leadership practices for setting school direction are to collaboratively develop a shared vision and have high performance expectations. According to White et al. (2002), long term technology plan goals should be used to develop higher order thinking skills within a framework where technology is just one piece of academia. First consideration, synthesized Schrum and Levin (2009), should be that adult learning is improved when respect, trust, and concern for learner are being demonstrated. As a result, Ertmer and Ottenbreit-Leftwich (2012) emphasized how peer buy-in and social acceptance generate a form of teacher peer pressure to achieve best practices, while still maintaining high levels of support as both school and community expectations.

Foster and Support Learning

Faculty. The top leadership practices for developing people are identified by Leithwood and Sun (2012) as providing individualized support and intellectual stimulation, and modeling the leader's valued beliefs and behaviors. When leading others in a school environment, "the purpose of supervision should be the enhancement of the teachers' pedagogical skills, with the ultimate goal of enhancing student achievement" (Marzano, Frontier, & Livingston, 2011, p. 2). Schrum and Levin (2009) explained how adults are more driven to develop professional development plans utilizing technology when they are allowed to direct their own learning by topic, content, and grade level interests. In fact, Marzano's et al. (2011) first learning condition is similar to Danielson's (2007) Teaching Models, and is a well-articulated knowledge base for teaching. Listed in order of most effect on student learning, these are

1. classroom strategies and behaviors;
2. planning and preparing;
3. reflecting on teaching; and
4. collegiality and professionalism.

Characteristics of teachers more likely to use educational technology in classroom instruction practices, as pointed out by Kanaya et al. (2005) in reference to Riel and Becker's (2000) work, are those who have a constructivist approach to teaching and who are actively engaged in professional communities to enact fundamental change. Marzano et al. (2011) illustrated practices of providing faculty opportunities to observe and discuss expertise is best achieved through videos, first hand observations, and virtual community involvement through interaction and peer teacher discussions. The third best practice

noted by Lessen and Sorenson (2006) is having a strong focus on funding and training development to support instruction through budgeting, grants, and other campaigns or shared partnerships.

These opportunities, reported Marzano et al. (2011), equip faculty with first-hand teacher adaptation strategies and ability to apply to self-teaching strategies through trial and error. Additionally, Marzano et al. (2011) pointed out that these same opportunities are a primary component of Professional Learning Communities. Next, Marzano et al. (2011) emphasized focused feedback and developing deliberate practices, which could be achieved by giving specific approaches and practice examples.

To illustrate the importance of teacher development, Marzano's et al. (2011) fourth learning component addresses having specific professional development growth and development plan criteria to define effective teaching, which actively allows tracking self-development of pedagogy over time, ultimately affecting increases in student learning. The three-year evaluation findings report by Kanaya, Light, and Culp (2005) bring to light eight key elements of effective professional development programs for K-12 and the necessity for linking individual ability with current needs and interests.

Kanaya et al. (2005) identified the key elements as: study group format with hands-on activity; longer in duration and relatively high intensity to increase teacher application and program use; collective in participation for classroom relevance to yield higher success; inclusiveness; incentives; active learning opportunities; strong content focus; and coherence in professional development. Whereas Ertmer and Ottenbreit-Leftwich (2012) generalized four variables, which help evolve the teacher role into a role

of change agent, as being knowledge, self-efficacy, pedagogical beliefs, and subject or school culture characteristics.

Further supported by Marzano et al. (2011) are the reasonable expectations for teachers to show skill improvement from year to year if they receive motivation to be better. Consequently, Marzano's et al. (2011) component five is based on recognition of expertise, which has to be developed over time. Marzano et al. (2011) pointed out this concept was initially set forth by Ericsson, Krampe, and Tesch-Romer (1993) and is most commonly referred to as the "10-year-rule."

According to Ericsson et al. (1993), not all teachers automatically reach the level of expertise even after 10 years, since the normal tendency is to maintain at an acceptable level of performance rather than push to a higher level of performance. In order to motivate teachers to move beyond acceptable to expert, Marzano et al. (2011) mentioned being an advocate for National Board for Professional Teaching Standards Certification; however, they did expound on the fact this can also be achieved by making available to all practitioners teacher evaluation and progress level supports to reach expert level.

Ertmer and Ottenbreit-Leftwich (2012) explained how specific variables are necessary for meaningful technology implementation, by detailing how various information technology tools continue to help learners within a variety of contexts. Schrum and Levin (2009) cited a strong need for redesign to both assess and evaluate technology-rich lessons. Similarly, these change agent characteristics are conceptualized and clarified in the NETS-T, as well as adopted by the National Council for the Accreditation of Teacher Education (NCATE). Furthermore, Schrum and Levin (2009)

concluded that knowing what to look for and in what context remains essential for bridging the electronic divide that exists between learners and generations.

Students. A Singapore case study conducted in schools using ethnomethodology conversation analysis, a concept originally proposed by Maynard and Clayman (1991), discovered, "instead of embedding 21st century literacies in the already packed curricula, a proposition is made for teachers to become brokers who bridge students' learning in classroom and informal contexts such as sports activities and social media environments" (Hung, Lee, & Lim, 2012, p. 71). In her peer-reviewed article, Rosen (2011) asserted that teachers who engage students can and should take learning to deeper cognitive levels of understanding and application of skills beyond the school environment. While, Marzano et al. (2011) explained student achievement is better by incremental degrees when paired with higher skilled teachers, so the higher the pedagogy of teacher the better the students improve.

Ertmer and Ottenbreit-Leftwich (2012) emphasized teachers need to compare results to intended outcomes for essential effective higher-level use of technology to increase effectiveness and create more meaningful student learning outcomes. Moreover, Akbaba-Altun (2004), Bakia et al. (2011), and Schrum and Levin (2009) support the continuation of analyzing components and practices for effective teacher and student learning. Finally, concluded Lessen and Sorenson (2006), providing access, training opportunities in a variety of formats, and support structures for faculty, students, and staff at all ability levels of technology usage is critical to the successful empowerment of technological skill synthesis and application.

Indeed, Ahmad and Muhammad's (2011) study elucidated, technology is an instructional tool useful for effective decision-making by administrators for increasing student achievement. According to Schrum and Levin (2009), the use of Internet provides students an opportunity to analyze an event or document from several different perspectives, which helps create authentic and relevant learning experiences. According to Chase and Laufenberg (2011), by leading through use of various technology modes to reach academic goals, teachers enable students to use discovery through inquiry driven curriculum utilizing technology.

Additionally important, as explained White et al. (2002), is having a focus on technology content that redefines and supports the instructional practices of learning and teaching, while providing adequate access and distribution of technology. As Chase and Laufenberg (2011) pointed out, educators must ensure students are the ones to use discovery process, which includes accessing various sources to determine relevance and collaboration, with presentation format to support learning opportunities. Consequently, as Mooij (2009) explained, to improve student learning and overcome motivation and achievement problems, learning strategies must be differentiated for learning materials and for learning procedures while being supported with technology.

Hung et al. (2012) further described co-curricular activities as being informal learning opportunities with few ties to curriculum, but are a rich environment to develop 21st-century literacies through collaboration, experimentation, and the need to adapt, which enables students other venues for achieving success. Mooij (2009) further extrapolated how through individualization of education, students are motivated because they are being provided a variety of ways to be successful, which remains a primary

focus for student retention goals to be met. In fact, Means' (2010) recommendations are analogous to Mooij's (2009) published article on systemic implementation approach and practices assessed in Dutch schools to keep students from dropping out.

Twenty-first Century Skills and Knowledge.

Learning changes. Interestingly enough, *The Clearing House* scholarly education journal of strategies, issues, and ideas published an article by John E. Cowan (2008), which addressed strategies for planning technology-enhanced learning experiences. According to Cowan (2008), the school leader for instruction and technology must have access and lead through integrated innovation technology communication. Accordingly, noted Dexter et al. (2012) in their editorial, education is an evolving work in progress that must address core content knowledge, pedagogy, and now technology integration to help generate our educational leaders of tomorrow. Whereas Harris and Hofer (2011) emphasized that technological pedagogical content knowledge requires planning to be the controlling connector of technology, curriculum, and student styles and abilities, all while in a context of relevancy and real world application.

In fact, public school administrators in Connecticut formed two formal focus groups composed of thirty beginning teachers who, explained Chelsey (2012) in her *Education Leadership* article, reflected on what they perceive as lacking in their collegiate program of study. Chelsey (2012) summed up that the programs are perceived as lacking the most current teaching skills such as differentiated instruction, objective versus activity, how to effectively manage behaviors, integrate technology, lesson design and assessment, using data to drive instruction, understanding of professional workload and related stress, and how to teach content. In truth, Pradham's (2011) article revealed,

teacher education programs are traditionally skill based and practicum oriented.

Interestingly, Harris and Hofer's (2011) interpretive study of interviews and reflections for seven experienced secondary social studies teachers' planning spell out their three major findings. With regard to technology and instructional planning:

> The participating teachers' (a)selection and use of learning activities and technologies became more conscious, strategic, and varied; (b)instructional planning became more student-centered, focusing primarily upon students' intellectual, rather than affective, engagement; and (c)quality standards for technology integration were raised, resulting in deliberate decisions for more judicious educational technology use. (Harris & Hofer, 2011, p. 211)

Whereas, Fullan (2008) culled through literature addressing private sector and public sector leadership to narrow down secrets of change that would, in theory, help leaders implement large-scale reform to bring about lasting change that will ultimately benefit all of society.

Chelsey (2012) speculated the possible reasons for deficiencies are the lack of current professor in-classroom experiences, thereby making instruction outdated and irrelevant to beginning teachers. Pradham (2011) cited a need for strong emphasis on classroom training while stressing the graduation of quality teachers - not quantity of teachers. Additionally, Pradham (2011) insisted that teacher education programs and professional development need to develop life skills through active learning and effective communication with curriculum being student focused, while fostering teacher competency and pedagogy.

In his book, Fullan (2008) suggested leaders "focus on developing many leaders working in concert, instead of relying on key individuals" (p. 109). Whereas Chelsey (2012) reported vital solutions are to redesign teaching programs with substantially more time in the classroom, and with various experienced teachers are over the courses in any college preparation program. Furthermore, Hung et al. (2012) recommended the redefinition of formal learning environments in order to help these same students gain confidence through success with more stringent curriculum.

Effective learning with guidance and teaching includes modeling for education relevancy, summarized Partridge and Hallam (2006), so as to be able to function within constantly changing environments through effective utilization of research skills to create information professionals who can proficiently collaborate. Furthermore, noted Partridge and Hallam (2006), practitioners must be reflective to acquire and refine their toolbox of evidence-based practices from which to draw, in order to meet accountability expectations and requirements through critical thinking processes. According to Harris and Hofer (2011), planning is best supported through interactive professional development focusing on integrating educational technology and content-based learning organized into skill taxonomy levels, while simultaneously keeping in mind school cultures, socioeconomics, and structures.

The three types of E-portfolios described by Lorenzo and Ittelson (2005) are student e-portfolios, teaching e-portfolios, and institutional e-portfolios, which can contain collection elements from text-based to electronic media. In contrast, Battenfield (2011) identified the 14 types of portfolios as "(a) product-oriented, (b) competency- or trait-oriented, (c) showcase, (d) spotlight, (e) discipline-based, (f) thematic, (g) skills-

based, (h) diagnostic, (i) progress, (j) project, (k) research-based, (l) learner reflection, (m) exit and exhibition, and (n) college application" (p. 5). Furthermore, e-portfolios have the added benefit of functioning as both a management tool and administrative tool using critical thinking and reflective practices to demonstrate concept mastery over time in a variety of contexts (Lorenzo & Ittelson, 2005). More essential, Battenfield's (2011) literature research concluded that e-portfolios have the potential to encourage and develop life-long learning practices.

Lorenzo and Ittelson (2005) extrapolated how "e-portfolios can support student advisement, career preparation, and credential documentation; the sharing of teaching philosophies and practices; department and program self-studies; and institutional and program accreditation processes" (p. 1). More relevant, digital portfolios are being used as academic and job prepared assessment tools (Battenfield, 2011). Educational organizations such as the Carnegie Foundation and educational institutions like the Western Association of Schools and Colleges encourage e-portfolios, whereas lifelong e-portfolios for the general public provide resources for career advancement. (Lorenzo & Ittelson, 2005). More poignantly, in our digital based culture a digital portfolio created electronically is a more applicable lifelong tool and give the impression of higher intelligence (Battenfield, 2011).

Kendall (2005) reported in his peer-reviewed article how lifelong learning continues to be a global education agenda in public policy. Kendall (2005) further explains how the evolution of lifelong learning, as discussed and published through the non-government non-profit organization IFIP TC3 Taskforce report, has evolved into a culmination of 16 characteristics, which take into account the three outlooks of

employment-related perspectives, social or civic perspectives, and personal perspectives that must be organized with an understanding of why and how learning occurs. In fact, "the early years of education provision are important in establishing the lifelong habits of inquiry and creativity within the socializing learning environment we create…" (Kendall, 2005, p. 295).

Digital age learning. According to Hung et al. (2012), the 21st-century dispositions and literacies necessary for those entering the workforce are for employees to be collaborative, expansive, problem solving, experimental, adaptable, resilient, meta-cognitive thinking, and to have acquired social capital. S. Bell (2010) questioned why not prepare students for the workforce through education in a like manner; and concludes performance is the evaluation tool in the workforce. Ultimately, "they will be evaluated not only on their outcomes, but also on their collaborative, negotiating, planning, and organizational skills" (Bell, 2010, p. 43).

In fact, Hung et al. (2012) advocated for teachers to use technology as a tool, enabling students to see similarities and make connections. Trespalacious et al. (2011) referenced the Project Tomorrow 2009 National Survey of more than 280,000 students, and cited the top two essentials as a laptop for each student and virtual simulations to teach concepts. According to Means' (2010) case study, the effects of technology on student learning through technology implementation practices most recommended for teachers are:

- integrating technology with learning goals and non-technology learning activities;
- frequent use of technology;

- teacher as presenter and facilitator when using technology;
- data driven change through constant review of reports;
- pre-establish routines for efficient transitions to and from technology use; and,
- maintaining a low student to computer ratio.

Research by Bell (2010) on intrinsic-motivated student learning and project based learning are both applicable for students who are ultimately applying 21st-century skills and knowledge. Ultimately, as reported by Hung et al. (2012), this creates interdisciplinary learning through the adoption of personalized approaches to learning in Singapore. Similarly, Pradham (2011) recommended incorporating more project-based instruction to develop 21st-century skill competencies and capabilities. Equally important, informal learning environments such as team sports and extra-curricular activities simulate real world application where students learn and practice soft skills and are not tied to specific learning indicators (Hung et al., 2012).

In fact, a multitude of learning technology resources continue to be available for customization to help learners and brokers of learning mediate dialogue and create data driven results (Hung et al., 2012). Schrum and Levin (2009) further detailed in their book how software and hardware such as SMART Board, Kidspiration, video cameras, and document cameras to name a few, enable teachers to document and authentically assess student growth digitally, and then easily share with parents and faculty. Rosen (2011) stated, “Providing information through a variety of modalities and sources helped students develop a richer, more complex mental representation of the material” (p. 14).

In addition, Schrum and Levin (2009) pointed out how educators who utilize Virtual Field Trips, Web Quests, e-Pals, Online Mentors, and other online learning

opportunities ultimately provide better instructional support, and by example encourage peers to delve further into technology integration. Summer program results by Trespalacious, Chamberlin, and Gallagher (2011), explained the benefits of online simulations and video games as being an easier and more interesting way to learn a lot, delve deeper into concepts, and work collaboratively in teams. In particular, Partridge (2006) generalized the following:

> To effectively meet the needs of the millennial student, library educators must develop their curriculum to include a real world activities and perspective, be customizable and flexible, incorporate regular feedback, use technology, provide trusted guidance, include the opportunity for social and interactive learning, be visual and kinesthetic and include communication that is real, raw, relevant and relational. (p. 400)

Younger generations comfortably multitask between technologies and have accepted this as the norm; whereas, according to Rosen (2011), older generations in general are not as comfortable implementing new technologies or utilizing several technologies simultaneously.

Interestingly enough, it is a relatively simple formula to bring online learning to life, concluded Caruso (2008), in that the teachers' role shifts to facilitator by tailoring classes to individual student interests and including online student collaborative learning opportunities. Caruso (2008) postulated in her peer-reviewed article on how facilitator duties are also titled coordinator or choreographer and on the potential for many different classes to simultaneously take place through remote online teaching. In fact, presented

Caruso (2008), bringing online learning to life allows for mixed grade level classes to be held simultaneously under one room facilitator.

Conversely, in a case study of interviews and observations combined with student data from 14 schools, Means (2010) reviewed teacher collaboration practices and support of principal through ongoing professional development with hands-on training. Unfortunately, Means (2010) summarized that the majority of teachers use technology as a productivity tool instead of applying it through technology-based student learning activities.

Based on research referencing standardized testing assessments, Bell (2010) concluded the essential skills students use are planning, organization, collaboration, and inquiry based learning with self-evaluation, which all culminate in a presentation to show concept mastery. An evidence based practice case study paper by Partridge and Hallam (2006), found best practices are incorporated using formal research skills and methods to make decisions. While Trespalacious et al. (2011) recommended to educators to simultaneously address computers and collaboration in student learning processes. What digital literacy (Ribble, 2013) could be for students is ". . . authentic, multimodal, far reaching, multitool, code interdependent…" (Chase & Laufenberg, 2011, p. 535) and will address the essential questions of what students can create and learn.

Developing technology impacts on education. Oxley (2010) explained that youth continually misperceive their anonymity online, the future impact of their accumulated digital portfolio or footprint, and the real-life legal implications of their private actions. Students must evolve into self-directed learners because they "have to

learn to filter mounds of information and successfully sort the fluff from the substance" (Caruso, 2008, p. 72).

To understand the extent of each user's digital footprint, Lambert (2011) challenges readers to think of how many times a day email is checked, photos and videos uploaded, and searches are performed, which becomes part of user browser history and for the most part tracked. In fact, according to M. Bell (2012), Google profiled one middle-aged northern female as a geriatric southern male based on website visits. Usage tracking, clarified Lambert (2011), allows the creation of algorithms to create specific user profiles for automatically generated recommendations and advertising.

Lambert (2011) explained that "with the rise of identity theft, corporate tracking, and the ability of 'Big Brother' to access our private data, it is more important than ever for Internet users to be aware of how past and future data can be erased and controlled more effectively" (p. 1). To counteract the online tracking of individual usage patterns, Lambert (2011) suggested utilizing a Network Advertising Initiative (NAI) service or a Digital Footprint Calculator such as the one provided by the EMC Corporation, regularly erasing the cookies cache on your computer, and deleting unused website accounts. Whereas, Bell (2012) took a generic approach and explained the four steps to limiting information collected as: getting organized and deleting old accounts; switching to one password using a password manager; self-tracking using alerts; and stopping the influx of spam. More drastic time consuming measures are available both for free and for a fee to erase personal information and negative user commentary (Lambert, 2011).

Unfortunately, according to Oxley (2010), most students do not realize all online postings can be retrieved using online sources such as the Wayback Machine (2013),

which lets the user check websites like Facebook, at any point in the past. Digital foot printing accumulates into a digital dossier that, according to Oxley (2010), employers can and will access, which Kirscht (2013) reiterated while also citing the increased usage in employer social media searches. Therefore, educators, such as Kirscht (2013) "teach students how to create a *positive* digital footprint while interacting with social media" (p. 1). In fact, reported Oxley (2010), the Library of Congress has archived all Twitter tweets from 2006 through 2010. With the rapid flow of global information, " …at present we are living in a world which is drowning in information and resulting in a less knowledgeable society" (Pradham, 2011, p. 17).

Rosen (2011) revealed, teachers have access to more resources now than ever in history but often need the support of a knowledge broker or professional-development training can provide for implementation. According to Ertmer and Ottenbreit-Leftwich's (2012) *Journal of Research in Technology Education* article, which referenced a collection of primary sources published by editors Voogt and Knezek (2009):

> To achieve the kinds of technology uses required for 21st century teaching and learning (Lai, 2008; Law, 2008; Thomas & Knezek, 2008), we need to help teachers understand how to use technology to facilitate meaningful learning, defined as that which enables students to construct deep and connected knowledge, which can be applied to real situations. (p. 257)

Ultimately, bridging the electronic divide has been addressed by the ISTE through creation of the NETS-A, NETS-T, NETS-C, and NETS-S.

Tamin, Bernard, Borokhovski, Abrami, and Schmid (2011) presented a summary of reports that are gleaned over a forty-year period and subjected to a systematic review

process. These second-order meta-analysis documented findings of significance by Tamin et al. (2011), show positive results to the hypothesis of computer technology uses affecting student achievement in formal face-to-face classrooms as compared to classrooms that did not use technology. In addition, Caruso (2008), surmised students will in the future be offered more opportunities in the virtual education setting than in the traditional brick and mortar setting.

Specific results, according to Tamin et al. (2011), indicate small to moderate positive affects in classrooms with technology than without technology; a higher positive impact when introduced to students in K-12 classrooms than in Post K-12 classrooms; and, most importantly, that technology which supports or enhances instruction has a higher average effect than those technologies that provided direct instruction. Whereas, interestingly enough, Chase and Laufenberg (2011) explained the squishiness of technology as related to future specific job skill needs and how educators must provide self-enabling skills for students to excel in future environments.

The Enhancing Education through Technology program invested $650 million, according to the SETDA (2012), which was distributed throughout districts across our country. The SETDA (2012) reports focus on the elements of competitive grants for professional development, for equipment, as a district to achieve proficiency in technological literacy and technological skill integration, the creation of technology literate students, e-Mints classrooms, e-textbook environments for Differentiated Instruction, online student learning, and a host of other 21st-century skills providing programs. At any rate, the SETDA (2012) concluded that federal seed grant funding

across the nation creates stronger leaders for implementation of student learner based instructional technology and student education skill mastery best practices.

Whereas on a global scale, Bakia, Murphy, Anderson, and Trinidad (2011) reported on technology in education from 21 countries in regards to how and to what extent technology integration has been occurring. The contract report by Bakia et al. (2011), explained how most countries answer questions on information technology integration as applicable to the classroom, but did not answer questions on professional development. Statistically, as presented by Bakia et al. (2011), most countries have a vision of education using information communication technologies, with a breakdown where only nine countries have active comprehensive plans, six countries are in process of developing systemic plans, and three countries plans are imbedded in other national documents or requirements, with two countries preferring to annually review and create action steps. Further cited by Bakia et al. (2011), 11 countries report outsourcing for development of related plans and instruction.

Amazingly disparate, noted Bakia et al. (2011), are how some countries are investing heavily, while others have put big projects on hold due to economic conditions. Interestingly enough, Bakia et al. (2011) reported how in some countries the norm is that the private sector is in charge of information communication technology education. Further findings by Bakia et al. (2011) are that most countries want funding improvement to create international collaborative learning spaces, which could explain why most have been moving to cloud computing and freeing up the local expenses of training, maintenance, and servers. Bakia et al. (2011) concluded that holistically, no country is one hundred percent satisfied with their current ICTE implementation at a national level.

Summary

The literature reviewed provides an overview of school leadership styles, characteristics, and practices on how best to foster and support learning in the newly chartered waters of 21st-century skills and knowledge. According to research, education leaders must address the challenges of preparing and developing teachers for content delivery, accountability measures, and effective planned use of 21st-century skills and knowledge for improved student learning. Likewise, based on research findings, it is important to address how effective school leaders support both teacher and student learning. Therefore, relevant studies determining the most effective leadership components will help better prepare the school community for simulation of successful educational experiences while trying to reduce the digital divide that exists between both users and generations.

Chapter Three: Methodology

Research Perspective

This study was quantitative in nature because data were collected through means of an online survey and focused on identifying potential relationships based on teacher perceptions of effective school leadership using 21st-century skills and knowledge. Moreover, a stratified random sample was used to select survey participants with data collection via an online survey instrument. Data collected were used in 10 scatter plot correlation studies between teacher self-score and principal score to determine if there was a simple positive or negative relationship (Bluman, 2009), to address the question of what 21st-century leadership practices are associated with the use of 21st-century instructional practices to effectively support teacher and student learning. Additionally, the subdivided responses for each participant were used to create the two variables needed for one correlation coefficient study to determine the type and strength of relationship between a teacher's integration of technology skills and knowledge in the classroom to his/her principal's integration of technology skills and knowledge in the building.

The research data were broken down to create subgroups, which were based on teacher perceptions of self and teacher perceptions of principal's level of successful 21st-century skills and knowledge implementation, for one Pearson Product Moment Correlation Coefficient (PPMCC) study. Individual participant responses were used to calculate the independent variable of principal score total, which was located on the *x* axis, and the dependent variable of teacher self-score total, which was located on the *y* axis. Next, data results were displayed on a number line to visually indicate the type and

strength of relationship. A line of regression study was not conducted based on statistically irrelevant results.

Data were then sorted into spreadsheet format and the coefficient formula was applied to individual teacher answer totals for statements one through 10 and statements11 through 20. Ten separate data scatter-plot charts were created to determine "if a relationship between two variables exists" (Bluman, 2009, p. 94). The independent variable of principal score was located on the *x* axis and the dependent variable of teacher self-score was located on the *y* axis; more importantly, the scatter plot chart patterns addressed 10 NETS based topics and data were used to answer question two: What 21st-century leadership practices are associated with the use of 21st-century instructional practices to effectively support teacher and student learning?

Furthermore, one PPMCC study was done on NETS (2009) component data with results displayed on a number line to visually indicate the type and strength of relationship for all statement column totals. The coefficient *x* and *y* pattern for formula application was statement one through 10 totals as the *y* components, and statement 11 through 20 totals as the *x* component. Results were displayed on a number line to visually indicate type and strength of relationship for further answer dissemination, which enabled descriptively summarizing predictions for question two relationship hypothesis.

Context and Access

Approval to conduct the study was granted July 9, 2013 by the Institutional Review Board of Lindenwood University (see Appendix A). On July 21, 2013 an approval request (see Appendix B) was sent via electronic mail (email) with a copy of the permission form (see Appendix C) and a copy of the survey instrument (see Appendix D)

for superintendent approval to three Missouri schools that had implemented a 1:1 student device policy and were members of the Southwest Center for Educational Excellence. Of the three school districts invited to participate in the study, all three approved the request.

On August 4, 2013, an email with the informed consent information (see Appendix E), a copy of the signed superintendent permission form, a copy of the survey statements, a list of potential survey participants from their building, and request for a reply for results was sent to each building principal. On August 13, 2013, an email with the cover letter for participation (see Appendix F), the informed consent information, and a live online survey link was sent to each potential survey participant. Of the 175 teachers invited to participate in the survey, 41 actually completed the survey prior to August 31, 2013.

Participants in the Study

The selection criteria for determining school districts used was based on the implementation of 1:1 student device policy and membership in Southwest Center for Educational Excellence. The three school districts, representing the three strata, were selected based on their differences in school population and size in order to obtain a variety of school participants for a stratified-random sample. This created a nicely rounded group of participants to gather teacher perceptions so all teacher groups were represented in data collection.

For this research study, the sample size calculated on StatTools (n.d.) set a minimum sample size of 39 participants at 22% survey return rate and a maximum sample size of 175 participants at 100% return rate. Figure assumptions set the probability if the null hypothesis is rejected of a type I error as $\alpha = 0.05$ or “there is a 5%

chance of rejecting a true null hypothesis" (Bluman, 2009, p. 404). The critical value was set at CV = 0.05 level of significance, and the Pearson product moment correlation coefficient (PPMCC) was set at $r = 0.50$.

The total high school teacher population from all districts to be surveyed was broken down into proportionally representative numbers from each of the three school districts. All teacher names were included in an excel spreadsheet. Using the random number assigned feature, a list was generated.

Having used this process, teacher selection for study survey inclusion met the criteria of a "Random Sample: A sample obtained by using random or chance methods" (Bluman, 2009, p. 667). The 175 potential participants stemmed from the calculation of 90% from the total teacher population of 194 and an anticipated return rate of 60% totaling 105. This broke down the data proportionally depicted in Table 2. The usage of 90% of total high school teacher population was established in hopes a reply minimum of 39 would have been received because "the distribution of the sample means will be approximately normal when the sample size is 30 or more" (Bluman, 2009, p. 401).

Table 2.

Survey Participant Ratios

School	*N*=Teacher Population	*n*=Participants	*n*=Anticipated Return Rate
1	*N*=119	*n*=107	*n*=64
2	*N*=40	*n*=36	*n*=22
3	*N*=35	*n*=32	*n*=19

Upon superintendent approval, a copy of superintendent approval, a copy of survey instrument, and a list of their teachers who were invited to participate in an online survey were emailed to the appropriate school district principals. Next, an email explaining informed consent and voluntary processes with attached anonymous online survey was sent to all potential participants. Participant results excluded were those with unfinished surveys, those who did not electronically give consent on the first required survey question, and staff other than those in a teacher role.

Methods and Instruments Used to Collect Data

An online account was created enabling the primary investigator to custom build a survey and collect data via the Internet. This survey information was included in emails previously sent to superintendents and principals. Upon connecting to the survey link, participants were reintroduced to the informed consent email attachment (see Appendix E), which reiterated voluntary processes with contact information.

Participants were then asked to sign their name as verified consent for participation; next, participants were asked to give the date of participation; after that, participants were asked to choose their educational title from a drop down menu; and then, using the survey Likert Scale (0=Never, 1=Rarely, 2=Sometimes, 3= Most of the Time, 4=Always) answered 10 survey statements about their practices and 10 survey statements about their principal's practices.

Data Analysis

Upon survey closure, results were electronically compiled into spreadsheet format as shown in Table 3, and excluded results from unfinished surveys, surveys that did not give electronic consent, and surveys completed by those other than teachers. Next, answers were converted to scale points as follows: 0 for never answers, 1 for rarely answers, 2 for sometimes answers, 3 for most of the time answers, and 4 for always answers.

Table 3.

Example Participant Data

Participant	Role	Approval Signature	Q1	Q2	Q3	Q4	. . . Q20
1	Teacher	Yes	3	3	4	1	. . .
2	Teacher	Yes	4	2	3	0	. . .

The results were compiled into 10 separate data scatter-plot charts as depicted in Figure 1 to determine "if a relationship between two variables exists" (Bluman, 2009, p. 94). The independent variable on the *x* axis was the principal's score and the dependent variable on the *y* axis was the teacher's self-score. The survey data responses from each participant were put into two data columns to create each scatter plot. The scatter plot and correlation coefficient provided statistical data to show if there was a topic relationship between the principal practices and teacher practices and was based on the statistical relevance rate established earlier at $r = 0.50$. Next, a PPMCC was conducted on column totals of data indicating a significant negative relationship existed, with scatter plot to show a simple negative relationship.

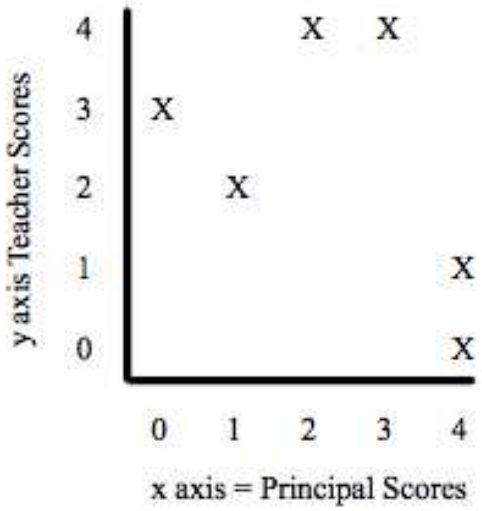

Figure 1. Example scatter plot.

The scatter plot chart pattern addressed 10 NETS based topic statements. The topics were structured: statement one to statement 11, statement two to statement 12, statement three to statement 13, statement four to statement 14, statement five to statement 15, statement six to statement 16, statement seven to statement 17, statement eight to statement 18, statement nine to statement 19, and statement 10 to statement 20 "using the ordinal level of measurement as each number is a category of implementation" (Bluman, 2009, p. 8). These data were then used to answer question two: What 21st-century leadership practices are associated with the use of 21st-century instructional practices to effectively support teacher and student learning as perceived by the teacher?

Next, the data results were applied to one Pearson Product Moment Correlation Coefficient (PPMCC) study, which compared cumulative total of teacher self-score statements in column B to principal score statements in column C to determine the type

and strength of a relationship. Data results were put into spreadsheet format as graphically represented in Table 4.

Table 4.

Example Spreadsheet

Column A Teacher	Column B Self Score	Column C Principal Score
1	Statements 1-10 Total	Statements 11-20 Total
2	Statements 1-10 Total	Statements 11-20 Total
3	Statements 1-10 Total	Statements 11-20 Total
4	Statements 1-10 Total	Statements 11-20 Total
5	Statements 1-10 Total	Statements 11-20 Total
6	Statements 1-10 Total	Statements 11-20 Total

Note: There were 39 survey participants using the same formula.

The cumulative scores, for each of the two subgroups, were then used to complete one correlation coefficient study to measure the strength and direction of a linear relationship between these two variables and was measured on a line graph between "-1 strong negative linear relationship, 0 no linear relationship, through +1 strong positive linear relationship" (Bluman, 2009, p. 533).

The coefficient formula was applied, and results data were then displayed on a Number Line to visually indicate type and strength of relationship. This established type of simple relationship in answer to question one: What is the relationship between a teacher's integration of technology skills and knowledge in the classroom and his/her principal's integration of technology skills and knowledge in the building? Since no significant relationship existed, further regression study on teacher's accumulative self-score statements on numbers one through 10 to corresponding principal accumulative score statements on numbers 11 through 20 was not conducted.

Summary

This quantitative study was focused on identifying potential relationships based on teacher perceptions of effective school leadership using 21st-century skills and knowledge. The methodology to determine the type and strength of relationship between a teacher's integration of technology skills and knowledge in the classroom to his/her principal's integration of technology skills and knowledge in the building was explained. A stratified random sample was used to select survey participants with data collection via an online survey instrument. The data collected were used to address the question of what 21st-century leadership practices were associated with the use of 21st-century instructional practices to effectively support teacher and student learning. The process of data analysis was described, and examples of the scatter-plots used in depicting the data were presented.

Chapter Four: Findings and Analysis of Data

The purpose of this study was to examine components of school leadership as referenced in the NETS (2009) for 21st-century skills and knowledge integration. According to longitudinal study research by Ringstaff and Kelley (2002), "Although technology can support educational change, it will have little impact without accompanying reform at the classroom, school, and district level" (p. 11). Ringstaff and Kelley (2002) pointed out how technology must continue to be interwoven throughout education in order to bring about meaningful systemic educational reform.

As Li (2010) explained, leaders must explore what their attributes are and the "characteristics, skills, and behaviors of effective open leaders" in order to drive meaningful change (Li, 2010, loc. 259). This need for examining effective leadership components was reiterated by Schwahn and McGarvey (2011). They further explained that organizational leaders have been responsible "for 1) setting the organization's direction, and 2) creating the organizational alignment that will effectively move the organization in that direction" (Schwahn & McGarvey, 2011, loc. 2931) in order to employ the performance role of authentic visionary leader.

This quantitative study was designed to investigate relationships between a teacher's use of 21st-century teaching skills and knowledge and his/her principal's use of 21st-century leadership skills and knowledge. Additionally investigated were the 21st-century leadership practices that were associated with the use of 21st-century instructional practices to effectively support teacher and student learning as perceived by the teacher. These determinations may be used to provide a framework of best practices and skills for successful technology leadership and implementation school wide. The implementation

of these identified best practices can potentially better prepare school communities for creating successful educational experiences in the 21st-century.

Research Questions

The following research questions guided the study:

1. What is the relationship between a teacher's integration of technology skills and knowledge in the classroom and his/her principal's integration of technology skills and knowledge in the building? Based on data tested, there was no statistical significance to support this research question.

2. What 21st-century leadership practices are associated with the use of 21st-century instructional practices to effectively support teacher and student learning as perceived by the teacher? Based on data tested, there was no statistical significance to support this research question.

Hypotheses

Null hypothesis. This is designated by the symbol H_0.

H_0 There is no relationship between a teacher's use of 21st-century teaching skills and knowledge and his/her principal's use of 21st-century leadership skills and knowledge. Based on data disseminated in Chapter Four, this null hypothesis was rejected.

Alternative hypothesis. This is designated by the symbol H_1.

H_1 There is a relationship between a teacher's use of 21st-century teaching skills and knowledge and his/her principal's use of 21st-century leadership skills and knowledge. Based on data disseminated in Chapter Four, this alternative hypothesis was not rejected.

Descriptive Statistics

Of the 175 teachers invited to participate in the survey, 41 actually completed the survey prior to August 31, 2013. Of the 41 completed surveys, two were not used due to incompletion of survey. Therefore, 39 survey participants' information was used, which according to StatTools (n.d.) and Bluman (2009) constituted a valid study survey group with a 22% survey return rate.

Of the proportionally representative numbers constituting 175 potential participants, School 1 return rate was 18%, School 2 return rate was 31%, and School 3 return rate was 28%. The anticipated return rate was 60%; however, the study's survey group had a lower than anticipated return rate of 22%.

The figure assumptions used set the alpha at $\alpha = 0.05$, the critical value at CV = 0.05 level of significance, and the PPMC correlation coefficient was $r = 0.50$. This information was then applied in a Correlation Study creating 10 separate data scatter-plot charts using the Alcula (2013) statistical calculator. The correlation coefficient results for each data scatter-plot were compared to the correlation coefficient for statistical relevance.

The data structure for scatter-plots as represented in Table 3, included statements one through 10 were teacher self-analysis based on the NETS-T and statements 11 through 20 were teacher perceptions of their principal based on the NETS-A. The Likert scale used for survey purposes was converted to a point system of 0=Never, 1=Rarely, 2=Sometimes, 3=Most of the Time, and 4=Always with raw data results found in Appendix G.

Inferential Statistics

The research data were broken down for a correlation study based on teacher perceptions of effective school leadership using 21st-century skills and knowledge. Ten separate data scatter-plot charts were used to determine "if a relationship between two variables exists" (Bluman, 2009, p. 94). The independent variable of principal score was located on the *x* axis and the dependent variable of teacher self-score was located on the *y* axis. The scatter-plot chart patterns addressed the NETS topics and data were used to answer question two: What 21st-century leadership practices are associated with the use of 21st-century instructional practices to effectively support teacher and student learning?

Survey answers for statements one and 11 are presented in Figure 2. On the *x* axis, data represented teacher answers to statement eleven: My principal provides digital age leadership and management to continuously improve our school through the effective use of information and technology resources. On the *y* axis, data represented teacher answers to statement one: In my classroom, students engage in ongoing activities at a level that would be unattainable without the support of technology. The correlation coefficient result of $r = -0.04786$ was compared to the statistical relevance standard of $r = 0.50$. The r = Sample Correlation shows a weak negative relationship between the two variables.

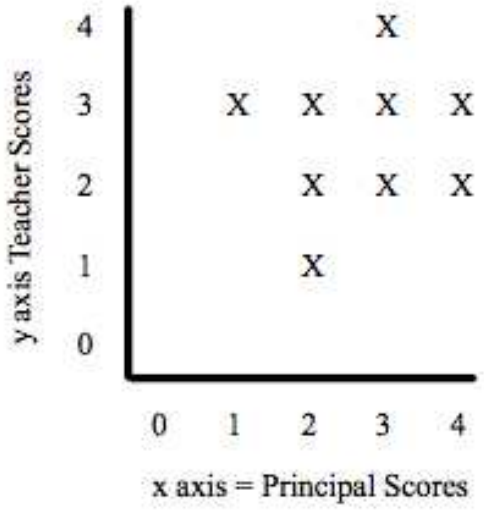

Figure 2. Scatter-plot 1.

Survey answers for statements two and 12 are presented in Figure 3. On the *x* axis, data represented teacher answers to statement 12: My principal inspires and leads the development and implementation of a school vision for comprehensive integration of technology to promote excellence in education. On the *y* axis data represented teacher answers to statement two: In my classroom, students use technology to construct, share, and publish knowledge. The correlation coefficient result of $r = -0.18179$ was compared to the statistical relevance standard of $r = 0.50$. The r = Sample Correlation shows a weak positive relationship between the two variables.

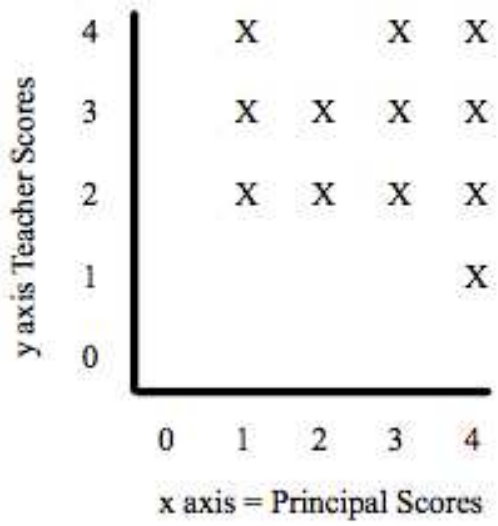

Figure 3. Scatter-plot 2.

Survey answers for statements three and 13 are presented in Figure 4. On the *x* axis, data represented teacher answers to statement 13: My principal promotes an environment of professional learning and innovation that empowers educators to enhance student learning through the infusion of contemporary technologies and digital resources. On the *y* axis, data represented teacher answers to statement three: In my classroom, students use technology to collaborate with peers and experts irrespective of time zone or physical distances. The correlation coefficient result of $r = -0.24841$ was compared to the statistical relevance standard of $r = 0.50$. The r = Sample Correlation shows a weak negative relationship between the two variables.

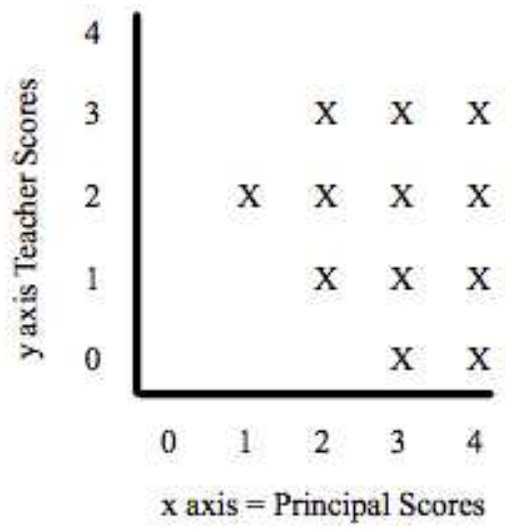

Figure 4. Scatter-plot 3.

Survey answers for statements four and 14 are presented in Figure 5. On the *x* axis, data represented teacher answers to statement 14: My principal creates, promotes, and sustains a dynamic, digital age learning culture that provides a rigorous, relevant, and engaging education for all students. On the *y* axis, data represented teacher answers to statement four: In my classroom technology is utilized to differentiate instruction and ensure individual needs are met in a relevant, rigorous, and engaging manner. The correlation coefficient result of $r = 0.24581$ was compared to the statistical relevance standard of $r = 0.50$. The r = Sample Correlation shows a weak positive relationship between the two variables.

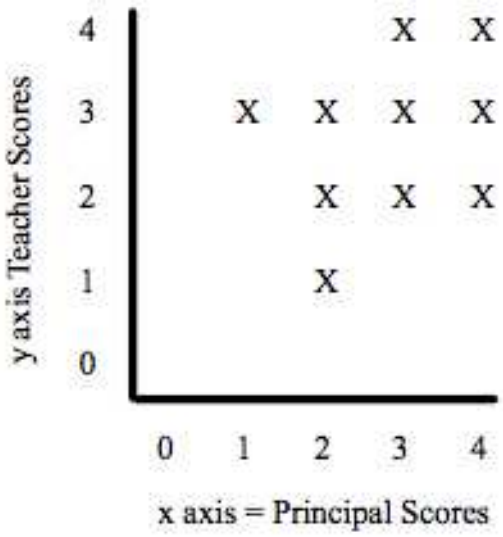

Figure 5. Scatter-plot 4.

Survey answers for statements five and 15 are presented in Figure 6. On the *x* axis, data represented teacher answers to statement 15: My principal models and facilitates understanding of social, ethical, and legal issues of an evolving digital culture. On the *y* axis, data represented teacher answers to statement five: In my classroom, copyright and fair use policies are addressed and utilized for print, video, and digital resources. The correlation coefficient result of $r = 0.02607$ was compared to the statistical relevance standard of $r = 0.50$. The r = Sample Correlation shows a weak positive relationship between the two variables.

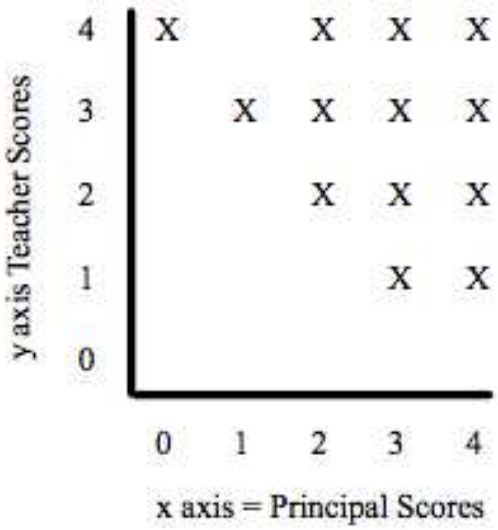

Figure 6. Scatter-plot 5.

Survey answers for statements six and 16 are presented in Figure 7. On the *x* axis, data represented teacher answers to statement 16: My principal models and facilitates understanding of responsibilities and safety related to an evolving digital culture. On the *y* axis, data represented teacher answers to statement six: In my classroom, digital etiquette, digital foot printing, and online safety are addressed and utilized. The correlation coefficient result of $r = -0.05119$ was compared to the statistical relevance standard of $r = 0.50$. The r = Sample Correlation shows a weak negative relationship between the two variables.

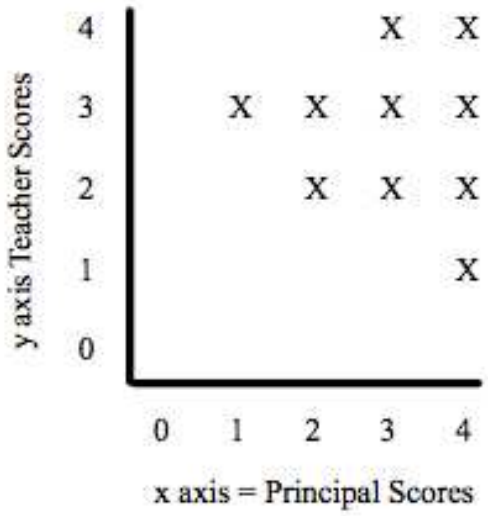

Figure 7. Scatter-plot 6.

Survey answers for statements seven and 17 are presented in Figure 8. On the *x* axis, data represented teacher answers to statement 17: My principal inspires and leads development and implementation of technology throughout my school to ensure teacher and organizational time is focused to support quality instruction and student learning. On the *y* axis, data represented teacher answers to statement seven: In my school district, I promote and use diverse technological resources and technologies to support teaching and learning. The correlation coefficient result of $r = 0.43613$ was compared to the statistical relevance standard of $r = 0.50$. The r = Sample Correlation shows a weak positive relationship between the two variables.

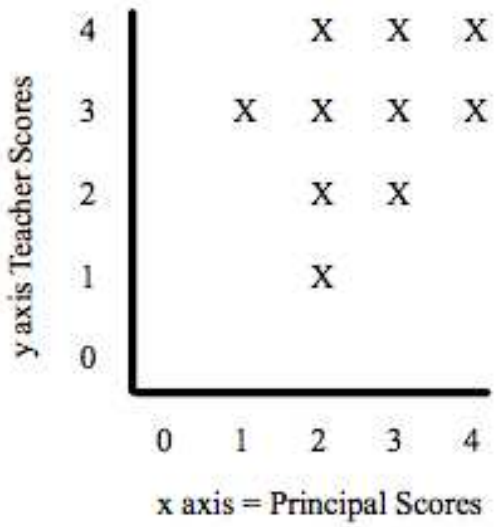

Figure 8. Scatter-plot 7.

Survey answers for statements eight and 18 are presented in Figure 9. On the *x* axis, data represented teacher answers to statement 18: My principal uses technology to collaborate at building and district levels through collecting data, analyzing data, and giving reflective feedback concerning operation systems and technological resources. On the *y* axis, data represented teacher answers to statement eight: In my school district, I use technology to collaborate with peers through collecting and analyzing data relevant to the educational environment for education improvement. The correlation coefficient result of $r = 0.04593$ was compared to the statistical relevance standard of $r = 0.50$. The $r =$ Sample Correlation shows a weak positive relationship between the two variables.

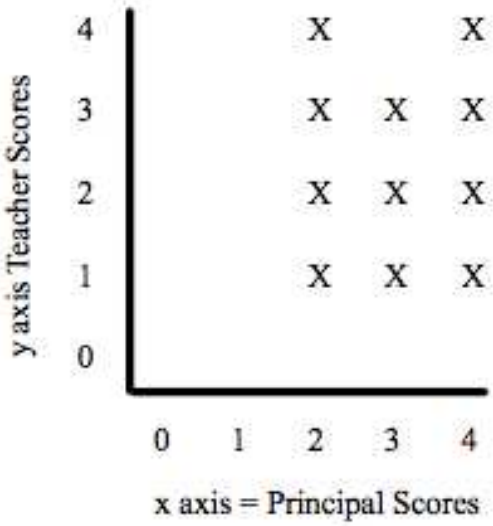

Figure 9. Scatter-plot 8.

Survey answers for statements nine and 19 are presented in Figure 10. On the *x* axis, data represented teacher answers to statement 19: My principal models the principles of self-awareness, reflective practice, transparency, and ethical behaviors through technology usage. On the *y* axis, data represented teacher answers to statement nine: In my classroom, I am the facilitator guiding students in self-managed learning projects with reflection for growth and improvement through technology usage. The correlation coefficient result of $r = 0.18541$ was compared to the statistical relevance standard of $r = 0.50$. The r = Sample Correlation shows a weak positive relationship between the two variables.

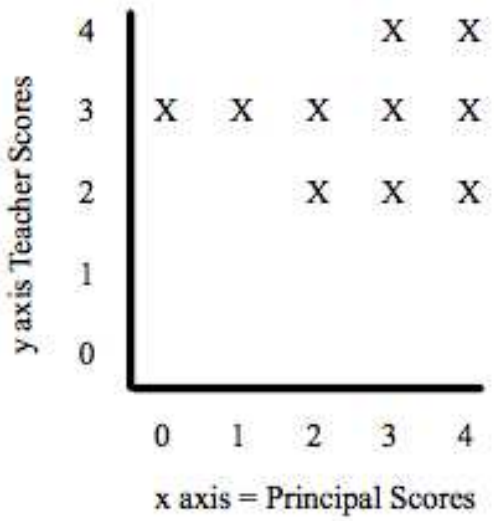

Figure 10. Scatter-plot 9

Survey answers for statements 10 and 20 are presented in Figure 11. On the *x* axis, data represented teacher answers to statement 20: My principal encourages and supports the use of technology to actively involve parents and community members in our school and district. On the *y* axis, data represented teacher answers to statement ten: In my classroom, I use technology to actively involve parents and community members thereby creating a holistic educational experience for my students. The correlation coefficient result of $r = 0.25054$ was compared to the statistical relevance standard of $r = 0.50$. The r = Sample Correlation shows a weak positive relationship between the two variables.

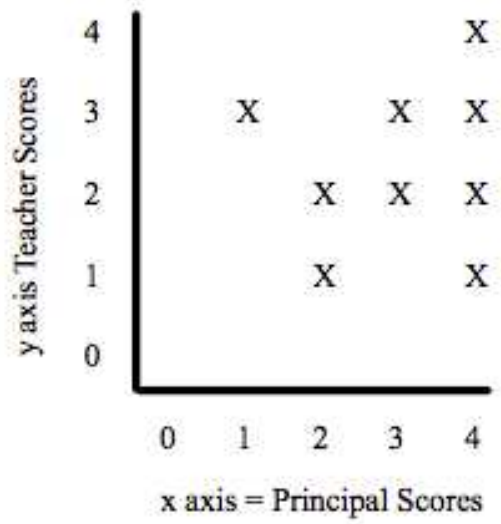

Figure 11. Scatter-plot 10.

Next, one Pearson Product Moment Correlation Coefficient study was conducted on this same data to determine the type and strength of relationship of NETS (2009) components by totaling teacher self scored responses by column for statements one through 10 and teacher principal score responses by column for statements 11 through 20. Data results were sorted into spreadsheet format and the coefficient formula was applied with results displayed on a number line to visually indicate type and strength of relationship to further answer question two. The Pearson Product Moment Correlation Coefficient results were $r = -0.53615$. Figure 12 depicts a number line indicating the correlation coefficient results compared to the statistical relevance standard of $r = 0.50$ showing a statistically relevant negative relationship existed.

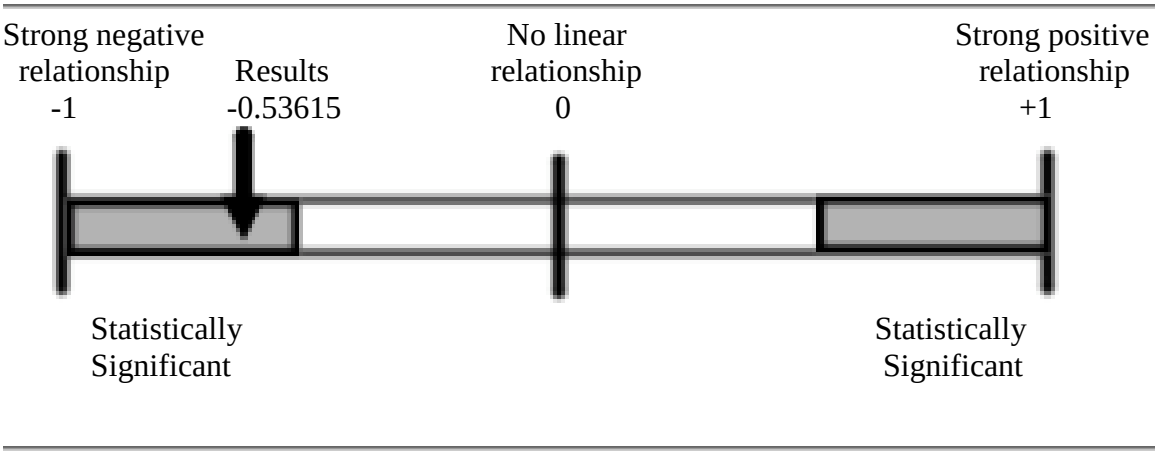

Figure 12. Number line.

Since a significant negative relationship existed, a regression study was completed to create a scatter plot and determine line of regression best fit. The line of regression best fit showed a simple negative relationship, as depicted in Figure 13

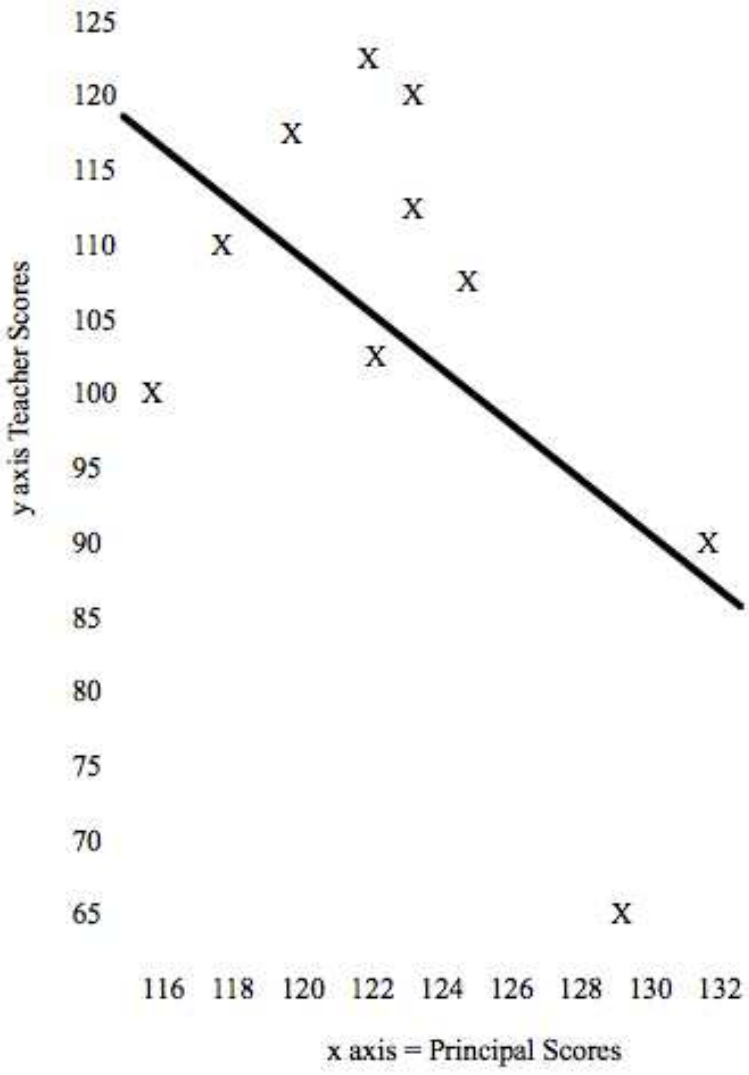

Figure 13. Regression scatter- plot.

The line of regression indicated a simple negative relationship with the six coordinating statement sets 2 and 12, 4 and 14, 7 and 17, 8 and 18, 9 and 19, and 10 and 20 remaining close to the line of regression. However, the four coordinating statement sets 1 and 11, 3 and 13, 5 and 15, and 6 and 16 were noticeable outliers. To address the potential of these outliers being influential points or influential observations a second line

of regression study was calculated. As indicated in Figure 14, the line of regression is influenced and therefore validated these outliers were influential data points when figuring the absolute line of regression.

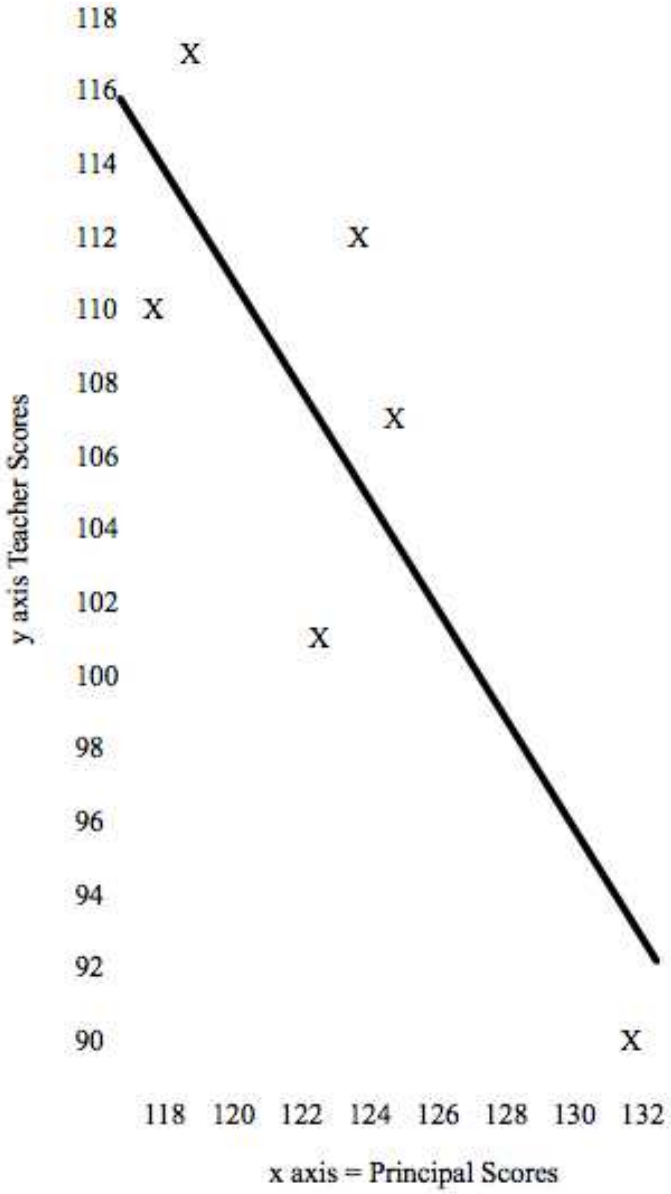

Figure 14. Line of regression excluding outliers.

The second set of data created verified the four outlier statement sets did influence the data results significantly. The second Pearson Product Moment Correlation Coefficient result excluding outliers was $r = -0.83920$. Figure 15 depicts a number line indicating the correlation coefficient results compared to the statistical relevance standard of $r = 0.50$. The data represented shows an even more statistically relevant negative relationship existed once outliers were excluded from calculations.

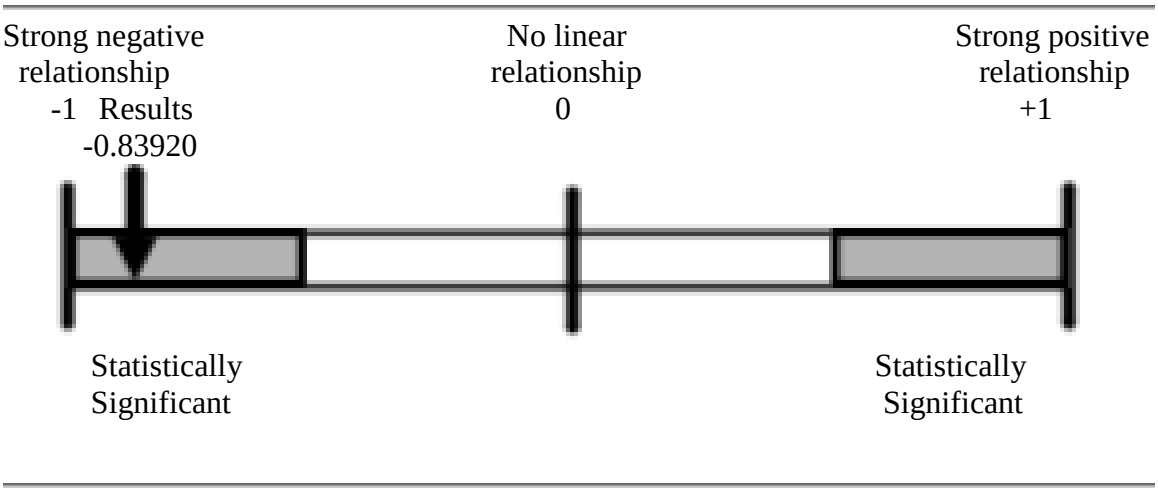

Figure 15. Number line data excluding outliers.

Based on the line of regression best fit between these two data sets, the inference can be made that statement sets 2 and 12, 4 and 14, 7 and 17, 8 and 18, 9 and 19, and 10 and 20 that an overall simple negative relationship existed as perceived by teachers in regards to leadership practices as related to instructional practices to support teacher and student learning. However, this left the outlier question sets 1 and 11, 3 and 13, 5 and 15,

and 6 and 16 in question as to whether or not they provided positive relationship potential in reference to research question two.

To further disseminate data for accuracy, the coefficient of determination, the standard error of the estimate, and the prediction interval, other measures associated with the correlation and regression techniques of data study, were constructed and used to disseminate data within a 95% confidence interval. The coefficient of determination formula measured the variation of the *y* axis teacher self analysis statement, or dependent variable, and the *x* axis teacher principal analysis statement, or independent variable.

Data from first Pearson Product Moment Correlation Coefficient (PPMCC) resulted in $r^2 = .2874$; and data from the second PPMCC resulted in $r^2 = .7039$. Therefore, where only 29% of the variation in the dependent variable is accounted for in the first PPMCC by the variations in the independent variable, an impressive 70% was accounted for in the second PPMCC. Respectively, this left a 71% coefficient of nondetermination value unaccounted for in the first PPMCC and only a 30% coefficient of nondetermination value unaccounted for in the second PPMCC.

The standard error of the estimate was created next, which is similar to standard deviation without using a mean. The first step was figuring the square root from the coefficient of nondetermination using data from the second PPMCC, which was the square root of 30% at 5.477. Next, the square root of 5.477 was divided by 28, which came from the formula *n*-2. The formula result for the standard error of the estimate was $s_{est} = .1956$.

Using the online statistics calculator (Soper, 2013) data were used to construct a prediction confidence interval. Data included in formula was standard error of the

estimate s_{est} = .1956, regression line equation y' = 303.471, correlation coefficient predicted value *r* = -0.839, sample size 39, and number of predictors with PPMCC data set two, which used only six of the 10 statement sets. The 95% confidence interval was established as $-1.23742 \leq y \leq -0.44058$ contained the actual value of y in relation to question two.

To address question one, the data were utilized to create one PPMCC study to determine the type and strength of relationship by creating two subgroups: the subgroup of total teacher self scored responses for statements one through 10; and, the subgroup of total teacher principal score responses for statements 11 through 20. Each of the 39 participant responses were used to calculate the independent variable of principal score total, which was located on the *x* axis, and the dependent variable of teacher self-score total, which was located on the *y* axis.

Data results were sorted into spreadsheet format and the coefficient formula was applied with results displayed on a Number Line to visually indicate type and strength of relationship in answer to question one: What is the relationship between a teacher's integration of technology skills and knowledge in the classroom and his/her principal's integration of technology skills and knowledge in the building? The Pearson Product Moment Correlation Coefficient results were *r* = 0.10468. Figure 16 depicts a number line indicating the correlation coefficient results compared to the statistical relevance standard of *r* = 0.50 showing a statistically relevant relationship did not exist.

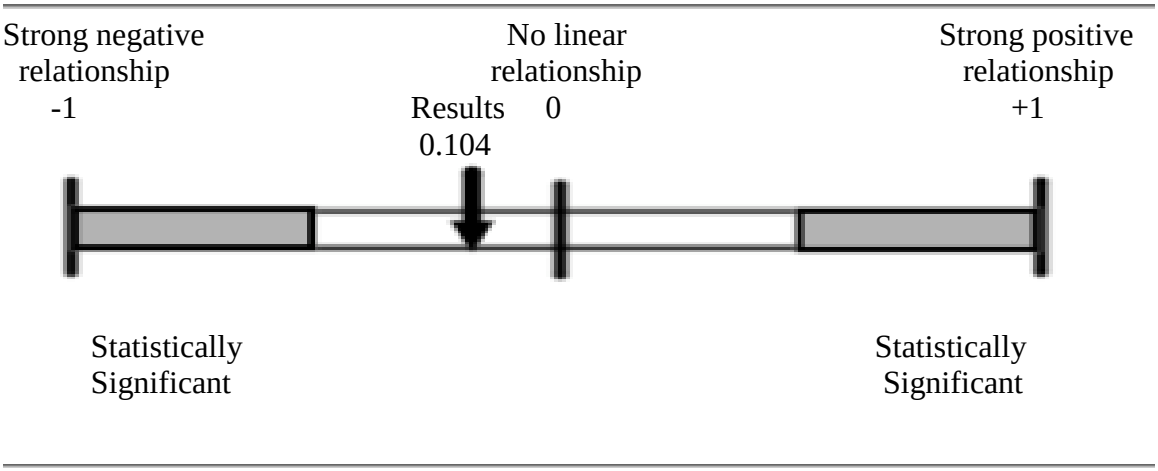

Figure 16. Question one number line.

Further data results showed the overall survey response mode was Likert scale number three. The number three represented the most common teacher survey answer as having been most of the time. Those statement sets that maintained a three mode for both teacher self-assessment and teacher principal-assessment were 2 and 12; 4 and 14; 7 and 17; and, 9 and 19. The statement set that contained teacher self-assessment mode as 3 = most of the time versus teacher principal assessment mode as 4 = always was survey statement set 8 and 18. The statement set that contained teacher self-assessment mode as 2 = sometimes versus teacher principal assessment mode as 4 = always was statement set 10 and 20.

The first statement set that maintained a three mode for both assessment values was set 2 and 12, which showed both teachers and administrators were proficient at facilitating technology integration. Survey statement 2: In my classroom, students use technology to construct, share, and publish knowledge, addressed the NETS-T (2009)

Standard 1: Facilitate and inspire student learning and creativity. Survey statement 12: My administrator inspires and leads the development and implementation of a school vision for comprehensive integration of technology to promote excellence in education addressed the NETS-A (2009) Standard 1: Visionary Leadership.

The next statement set that maintained a three mode for both assessment values was set 4 and 14 indicating both teachers and administrators were proficient at differentiation within a digital culture. Survey statement 4: In my classroom, technology is utilized to differentiate instruction and ensure individual needs are met in a relevant, rigorous, and engaging manner, addressed the NETS-T (2009) Standard 4: Promote and model digital citizenship and responsibility. Survey statement 14: My administrator creates, promotes, and sustains a dynamic, digital age learning culture that provides a rigorous, relevant, and engaging education for all students, addressed the NETS-A (2009) Standard 2: Digital age learning culture.

Survey statement set 7 and 17 also maintained a three mode for both assessment values, which showed both teachers and administrators were proficient users of technology to support and improve education practices. Survey statement 7: In my school district, I promote and use diverse technological resources and technologies to support teaching and learning, addressed the NETS-T (2009) Standard 2: Design and develop digital age learning experiences and assessments, and Standard 5: Engage in professional growth and leadership. Survey statement 17: My administrator inspires and leads development and implementation of technology throughout my school to ensure teacher and organizational time is focused to support quality instruction and student

learning, addressed the NETS-A (2009) Standard 1: Visionary leadership, which was the same standard utilized with survey statement 12.

The next survey statement set that maintained a three mode for both assessment values was 9 and 19, which pointed out both teachers and administrators were proficient at providing transparent expectations of technology use. Survey statement 9: In my classroom, I am the facilitator guiding students in self-managed learning projects with reflection for growth and improvement through technology usage, addressed the NETS-T (2009) Standard 1: Facilitate and inspire student learning and creativity, which was the same standard utilized with survey statement two. My administrator models the principles of self-awareness, reflective practice, transparency, and ethical behaviors through technology usage, addressed the NETS-A (2009) Standard 5: Digital citizenship.

The sole data, which maintained a three mode for teacher self-assessment and a four mode for teacher principal-assessment was data set 8 and 18. This data set showed some room for teachers to improve in providing a global digital age learning environment, while administrators had achieved mastery. Survey statement 8: In my school district, I use technology to collaborate with peers through collecting and analyzing data relevant to the educational environment for education improvement, addressed the NETS-T (2009) Standard 3: Model digital age work and learning. Survey statement 18: My administrator uses technology to collaborate at building and district levels through collecting data, analyzing data, and giving reflective feedback concerning operational systems and technological resources, addressed the NETS-A (2009) Standard 2: Digital age learning culture, which was also focused on in survey statement 14.

The following data set, which maintained a two mode for teacher self-assessment and a four mode for teacher principal-assessment, was data set 10 and 20. Statement 10: In my classroom, I use technology to actively involve parents and community members thereby creating a holistic educational experience for my students, addressed the NETS-T (2009) Standard 3: Model digital age work and learning, which was also focused on with survey statement eight. Statement 20: My administrator encourages and supports the use of technology to actively involve parents and community members in our school and district, addressed the NETS-A (2009) Standard 3: Excellence in professional practice. This data set emphasized the discrepancy between growth potential teachers had and mastery administrators had communicating and using digital resources.

The first outlier data set was 1 and 11, and maintained a three mode for both assessments. Statement 1: In my classroom, students engage in ongoing activities at a level that would be unattainable without the support of technology, addressed the NETS-T (2009) Standard 1: Facilitate and inspire student learning and creativity, which was also the focus of survey statements two and nine; and, Standard 2: Design and develop digital age learning experiences and assessments, which was also addressed in survey statement seven. Statement 11: My administrator provides digital age leadership and management to continuously improve our school through the effective use of information and technology resources, addressed the NETS-A (2009) Standard 4: Systemic improvement. Essentially, this data set indicated that both teachers and administrators were proficient at providing leadership that supported and managed instructional technology.

The second outlier data set was 3 and 13, and reported a two mode for teacher self-assessment with a four mode for teacher principal-assessment. Statement 3: In my

classroom, students use technology to collaborate with peers and experts irrespective of time zones or physical differences, addressed the NETS-T (2009) Standard 3: Model digital age work and learning, which is also addressed with survey statements eight and 10. Statement 13: My administrator promotes an environment of professional learning and innovation that empowers educators to enhance student learning through the infusion of contemporary technologies and digital resources, addressed the NETS-A (2009) Standard 3: Excellence in professional practice. Surprisingly, this data set showed lots of room for teacher improvement modeling digital age work and learning, while administrators excelled at promoting professional learning and innovative resources.

The next outlier data set was 5 and 15 and maintained a four mode for both assessments. Survey statement 5: In my classroom, copyright and fair use policies are addressed and utilized for print, video, and digital resources, addressed the NETS-T (2009) Standard 4: Promote and model digital citizenship and responsibility, which was also addressed with statement four. Survey statement 15: My administrator models and facilitates understanding of social, ethical, and legal issues of an evolving digital culture, addressed the NETS-A (2009) Standard 5: Digital citizenship, which was also addressed with statement 19. This data set was empowering in that it was an outlier because both teachers and administrators have mastered facilitating the responsible and ethical use of information in our digital culture.

The last outlier data set was 6 and 16, and reported a three mode for teacher self-assessment with a four mode for teacher principal-assessment. Survey statement 6: In my classroom, digital etiquette, digital foot printing, and online safety are addressed and utilized, addressed the NETS-T (2009) Standard 4: Promote and model digital citizenship

and responsibility. Survey statement 16: My administrator models and facilitates understanding of responsibilities and safety related to an evolving digital culture, addressed the NETS-A (2009) Standard 5: Digital citizenship. This data set showed both teachers and administrators strongly model online safety, with only a slight need for improvement among teachers.

Summary

The purpose of this study was to examine components of school leadership and practices as referenced in the NETS (2009) for 21st-century skills and knowledge integration. This quantitative study was designed to investigate potential relationships between teachers and principals within the realm of 21st-century teaching and learning as perceived by teachers whose schools have implemented a 1:1 student device policy. Two research questions guided the study, which was based on a random stratified sample with 22% return rate and a sample size of 39.

Chapter Five: Conclusions and Recommendations

The purpose of this study was to examine components of school leadership and practices as referenced in the NETS (2009) for 21st-century skills and knowledge integration. This quantitative study was designed to investigate potential relationships between teachers and principals within the realm of 21st-century teaching and learning as perceived by teachers whose schools have implemented a 1:1 student device policy. Data for measurement was obtained from an online survey distributed using a stratified random sampling process among three schools.

Two research questions guided the literature examination for components of school leadership and practices for 21st-century skills and knowledge integration. Survey statement topics were derived from both the NETS-A and the NETS-T standards, which addressed how technology should be interwoven throughout education to systemically change the culture of education. The survey was based on both teacher self-perceptions and teacher perceptions of their principal by using a Likert Scale to rate educational statements applicable to both teachers and principal practices.

A lower than expected sample study return rate still yielded a valid study group size, as well as having responses from all three strata schools who had implemented a 1:1 student device policy. All of the NETS-A standards were addressed in relation to all of the NETS-T standards, which emphasized how technology continues to be interwoven throughout education as referenced in work by Ringstaff and Kelly (2002). More essentially, this study has examined effective leadership components (Schwahn & McGarvey, 2011) in order to drive meaningful change (Li, 2010).

Summary of the Study

The significance of the study was to examine if a relationship existed between teachers and their principals in correlation to 21st-century skills, knowledge, and practices that effectively support teacher and student learning. Results were unforeseen, yet provided relationship variables for future research that will potentially provide clear-sited application of best practices and skills for effective technology leadership. Within the global education community, together we can accomplish more than any one individual (Willis, 1994), through collective efforts to harness technology in order to improve leadership skills.

Integration Relationships Data Analysis

The first research question, which guided the study was, "What is the relationship between a teacher's integration of technology skills and knowledge in the classroom and his/her Principals' integration of technology skills and knowledge in the building?" Survey data obtained listed the independent variable as teacher perception of principal and dependent variable as teacher perception of self. Based on survey results, data were tested and disseminated using the Pearson Product Moment Correlation Coefficient (PPMCC) formula results as $r = 0.10468$, which illustrated there was no statistical significance to support this research based question based on the statistical relevance standard of $r = 0.50$.

From these data results, the null hypothesis, "There is no relationship between a teacher's use of 21st-century teaching skills and knowledge and his/her principal's use of 21st-century leadership skills and knowledge" was not rejected. This determination was

made due to the outcome of no statistical relevance determined from results of $r = 0.104$ with a relevance standard of $r = 0.50$.

While concurrently, the alternative hypothesis, "There is a relationship between a teacher's use of 21st-century teaching skills and knowledge and his/her principal's use of 21st-century leadership skills and knowledge" was rejected. Further data results from the PPMCC study showed the overall survey response mode was Likert Scale number three. The number three, on a zero to four scale, represented the most common teacher survey answer as having been "most of the time".

Implications Regarding Integration Relationships

Implications for this study regarding 21st-century skill and knowledge integration relationships between teaching and leadership were unexpected. The null hypothesis "There is no relationship between a teacher's use of 21st-century teaching skills and knowledge and his/her principal's use of 21st-century leadership skills and knowledge" was not rejected based on a statistically insignificant relationship, when a statistically significant positive relationship was the anticipated outcome. These data results effect, at minimum schools surveyed and at most globally, and associate that leadership application of the NETS-A standards had no impact on teacher application of the NETS-T standards.

Leadership and Instructional Practices Data Analysis

The second research question, which guided this study was, "What 21st-century leadership practices are associated with the use of 21st-century instructional practices to effectively support teacher and student learning as perceived by the teacher?" Based on stratified random sample survey results, data were tested and disseminated using the scatter-plot formula with correlation coefficient to determine statistical significance. Ten

scatter-plot charts were created analyzing the 10 statement sets from survey data, which were derived from components of the NETS-A and the NETS-T standards. Each question set data listed the independent variable as teacher perception of principal and the dependent variable as teacher perception of self. The 10 data set correlation coefficient results on NETS components ranged from $r = -0.24841$ to $r = 0.43613$, which did not meet the statistical relevance standard of $r = 0.50$.

Based on these data results, the null hypothesis, There is no relationship between a teacher's use of 21st-century teaching skills and knowledge and his/her principal's use of 21st-century leadership skills and knowledge, was not rejected since the statistical relevance standard of $r = 0.50$ was not met. While concurrently, the alternative hypothesis, There is a relationship between 21st-century leadership practices and 21st-century instructional practices to effectively support teacher and student learning, was rejected.

Further data breakdown, based on survey results using NETS (2009) component column totals, and the PPMCC formula results as $r = -0.53615$ illustrated there was statistical significance to support further research based on the statistical relevance standard of $r = 0.50$. Since a significant negative relationship existed, a regression study was completed to create a scatter-plot and determine line of regression best fit. The regression line slope showed a simple negative relationship.

However, there were noticeable outliers, which led to a second line of regression study. The second line of regression study validated the outliers were influential data points. Therefore, excluding outliers helped generate a more accurate PPMCC formula

result of r = -0.83920, which ultimately indicated only a 30% coefficient of nondetermination remained.

Implications Regarding Leadership and Instructional Practices

Implications of this study for school leaders' efforts to effectively support teacher and student learning in this study surprisingly did not show a statistically relevant relationship overall, even though the examination of effective leadership components was recommended by Schwahn and McGarvey (2011). However, based on the wide correlation coefficient range produced, study implications suggested that the NETS-A and the NETS-T standard elements be examined separately for a more individual focus to achieve systemic improvement, because separate data scatter-plot charts were used to determine "if a relationship between two variables exists" (Bluman, 2009, p. 94) in relation to different NETS standards and roles.

For example, data set 7 and 17 collaboratively addressed the NETS-A standard one and the NETS-T standard two with a resultant r = 0.43613, which was only r = 0.064 from being statistically significant. This data set correlated the NETS-A standard one technology infused visionary leadership in conjunction with the NETS-T standard two digital age learning experiences and assessments rather than separately.

However, application of PPMCC of column totals with regression study showed the teacher assessment of principal score was the independent variable, and the teacher self-assessment was the dependent variable. From these data totals, two outcomes can be correlated. Leaders were weak in the NETS-A and therefore negatively impacted the NETS-T implementation, or leaders were strong in the NETS-A and therefore negatively impacted the NETS-T implementation, based on survey responses of teacher perceptions.

Based on the first data correlated outcome of teacher perceptions of weak leadership, one potential underpinning was a weak professional development program. Harris and Hofer (2011) emphasized that technological pedagogical content knowledge required planning to be the controlling connector of technology, curriculum, and student styles and abilities, all while in a context of relevancy and real world application. Recommendations for professional development, according to Harris and Hofer (2011), are planning could best be supported through interactive professional development focused on integrating educational technology and content-based learning organized into skill taxonomy levels, while simultaneously keeping in mind school cultures, socioeconomics, and structures.

Additional recommendations were effective learning with guidance and teaching included modeling for education relevancy, summarized Partridge and Hallam (2006), so as to be able to function within constantly changing environments through effective utilization of research skills to create information professionals who could proficiently collaborate. Furthermore, noted Partridge and Hallam (2006), practitioners must have been reflective to acquire and refine their toolbox of evidence-based practices from which to draw, in order to meet accountability expectations and requirement through critical thinking processes. Decisions affected by study results, should be based on how professional development was structured and offered to teachers.

Based on the second data correlation outcome of teacher perceptions of strong leadership, one potential underpinning was a weak preparatory teacher education program. Recommendations, as Chelsey (2012) summed up, were that teacher education programs as perceived by recent graduates were lacking the most current teaching skills

such as: differentiated instruction; objective versus activity; how to effectively manage behaviors; integrating technology; lesson design and assessment; using data to drive instruction; understanding of professional workload and related stress; and, how to teach content. Decisions affected by study results should be based on teacher education program infrastructures, as well as student information on quality teacher education program characteristics.

Further study recommendations included determination of primary causes for negative relationship perceptions based on underpinnings and the potential impact upon the education workforce and transient nature of employees between employers. Decisions affected by study results on a state, national, and global level should be based on life-long learning as a global education agenda in public policy (Kendall, 2005).

A true technology leader, as analyzed by Davies (2010), was aware of trends, new developments, how technology could positively impact the organization, and advocated through investment and technology introduction, management, and access to improve learning, which contradicted the non-rejection of study null hypothesis. Therefore, resultant determination was the further study of leadership and instructional practices in a more individual NETS standards focused investigative manner.

Conclusions

Consequently, as Kowch (2009) explained, developing leaders has remained an essential focus for continued growth within our school systems. Current school leadership roles and student learning expectations are outdated (Bakia et al., 2011). Schrum and Levin (2009) explained in more depth that technology has offered a variety

of ways to support learning and instruction; and thereby, helping school leaders become more effective.

Experts have agreed leaders must effectively use and implement 21st-century skills and knowledge to drive relevant long-term change (Lessen & Sorenson, 2006). Schrum and Levin (2009) proposed utilizing the NETS "which provides guiding principles for how school leaders can inspire, advance, and sustain the integration of 21st-century technology in their schools and districts" (p. xii).

According to Schrum and Levin (2009), "administrative support is the most important factor in technology implementation and that without it other variables will be negatively affected" (p. xiv). Similarly, Blasé and Blasé (1999) addressed the need "for more research into the effects of leader behavior on teacher behavior, the relationship of instructional leadership to teaching, instructional leaders' characteristics, and conditions necessary for effective instructional leadership" (p. 131). In fact, The U.S. Department of Education (2010) has continued their grants program focus on educational research and development.

This study was significant in view of the fact that, according to Blasé and Blasé (1999), "few studies have directly examined teacher's perspectives on principals' everyday instructional leadership characteristics and the impacts of those characteristics on teachers" (p. 130). The basis of this study was the continued examination of effective leadership components and practices, in regard to 21st-century skills and integration, to determine relationships and patterns of effective implementation needed to initiate systemic change for improved leadership development. More importantly, data indicated

weak results based on teacher perceptions that could lead to further studies and identification of newly relevant factors essential for a 21st-century learning environment.

Recommendations for Further Study

Three primary limitations were identified in this study as sample demographics, survey instrument, and participant responses. The sample population was limited based on consortium membership and school technology implementation plan, and could be rectified in a future study by amassing results from a global education community.

Next, the survey instrument was limited based on single source for survey creation, combined with limited previous studies from which to compare data, and could be rectified in a future study based on issue trends in research relevance. Finally, the participant group was limited based survey return rate, school policy of one to one initiative, and role of high school teacher, and could be rectified in a future study with larger numbers from a more diverse survey candidate pool to be surveyed.

Further study recommendations included determination of primary causes for negative relationship perceptions stemming from column topic correlation studies. Determining the potential impact upon the education workforce and transient nature of employees between employers can be addressed through further studies as to exit survey information that disseminates whether exiting faculty perceive their administration as being weak in regards to technology skills and knowledge integrations; or whether exiting faculty perceive their administration as being strong in regards to technology skills and knowledge integrations.

These data results could provide a data rich environment as to the effects of technology integration comfort level in regards to the impact of comfort or discomfort

with technology usage and application weighed on the teacher's decision to change employment. Furthermore, studies based on teacher's philosophy and compatibility with school district vision in regards to technology usage and district implementation of professional development.

Moreover, discovering what effective professional development structures as perceived from different viewpoints, and how it is implemented with administrators, teachers, and support staff could provide insight into negative relationship perceptions. In addition, based on the wide correlation coefficient range produced, study implications suggested that the NETS-A and the NETS-T standard elements be examined separately for a more individual focus to achieve systemic improvement in relation to different NETS standards and roles.

Appendix A

IRB Approval

LINDENWOOD

LINDENWOOD UNIVERSITY ST. CHARLES, MISSOURI

DATE:	July 9, 2013
TO:	Bobbie Augspurger
FROM:	Lindenwood University Institutional Review Board
STUDY TITLE:	[483211-1] Teacher Perceptions of Effective School Leadership Using Twenty-first Century Skills and Knowledge
IRB REFERENCE #:	
SUBMISSION TYPE:	New Project
ACTION:	APPROVED
APPROVAL DATE:	July 9, 2013
EXPIRATION DATE:	July 9, 2014
REVIEW TYPE:	Expedited Review

Thank you for your submission of New Project materials for this research project. Lindenwood University Institutional Review Board has APPROVED your submission. This approval is based on an appropriate risk/benefit ratio and a study design wherein the risks have been minimized. All research must be conducted in accordance with this approved submission.

This submission has received Expedited Review based on the applicable federal regulation.

Please remember that informed consent is a process beginning with a description of the study and insurance of participant understanding followed by a signed consent form. Informed consent must continue throughout the study via a dialogue between the researcher and research participant. Federal regulations require each participant receive a copy of the signed consent document.

Please note that any revision to previously approved materials must be approved by this office prior to initiation. Please use the appropriate revision forms for this procedure.

All SERIOUS and UNEXPECTED adverse events must be reported to this office. Please use the appropriate adverse event forms for this procedure. All FDA and sponsor reporting requirements should also be followed.

All NON-COMPLIANCE issues or COMPLAINTS regarding this project must be reported promptly to the IRB.

This project has been determined to be a Minimal Risk project. Based on the risks, this project requires continuing review by this committee on an annual basis. Please use the completion/amendment form for this procedure. Your documentation for continuing review must be received with sufficient time for review and continued approval before the expiration date of July 9, 2014.

Please note that all research records must be retained for a minimum of three years.

If you have any questions, please contact Tameka Moore at (618)616-7027 or ttm537@gmail.com. Please include your study title and reference number in all correspondence with this office.

If you have any questions, please send them to IRB@lindenwood.edu. Please include your project title and reference number in all correspondence with this committee.

This letter has been electronically signed in accordance with all applicable regulations, and a copy is retained within Lindenwood University Institutional Review Board's records.

Appendix B

Request for Research Site Approval

Permission Letter for Superintendent

June 16, 2013

Dear Superintendent _____,

I am conducting a research project entitled, *Teacher Perceptions of Effective School Leadership Using Twenty-first Century Skills and Knowledge*, in partial fulfillment of the requirement for a doctoral degree in educational administration at Lindenwood University.

The research gathered should assist in providing insights and perspectives into the components of school leadership as referenced in National Education Technology Standards (NETS) for twenty-first century skills and knowledge integration.

I am seeking your permission as the superintendent of the <*Name Here*> School District to survey a randomly selected portion of your high school faculty as part of the data collection and analysis process.

Consent is voluntary, and you may withdraw from the study at any time without penalty. The identity of the participants, as well as the identity of the school district will remain confidential and anonymous in the dissertation or any future publications of this study.

Please do not hesitate to contact me with any questions or concerns about participation (phone: XXX-XXX-XXXX or electronic mail: XXXXXXXXXX@XXXXXXX.com. You may also contact the dissertation advisor for this research study, Dr. Devore, (phone: XXX-XXX-XXXX or electronic mail: XXXXXXX@XXXXXXXXXX.edu. A copy of this letter and your written consent should be retained by you for future reference.

Yours truly,

Bobbie Augspurger
Doctoral Candidate

Appendix C

Research Site Approval Permission Letter

Permission Letter

I, <*Name of Superintendent*>, grant permission for Bobbie Augspurger to survey our high school faculty as part of a research project entitled, Teacher Perceptions of Effective School Leadership Using Twenty-first Century Skills and Knowledge. By signing this permission form, I understand that the following safeguards are in place to protect the participants:

1. I may withdraw my consent at any time without penalty.

2. The identity of the participants, as well as the identity of the school district will remain confidential and anonymous in the dissertation or any future publications of this study.

I have read the information above, and any questions that I have posed have been answered to my satisfaction. Permission, as explained, is granted.

_____ _____

Superintendent's Signature Date

Appendix D

Online Survey Instrument

The survey Likert Scale of 0=Never,1=Rarely, 2=Sometimes, 3= Most of the Time, 4=Always was introduced and followed by these twenty survey statements:

1. In my classroom, **STUDENTS ENGAGE IN ONGOING ACTIVITIES** at a level that would be unattainable without the support of technology.

2. In my classroom, **STUDENTS USE TECHNOLOGY TO CONSTRUCT, SHARE, AND PUBLISH** knowledge.

3. In my classroom, **STUDENTS USE TECHNOLOGY TO COLLABORATE WITH PEERS AND EXPERTS** irrespective of time zone or physical distances.

4. In my classroom, **TECHNOLOGY IS UTILIZED TO DIFFERENTIATE INSTRUCTION** and ensure individual needs are met in a relevant, rigorous, and engaging manner.

5. In my classroom, **COPYRIGHT AND FAIR USE POLICIES ARE ADDRESSED** and utilized for print, video, and digital resources.

6. In my classroom, **DIGITAL ETIQUETTE, DIGITAL FOOT PRINTING, AND ONLINE SAFETY ARE ADDRESSED** and utilized.

7. In my school district, **I PROMOTE AND USE DIVERSE TECHNOLOGICAL RESOURCES AND TECHNOLOGIES** to support teaching and learning.

8. In my school district, **I USE TECHNOLOGY TO COLLABORATE WITH PEERS** through collecting and analyzing data relevant to the educational environment for education improvement.

9. In my classroom, **I AM THE FACILITATOR GUIDING STUDENTS** in self-managed learning projects with reflection for growth and improvement through technology usage.

10. In my classroom, **I USE TECHNOLOGY TO ACTIVELY INVOLVE PARENTS AND COMMUNITY MEMBERS** thereby creating a holistic educational experience for my students.

11. My principal provides **DIGITAL AGE LEADERSHIP AND MANAGEMENT** to continuously improve our school through the effective use of information and technology resources.

12. My principal **INSPIRES AND LEADS THE DEVELOPMENT AND IMPLEMENTATION OF A SCHOOL VISION** for comprehensive integration of technology to promote excellence in education.

13. My principal **PROMOTES AN ENVIRONMENT OF PROFESSIONAL LEARNING AND INNOVATION** that empowers educators to enhance student learning through the infusion of contemporary technologies and digital resources.

14. My principal creates, promotes, and sustains a dynamic, **DIGITAL AGE LEARNING CULTURE** that provides a rigorous, relevant, and engaging education for all students.

15. My principal **MODELS AND FACILITATES UNDERSTANDING OF SOCIAL, ETHICAL, AND LEGAL ISSUES** of an evolving digital culture.

16. My principal **MODELS AND FACILITATES UNDERSTANDING OF RESPONSIBILITIES AND SAFETY** related to an evolving digital culture.

17. My principal inspires and leads development and implementation of technology throughout my school to **ENSURE TEACHER AND ORGANIZATIONAL TIME IS FOCUSED** to support quality instruction and student learning.

18. My principal **USES TECHNOLOGY TO COLLABORATE** at building and district levels through collecting data, analyzing data, and giving reflective feedback concerning operational systems and technological resources.

19. My principal **MODELS THE PRINCIPLES** of self-awareness, reflective practice, transparency, and ethical behaviors **THROUGH TECHNOLOGY USAGE.**

20. My principal **ENCOURAGES AND SUPPORTS THE USE OF TECHNOLOGY TO ACTIVELY INVOLVE PARENTS AND COMMUNITY MEMBERS** in our school and district.

NETS: Acronym for National Educational Technology Standards. Definition found

online at www.iste.org/standards. Key words noted in **BOLD** changes by Augspurger.

Appendix E

Informed Consent Form

Lindenwood University

School of Education
209 S. Kingshighway
St. Charles, Missouri 63301

Informed Consent for Participation in Research Activities

"Teacher Perceptions of Effective School Leadership Using Twenty-First Century Skills and Knowledge"

Principal Investigator: Bobbie A. Augspurger Telephone: XXXXX E-mail: XXXXX

Participant _____ Contact info _____

---

1. You are invited to participate in a research study conducted by Bobbie Augspurger under the guidance of Dr. Sherry DeVore and Dr. Trey Moeller. The purpose of this research is to examine the primary components of school technology leadership for technology integration in the twenty-first century.

2. a) Your participation will involve the completion of an online survey.

   b) The amount of time involved in your participation will be approximately twenty minutes in length and you will receive the results via email.

   Approximately one hundred participants will be involved in this research from various public schools at various grade levels in southwest Missouri.

3. There are no anticipated risks associated with this research.

4. There are no direct benefits for you participating in this study. However, your participation will contribute to the knowledge about leadership styles, characteristics, and practices for effective technology integration.

5. Your participation is voluntary and you may choose not to participate in this research study or to withdraw your consent at any time. You may choose not to answer any questions that you do not want to answer. You will NOT be penalized in any way should you choose not to participate or to withdraw.

6. We will do everything we can to protect your privacy. As part of this effort, your identity will not be revealed in any publication or presentation that may result from this study and the information collected will remain in the possession of the investigator in a safe location.

7. If you have any questions or concerns regarding this study, or if any problems arise, you may call the Investigator, Bobbie Augspurger at XXXXX or the Supervising Faculty, Dr. Trey Moeller at XXXXX. You may also ask questions of or state concerns regarding your participation to the Lindenwood Institutional Review Board (IRB) through contacting Dr. Jann Weitzel, Vice President for Academic Affairs at XXX-XXX-XXXX.

I have read this consent form and have been given the opportunity to ask questions. I will also be given a copy of this consent form for my records. I consent to my participation in the research described above.

_____	_____
Participant's Signature Date	__ Participant's Printed Name
_____	_____
_ Signature of Principal Investigator Date	___ Investigator Printed Name

Appendix F

Cover Letter for Participation

June 16, 2013

Dear <Title and/or name of participant>,

I am writing to request your participation in my doctoral dissertation research project at Lindenwood University. I believe the information gathered through this study will positively contribute to the body of knowledge and add to the sparse amount of existing literature that addresses combined leadership and twenty-first century skill integration through analysis of teacher perceptions.

The purpose of the study is to examine components of school leadership as referenced in National Education Technology Standards (NETS) for twenty-first century skills and knowledge integration. This quantitative study is designed to investigate the relationship between a teacher's use of twenty-first century teaching skills and knowledge and his/her principal's use of twenty-first century leadership skills and knowledge. Additionally investigated are what twenty-first century leadership practices are associated with the use of twenty-first century instructional practices to effectively support teacher and student learning as perceived by the teacher.

Attached is an electronic document survey. Your participation in this research study is voluntary, and you may withdraw at any time. Confidentiality and anonymity are assured.

If you have questions, you can reach me at 417-389-6055 or by electronic mail at Bobbie0011@hotmail.com. Dr. Devore, my dissertation advisor for this research project, may be contacted by electronic mail at sdevore@lindenwood.edu or by phone at 417-881-0009.

By completing this survey, you consent to participate in this study.

Thank you for your time,

Bobbie Augspurger
Doctoral Candidate
Lindenwood University

Appendix G

Survey Responses Raw Data

Teacher	S.1	S.2	S.3	S.4	S.5	S.6	S.7	S.8	S.9	S.10
1	3	4	3	4	4	4	4	3	3	2
2	3	2	2	3	3	3	3	3	3	2
3	2	3	3	4	4	4	3	3	4	4
4	2	2	1	3	4	4	4	4	3	2
5	2	2	2	3	3	3	2	2	2	3
6	2	2	1	4	1	4	3	3	4	3
7	3	3	2	3	4	4	4	3	3	2
8	1	3	2	3	4	3	3	2	3	2
9	2	3	3	2	4	3	2	2	3	2
10	3	3	2	3	3	3	3	3	2	1
11	3	2	0	3	1	2	2	3	3	2
12	3	3	2	3	2	3	2	2	3	2
13	2	2	1	3	4	4	3	2	3	2
14	4	2	1	4	3	2	3	4	2	3
15	2	2	3	2	2	3	3	3	2	2
16	3	4	2	3	4	3	3	4	3	2
17	3	3	3	3	4	4	4	4	3	3
18	2	1	1	2	4	1	3	3	3	4
19	3	3	2	3	4	4	3	3	3	3
20	3	3	2	4	4	3	4	4	3	2
21	2	2	2	3	3	3	2	3	3	2
22	2	2	2	3	2	2	3	2	3	2
23	2	3	1	3	2	2	4	3	3	3
24	2	1	0	2	3	3	3	3	2	2
25	2	2	1	3	3	3	3	3	2	2
26	3	3	3	4	4	2	3	3	2	2
27	2	3	1	2	4	4	3	2	3	2
28	3	3	3	3	3	2	3	3	3	2
29	3	2	0	4	1	2	3	1	2	2
30	2	2	1	2	2	2	2	2	2	2
31	2	2	1	2	2	2	2	3	3	2
32	3	3	2	3	4	4	4	3	3	4
33	4	4	1	3	4	4	4	1	4	2
34	3	4	2	4	3	4	4	3	3	3
35	2	2	2	2	3	3	2	3	2	3
36	3	3	1	1	4	3	1	1	3	2
37	3	3	1	2	3	3	3	3	2	2
38	3	3	3	2	4	4	3	3	3	2
39	3	2	0	2	4	4	4	2	4	1
Total	100	101	65	112	124	120	117	107	110	90

Teacher	S.11	S.12	S.13	S.14	S.15	S.16	S.17	S.18	S.19	S.20
1	3	3	3	3	3	3	2	2	2	2
2	1	1	1	1	1	1	1	2	1	3
3	4	3	3	3	3	3	3	3	3	4
4	4	4	4	4	4	4	4	4	4	4
5	3	3	4	3	4	3	3	4	3	4
6	4	3	4	4	4	4	3	3	4	4
7	4	4	4	4	4	4	4	4	4	4
8	2	3	3	2	2	2	2	2	2	3
9	3	3	3	3	3	3	3	4	4	4
10	2	2	2	3	2	2	2	3	2	2
11	4	4	4	4	3	4	3	4	4	4
12	2	3	3	2	2	2	2	3	3	3
13	3	3	3	3	3	3	3	4	4	3
14	3	4	4	4	4	4	4	4	4	4
15	3	3	3	3	3	3	3	3	3	3
16	3	3	4	4	3	3	3	2	3	4
17	2	2	2	1	0	0	2	2	0	1
18	3	4	4	4	4	4	4	4	4	4
19	4	4	4	4	4	4	3	4	3	4
20	4	4	4	4	4	4	4	4	4	4
21	3	3	3	3	4	4	3	3	3	4
22	3	3	3	3	3	3	3	3	3	3
23	4	4	4	4	4	4	4	4	4	4
24	3	4	3	3	3	3	4	4	3	3
25	2	3	3	3	2	3	3	3	3	2
26	4	4	4	4	4	4	4	4	4	4
27	4	4	4	3	3	3	3	3	3	3
28	2	3	3	3	3	3	3	3	3	3
29	2	4	4	4	4	4	3	3	3	4
30	2	2	2	2	2	2	2	2	2	2
31	3	3	3	3	3	3	3	3	3	3
32	3	3	3	3	3	3	3	3	4	4
33	3	4	4	4	4	4	4	4	3	4
34	1	1	4	3	4	4	4	4	4	3
35	3	3	3	3	2	2	2	2	2	4
36	3	1	2	2	3	3	2	2	1	2
37	3	3	4	3	4	4	3	3	2	4
38	4	4	4	4	4	4	4	3	3	4
39	4	4	4	4	4	4	4	4	4	4
Total	117	123	129	124	123	124	119	125	118	132

S.1-10 Total 1046
S.11-20 Total 1234

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Vita

Bobbie works as the Technology Integration Coordinator at Joplin Schools in Joplin, MO. Prior to this, Bobbie served as Director of the High School Library Media Center for Webb City Public Schools. She has had the opportunity to teach at elementary, middle, and high school grade levels and has been successful thanks to some truly wonderful peers and mentors she has worked with along the way.

Bobbie earned her Educational Specialist degree in Educational Administration from Missouri State University in 2008 and her Master's degree in Elementary Education from Missouri State University in 2002. Her Bachelor's degree in English Secondary Education was earned from Missouri Southern State University in 1998 and her Associate of Arts in General Studies was earned from Crowder College in 1997.

The topic of effectively integrating 21st-century skills and knowledge has been an evolving interest since the start of her Master's program when personal computers really became accessible to Southwest Missouri students in public education. In 2013, she co-authored and published, *Joplin High School*, an interactive eBook for Joplin Schools. In 2012, she authored and published, *Library Science*, an interactive eBook through iTunes, for students learning about and peer teaching processes in the library media center. She actively presents at local through national workshops on a variety of topics that disseminate information to help educators effectively reach and teach all learners.